CTU

CZECH TECHNICAL UNIVERSITY IN PRAGUE

ANNUAL REPORT ON ACTIVITIES 2020

Annual Report on Activities of CTU in Prague in 2020

Prague, May 2021

Annual Report on Activities of CTU in Prague for 2020
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RECTOR'S OPENING

Dear readers,

2020 was the year for CTU to face an unprecedented situation - the Covid-19 pandemic. The crisis affected all areas of the university's activity and not only confronted us with new challenges in education and research, but also with the need and necessity to provide help when it was in short supply. I'm extremely proud that we did that in a number of ways.

At the beginning of 2020, there was a huge wave of cooperation, solidarity and invention that helped solve the fundamental problems that threaten the very lives of our fellow citizens. Together with companies and volunteers, we developed protective masks and lung ventilators over a few weeks, helped enforce the use of masks, manufactured disinfectant solutions, robots assist in hospitals and apps to protect residents. All to the extent necessary for our country.

I'm glad I could witness this surge of cooperation and also that I could contribute! Very quickly, we deployed and developed a distant form of teaching and discussion, and what would have taken years in the days before the corona, we managed to implement in the order of weeks. In addition, we were able to continue our research, although the sharing of results at conferences was very limited.

We managed – within the scope of the university's Third Mission – to help not only the state, but also the places where we operate as a school. I dare say that our expert work helped in a number of crisis situations – such as establishing protective procedures against the Covid infection, the role of aerosol, and the effectiveness of protective equipment.

The CTU completed an international evaluation of research quality during the year. It was rated as excellent, confirming our place among the top five Czech universities – those aiming for world quality.

We will remember 2020 not only as a year of health and economic crisis, but also as a year of opportunity. Opportunities that our university took advantage of, and I am delighted that you can familiarise yourselves with them in this Annual Report.

Let us recall the stories of people and teams whose significant feats give hope for the future for others.

It started with disinfectant

Our scientists promptly responded to the acute lack of disinfectant, producing 112,000 litres of it from March 9 to April 30 at the Faculty of Nuclear Sciences and Physical Engineering (FNSPE). It served the needs of both the university and the Integrated Rescue System of the city of Prague, hospitals, Prague city districts, the Mountain Service of the Czech Republic, seniors'homes, children's homes and many other non-profit organizations. The Faculty of Civil Engineering, provided 350 litres of disinfectant for social workers in Prague 6.

We also developed full-face masks of the highest level of protection in collaboration with COVMASK. The project for protective equipment assembled from commonly available diving masks and P3R exchange filters received CTU's expertise and support, resulting in manufacturing 30,000 masks to assist frontline physicians.

The Czech Institute of Informatics, Robotics and Cybernetics (CIIRC) developed the RP95-3D semi-mask in a record time of one week. As a protective personal device, it first obtained full CE certification in first summary and, subsequently, due process and, combined with the filter, it meets even a higher level of protection requirements than FFP3 respirators.

In collaboration with industry partners, the start-up TRIX Connections, which originated at CTU developed a model labelled RP95-M for mass production using the plastic injection method for up to 10,000 masks per day. This mask also received full CE certification. Innovative developments continue to achieve greater customisation based on digitisation of production, from modification of the respirator for children according to parameterized data supplied by the Anthropological Institute of the Faculty of Science of Masaryk University, to new possibilities of developing methods for individualized mask models produced using 3D printing. CIIRC and TRIX Connections also jointly developed a smartphone app to scan the face and then select the appropriate mask seal size.

CoroVent lung ventilator

Prof. Karel Roubík, with his team from the Faculty of Biomedical Engineering (FBME) of CTU and other experts, developed the CoroVent lung ventilator, manufacture of which was launched under a CTU licence by the Třebíč-based company MICo Medical. In August 2020, CoroVent received certification from the prestigious US Food and Drug Administration, which facilitated its sale on global markets outside the EU, and later also a permission for sale and use from the Ministry of Health of the Czech Republic. However, CoroVent would not have come into existence without the financial support of the partners, who donated a total of CZK 29 million through the Donio Foundation Fund. At the beginning of November, distribution of this device to Czech hospitals began.

Apps and communications online solutions

Scientists and students from the Artificial Intelligence Centre of the CTU Faculty of Electrical Engineering (FEE) launched the FreMEn contra COVID project. Its output is the unique Nebojsa app, which advises when to avoid shop queues or crowded parks. FEE students, in collaboration with the Faculty of Information Technology (FIT) students, developed a logistics web platform, GoDeliver, to deliver food, medicines or masks to quarantined people, with the involvement of courier-volunteers.

CIIRC and TRIX Connections presented an integration system for online capacity monitoring of various categories of beds in hospitals in real-time, Beds On-line, in cooperation with VŠB-Technical University of Ostrava and Ostrava University Hospital. The FEE participated in a web application to work with historical sources, HistoryLab.cz, designed for history teachers. Three FIT students launched a chatbot on www.koronavirus24.cz, which answered questions about the coronavirus 24 hours a day during the spring wave. For this project, they received the Minister of Education, Youth and Sports Award for Extraordinary Acts by

Students or Graduates for 2020. The faculty also produced an independent review for the eRouška mobile application and plugged its computing CloudFIT into the Folding@Home project. This is used by development teams around the world for calculations and simulations in research on therapeutic agents.

Other original solutions and technologies

I would mention that robots have also been involved in fighting the pandemic. CIIRC's "pipette-working" robot assisted in testing at the Bulovka Hospital. Due to several Eppendorf pipetting robots, sample testing was automated at Bulovka and also at the First Medical Faculty of Charles University and Vinohrady University Hospital.

In a record time of three months, the team of Doc. Lukáš Vojtěch and Ing. Marek Neruda of the FEE designed and tested a prototype of a textile composite material that can be sterilized by electric current. It consists of carbon fabrics, nanotextiles and an electrode system. The filter concept is filed for patent protection.

Thanking the scientists

All major activities that started a year ago are still ongoing. We are also trying to think continuously about how to help tackle the societal effects of the crisis that is no longer just a health crisis.

We organized a virtual music festival under the motto Musicians to Scientists: People Science Art Tolerance, which took place in May at the Lucerna Music Bar, where I expressed my heartfelt thanks to all the experts for what they had created for society in the time of the pandemic.

I am also very pleased that a way has been found to stay in touch with our students and to communicate with them during the second wave of restrictions. In the autumn we launched a new television station TV9P. It started airing news from CTU and a music programme at a time when students could not meet in auditoriums and colleges. Technical production of the broadcast is provided by AVC Silicon Hill of the CTU Student Union. TV9P has found its audience and has steadily increased ratings, which encourages us in the further activities of this project.

100 years under the CTU brand

Last year, CTU marked a century since its reorganization, which brought it alongside modern universities in today's sense and, together with old and newly established universities in Czechoslovakia, became an integral part of the backbone of higher education in the emerging republic. It has increasingly built up its identity within the European space. Its educators and

graduates have also become more widely recognized abroad, both as practical engineers and as scientists, within international professional organizations. Conversely, the university it welcomed among its students foreigners who sought better jobs in Czechoslovakia, or who were immigrants seeking democracy, e.g. from the then revolutionary Russia.

To mark the centennial, the CTU Archive prepared an exhibition presenting representative documents showing the development of both the school and its administration.

Year of Remembrance of Dr Milada Horáková

In June, CTU and the Czech public commemorated, the 70th anniversary of the death of Milada Horáková, who was the victim of the judicial murder by the then regime in 1950. Black banners were hung on our buildings and members of the management laid flowers at the doctor's memorial in Prague's Sněmovní Street. That commemoration was, and still is, a memento for present and future generations! It is our duty to remind and defend her story from those for whom the truth is still inconvenient today.

Personalities of the year

2020 also brought other moments and successes for our workers and students.

I am delighted that among the 30 Czech talents from the world of business, start-ups, science, sport and art listed by Forbes Magazine in 2020 is student Roberta Bimbová from FNSPE. Her space debris detector can detect from Earth tiny satellite fragments in orbit. Another talent, student David Klečka and founder of start-up Yieldigo, is also from FNSPE. Student Martin Kučera and graduate Vojtěch Paukner from FIT were nominated for their successful project Dear Santa.

Our students were also awarded last year by the Minister of Education, Youth and Sports for extraordinary actions of students or graduates in 2020. FBME student Alžběta Šabouková won the award for saving a human life, and FIT students Jan Šafařík, Tomáš Bašta and Tomáš Stanovčák won the award for a web application with a chatbot related to the coronavirus. The award for best thesis in information technology in the IT SPY competition went to FEE student Šimon Mandlík.

Faculty of Architecture (FA) students were also very successful in the past year. PhD student Vojtěch Rudorfer was the winner of the sixth annual competition for Kaplicky Internship emerging architects and went on to win first place in the architectural competition for students on Unique Construction in a Complicated Place. Bianka Hudáková and Kryštof Bouřil ranked among the 50 most successful participants in the Model Young Package 2020 international competition.

Among the academicians, I would like to mention the FA's dean emeritus, Prof. Zdeněk Zavřel, who received the Czech Chamber of Architects 2019 honour. A prominent figure in 2020 was undoubtedly Tomáš Mikolov, who joined CIIRC. It was he who walked through the disinfectant gate on the winning image of ČTK photographer Roman Vondrouš in the Czech Press Photo 2020 competition. Thanks to the RICAIP center, another top foreign scientist and computer vision expert, Torsten Sattler, came to reinforce research at CTU.

Cooperation on projects

I am very pleased that last year we succeeded in getting engaged in three artificial intelligence research networks funded by the European Commission, with the involvement of CIIRC. Along with AIZEN, a network that carries out research into the use of artificial intelligence for a secure civil society, this provides a solid basis for the further development of AI at our university.

CTU, together with Masaryk University and Brno University of Technology, agreed to expand cooperation in cybersecurity and established the CyberSecurity Hub. Close cooperation will improve the usefulness of products and services and thus strengthen the competitiveness of Czech industry internationally.

CTU also became a partner in EuroTeQ Engineering University, a consortium of six European universities. The aim of the three-year project is to implement the visions of the European Universities Initiative and the European Education Area, supported financially by the European Commission, Erasmus+ programme A.1 - European Higher Education, in an environment of leading technical universities.

In July, a memorandum of cooperation was signed with the National Sports Agency, the Czech Chamber of Architects and the Czech Chamber of Authorized Engineers and Technicians Working in Construction. CTU, through the FA, will be involved in designing sports facilities so that they best fulfil their purpose and are used by clients to their maximum satisfaction.

In September, 30 branches of the European Laboratory for Learning and Intelligent Systems (ELLIS) launched their operation. The branches, called ELLIS Units, are located in 14 European countries and include institutions such as the University of Oxford, ETH Zurich, the Max Planck Intelligent Systems Institute in Tübingen and others. They make a major contribution to securing European sovereignty and leading position in research on modern artificial intelligence. These institutions include CIIRC, which houses the only Czech branch – ELLIS Unit Prague.

Furthermore, last year CTU became a member of SIAM Student Chapter Prague, a student association that is part of the prestigious global company for industrial and applied mathematics, SIAM. The main objectives of the fraternity are to strengthen cooperation between doctoral students in applied mathematics and related disciplines, to build contacts with practitioners across disciplines and to promote applied mathematics in general.

Science for practice

Among the achievements of our teams, I would like to highlight the first place of FEE scientists and students in the non-sponsored team category and the overall third place in the prestigious DARPA Subterranean Challenge robotics competition that took place in the US. They took a $500,000 prize and valuable experience for their performance. Another success was

celebrated by a team from the FEE at the Mohamed Bin Zayed International Robotics Challenge, in which the team members with colleagues from the universities of Pennsylvania and New York won first place for building a wall with drones, silver for eliminating defined targets, and the most valuable gold medal in the complete Grand Challenge race. Once again, our students and researchers scored against world-class universities such as ETH Zurich, Georgia Tech, the University of Tokyo, KAIST, Carnegie Mellon University, and Virginia Tech.

Faculty of Mechanical Engineering (FME) experts were involved in the development of equipment to test the toxicity of complex mixtures of pollutants in the air. The newly patented toxicological incubator, on which Czech University of Life Sciences collaborated under the guidance of scientists from the Institute of Experimental Medicine of the Czech Republic, can test, for example, combustion engine emissions in real-time operation.

The European Patent Office has accepted the Czech patent of scientists from CTU and the Academy of Sciences of the Czech Republic, which helps extend the life of fuel cells in nuclear reactors under both emergency and standard conditions, by covering the surface of the fuel cells with a thin polycrystalline diamond layer. The Fukushima nuclear accident was one of the events that inspired experts to research in this field.

As of late August, it was possible to visit the world premiere of the iMucha interactive exhibition – a famous collection in motion – at the Municipal House. Among other things on display was a vivid self-portrait by Alfons Mucha, or moving beauties depicted in his famous posters. The animations were created, inter alia, with the help of the EbSynth tool developed by the emerging firm Secret Weapons, backed by researchers from Prof Daniel Sýkora's FEE team.

The shelter, walkway and flagpole, three structures realised by FA students, received honorary recognition of the Architects' Grand Prix - the 2020 National Architecture Awards. They were praised by an international jury whose members included Dutch MVRDV studio partner Fokke Moerel and French Pritzker Prize winner Christian de Portzamparc.

Last year, the school's VR-1 Vrabec fission nuclear reactor, which serves students from the Czech Republic and abroad, as well as scientists, celebrated 30 years. In addition, at the time of the pandemic, it became part of an international network of reactors that, in cooperation with the International Atomic Energy Agency, were equipped with the Internet Reactor Laboratory for remote instruction. I am pleased that in November the State Office for Nuclear Energy issued a permit to place a second sub-critical VR-2 reactor at FNSPE, as the demand for training and research activities exceeds the capacity of one facility. The new reactor should be launched in 2022.

At the beginning of December, a research team from the Chinese University of Science and Technology published a report on the results of their research in the journal Science. To prove the so-called quantum dominance of a photon-based quantum computer, Chinese scientists used a solution to a computational problem formulated at FNSPE. Specifically, the protocol for Gaussian boson sampling developed by Craig Hamilton and Prof. Igor Jex of the FNSPE and their partners, the Christine Silberhorn Group of the German University of Paderborn.

Last year, individual faculties and components again engaged in grants and R&D and innovation projects funded from dedicated financial support under the programmes of the largest domestic providers - Grant Agency and Technology Agency of the Czech Republic, as well as the departmental programmes of dedicated support of individual ministries of the Czech Republic and regions. The total amount of dedicated support received by CTU for research, development and innovation amounted to CZK 1,687,602,820 in 2020.

The International Evaluation Panel also assured us of the quality of research at our university in its mission towards the end of 2020. Of the 14 components reviewed, five are excellent and the vast majority are very good! This testifies to the university's brilliant and ever-increasing level of research and creative activity. In addition, the Evaluation Panel provided us with a number of recommendations which we are now implementing to further improve the situation.

New Merit-based Career System

During last year there was an intense school-wide discussion leading to approval of the new Merit-based Career System at the year-end.. It sets the rules for the admission and career growth of university academic and scientific staff. CTU, as a prestigious technical research university, needs the best people, and every member knows what the university expects of her/him and what s/he should expect of it. And it's not too little. Pay increases are no longer determined by age automatically but by personal growth, as employees are regularly and comprehensively assessed. The Career System enshrines the principles of equal treatment, transparency and reviewability of all decisions in relation to employees' professional growth. It also lays down rules for extensive support from the university. It emphasises international experience that is expected especially from candidates for the positions of associates and professors because CTU hires only renowned world-class professionals. This document fulfils one of the obligations arising from the HR Excellence in Research Award.

Keeping study candidates interested

CTU carried out a total of 271 accredited study programmes or disciplines in 2020, including 65 in bachelor's, 99 follow-up master's and 107 in doctoral programmes. The total number of foreign-language accredited courses was 54.

Management and Economics in Construction returned to the Faculty of Civil Engineering (FCE) as a separate bachelor's programme. The faculty also successfully re-accredited Intelligent Buildings. FNSPE completed the accreditation of a total of 11 new programmes, such as Nuclear Decommissioning, which is unique in its complexity across the Czech Republic, as is Quantum Technologies. The Faculty of Transportation Sciences (FTS) completed the process of accrediting a number of bachelors, follow-up masters and doctoral degree programmes, such as Smart Cities, at the level of the follow-up master's and doctoral

studies, developed in collaboration with the FA and the University of Texas at El Paso. Last year, The Faculty of Mechanical Engineering became the new partner to the University Centre of University of Chemistry and Technology Prague – Unipetrol Litvínov.

A total of 17,442 students were enrolled at CTU last year, including 5,327 women and 3,255 foreigners. The data are almost identical to the previous year, implying that we have retained students' interest despite the obstacles caused by the pandemic and demographic trends.

We still have a lot to offer, not just for industrial partners

There are a number of companies that have established cooperation with CTU or one of the faculties, but I would like to mention those who work with us on a permanent basis. These include GE Aviation, Škoda Auto, NET4GAS, Continental Automotive, Unicorn and Komerční banka. Long-term cooperation shows that CTU is an important partner with whom they want to be in touch and seek solutions to their problems, be it technical issues where our experts help find new solutions with people from the practice, or when we seek new talent and thereby create opportunities for our graduates.

Internationalisation

The pandemic paralyzed travel, leading to the introduction of distance learning for foreign students as well. All internationalisation activities had to be moved into the online environment. I am pleased that even in these conditions we managed to retain the numbers of foreign students, both exchange and self-paying, from all over the world. We intend to maintain this trend, primarily through continued cooperation with major foreign universities and through recruitment activities carried out in cooperation with other Czech universities.

I would like to mention that in September 2020, the President of Taipei University, National Taiwan University of Science and Technology, Mr. Ching-Jong Liao, signed a memorandum of mutual cooperation between the two universities aimed at new joint opportunities and development in science and research. This memorandum was brought to a ceremony in Taiwan by CTU vice-rector for Quality Management, Ing. Radek Holý, Ph.D.

Strategic plan

In 2020, we prepared the CTU Strategic Plan 2021+, which is a fundamental document setting out development priorities of the university's education policy through 2030. It describes university-wide activities planned in coordination with faculties, higher-education organizations and other CTU components in order to meet the plan's targets, and it also presents targeted measures that need to be implemented by specific units with regard to their respective mission and profile. The Strategic Plan draws on the definition and detailed description of the process of reinforcing the strengths and minimizing the weaknesses of the university. Thanks to this document and the maximum use of human resources, as the most valuable asset possessed by CTO due to its very nature, we have all prerequisites not only to maintain but also to greatly enhance the reputation of a respected public university at home and abroad over the next decade.

Our athletes' achievements

Our athletes also contributed to the good reputation of our university in the Czech Republic and abroad by. I would like to congratulate the athletes who won a total of twelve medals at the Czech Academy Championships in Brno, of them three golds, five silvers and four bronzes. Martina Satková, a student of the Masaryk Institute of Advanced Studies (MIAS) took the first place at the Czech Academy Championships in canoe slalom in Trnávka. Out of a 10-member team at the Czech Academy Swimming Championships, five of our swimmers succeeded in taking nine medal positions. I am pleased that our hockey players won for the second time in the 17-year history of the Czech Academy Championship. In the races of the "Univerzitní osmy", CTU's men's and women's crews both won silver medals. The winner of the postponed Czech 50 kilometre walk championship was Vít Hlaváč, an FBME student, with a time of 3:56:26, which registered as a new Czech record. CTU participated in the TERIBEAR charity event for the second time and 113 team members ran or walked a total of 9,444.8 km, bringing in 94,448 CZK for the Tereza Max Foundation to children.

Dear readers,

Over the past year, we were forced to learn a lot of new things. As for my personal feelings, I would say that the best finding is precisely the high level of creativity, flexibility, solidarity and goodwill in society that reassures me that, despite occasional disputes and conflicts, our world remains fundamentally a good place. I also learned that the spirit of togetherness and university community is important to most of us. And that is a discovery on which we can build and which has the potential to carry us through any future challenges.

Doc. RNDr. Vojtěch Petráček, CSc.
Rector, CTU in Prague

CoroVent ventilators help patients

CoroVent lung ventilators developed at the Faculty of Biomedical Engineering of the CTU and paid for by the collection of citizens and companies are supplied to Czech hospitals. The first installation took place at the Regional Health Centre – Masaryk Hospital in Ústí nad Labem, others followed in hospitals Rychnov nad Kněžnou, Slane, Valašské Meziříčí, Žatec, Broumov and Liberec. Installation for the whole Czech Republic is provided by two expert teams, which also train the hospital staff.
The development of the CoroVent pulmonary ventilator was started by a team led by Prof. Karel Roubik from FBMI CTU in March 2020. MICo Medical in Třebíč, based on a licence from the Czech Technical University. In 161 days since the start of development, CoroVent has received the prestigious FDA certification EUA (Food and Drug Administration Emergency Use Authorization), which allowing it to enter global markets. On October 22, CoroVent was awarded approval for sale and use as a medical device from the Department of Health Ministry of the Czech Republic, which started the distribution of these ventilators in the Czech hospitals. "I am pleased that we have managed to develop in a very short time such a device, which saves human lives in a crisis situation," said Prof. Karel Roubík.

STORIES OF 2020

“The 3D printing data has reached 30 countries and more than 100 institutions, including the US Navy and NATO. Further development of the mask was transferred to the spin-off company TRIX Connections, which enabled the mask to be developed for mass production in parallel and the entire technology transfer to be completed. What normally takes years was achieved in weeks and months.”

Prototyping stages of the CIIRC RP95-3D half-mask

WORLDWIDE ACCLAIM FOR THE PROTECTIVE HALF-MASK FROM 3D PRINTING

The "CIIRC RP95-3D" protective half-mask was developed by researchers from the Czech Institute of Informatics, Robotics and Cybernetics at CTU in early March 2020, in just one week. The mask consists of a body printed on special 3D printers and an external P3 grade filter and was developed within the new international centre of excellence for advanced industrial manufacturing RICAIP. The centre is being built by the CIIRC in collaboration with Czech and German partners with the help of European and national resources. The mask was developed using a MultiJet Fusion printer, which had been acquired just a few weeks earlier thanks to RICAIP. This resulted in a highly professional product that has been tested and obtained the necessary certifications. The mask combined with the filter meets an even higher level of protection requirements than the FFP3 respirator and can be reused thanks to a proven sterilization and disinfection procedure.

The CIIRC CTU team did not stop at research and development - it managed to organize production on most of the printers available in the Czech Republic at that time in cooperation with partners such as 3Dees Industries, Škoda Auto, Siemens or the University of West Bohemia. It was thus possible to produce up to 500 pieces of half-masks per day. In addition, the print data was made available for non-commercial purposes and shared with the owners of the respective deVICes worldwide. The data for 3D printing reached 30 countries and more than 100 institutions, including the US Navy and NATO. Further development of the mask was transferred to the spin-off company TRIX Connections, which enabled the mask to be developed for mass production in parallel and the entire technology transfer to be completed. What normally takes years was achieved in weeks and months.

At the end of the year, the Research, Development and Innovation Council awarded the research team with the honorary Czech Head award for their scientific contribution to solving the problem of the Covid-19 epidemic in a global context.

Another success was the European Parliament's European Citizen Award 2020, which is awarded by a jury composed of representatives of the EP and prominent figures from civil society.

"The protective half-mask was a valuable experience for our institute and also a demonstration of how Czech science in cooperation with industrial partners can quickly help - and not only in times of crisis," said Ondřej Velek, Director of the CIIRC CTU.

The protective half-mask project became the first output of the RICAIP centre to test the concept of distributed production. Its implementation was significantly supported by the EU Horizon 2020 programme, the OP Research, Development and Education, contributions from private sources and direct support from the Czech Technology Agency programmes, which, like the European Commission, reacted promptly and made it possible to support activities that address research and development topics related to the Covid-19 pandemic.

Lead mask designer, Alexander Lazarov

Members of the CIIRC CTU research team. From left: Vít Dočkal, Jaroslav Líškovec, Petr Kadera, Alexandr Lazarov, Pavel Burget.

NEGRELLI VIADUCT

In June 2020, the Negrelli Viaduct became fully operational again after a three-year reconstruction. The important railway bridge was put into operation in 1851 and originally consisted of 85 arches, but in 1875 a so-called connecting viaduct with another 26 arches was added. The Negrelli Viaduct, as we know it today, is made up of 15 separate structures containing 100 arches and five non-vaulted bridge structures. The railway bridge was not originally designed for today's conditions, but it survived the 2002 floods, the aggressive Prague air and the ever-increasing railway traffic almost unscathed. The track that the bridge connects is 1,110 m long and runs from Karlín to Holešovice-Bubny and then connects Masaryk railway station with Holešovice-Bubny railway station. In 2017, the Negrelli Viaduct saw the start of its largest and most comprehensive reconstruction. It was carried out under the auspices of the Railway Administration, which acted as the main investor in the reconstruction.

As the Klokner Institute has long been involved in diagnostic surveys of large Prague bridges, it was also involved in the assessment of the condition of the Negrelli Viaduct from the beginning of the reconstruction. In June 2017, the Institute was the first to present a methodology for a supplementary structural engineering survey. Its main objective was to create a system for recording the condition of each stone masonry element in detail prior to the start of repairs, and to provide a basis for designing the actual extent of masonry repairs. In July of the same year, the Institute's staff began to conduct surveys of each part of the viaduct. Testing was carried out using both destructive and non-destructive methods. Because it was necessary to examine each stone in the arches separately, workers eventually examined more than 60,000 pieces of stone in the aboveground portion of the bridge. As part of the reconstruction, 19 masonry arches had to be completely disassembled and then reassembled, using the original stones as much as possible.

Load testing was the imaginary end of three years of work by the Klokner Institute and other partners. The test was perfomed along the route from Křižíkova Street to Masaryk Station, the bridge over Křižíkova Street and the section between Křižíkova and Sokolovská Streets. A total of 20 arches were tested, as well as newly built non-arch bridges. A set of trolleys was used as test loads, each weighing approximately 60 tonnes. During the load test, the expansion of the joints at the quarter-span and apex, settlement of the substructure, wind speed and air temperature, and the supporting structure were measured. The viaduct was reopened on 1 June 2020. The complexity and difficulty of the work involved in the reconstruction of the Negrelli Viaduct and its exceptional importance make this one of the largest and most significant contracts in the century-long history of the Klokner Institute. Finally, we would like to wish the Negrelli Viaduct at least another 160 years of trouble-free operation.

THE EXHIBITION "ONE HUNDRED YEARS UNDER THE CTU BRAND NAME"

Although technical studies in Prague have a tradition of more than three hundred years, the school has been known as Czech Technical University for 100 years. Its thorough reorganisation in 1920, however, marked a significant milestone, which placed Prague Technical University with its Czech teaching language among modern universities. Gradually, it formed a complex of seven faculties, then called "colleges", which had a greater degree of autonomy than the previous "departments", and began to develop research and testing institutes. There was also a greater focus not only on the activities of professors, but also on students' facilities and activities and the promotion of their future careers.

On the occasion of this anniversary, the CTU Archives organised an exhibition with the apt title "One Hundred Years under the CTU Brand", which drew attention through representative archival sources to several cross-cutting themes in the history of the university over the last hundred years, with overlap into the 19th century. The original intention was to present to the public the originals of various documents, technical plans, catalogues, publications and photographs kept under special protective conditions in the depositories. The Covid-19 pandemic transformed the exhibition into large-format posters, displayed from 30 November 2020 to 1 February 2021 on the glass façade of the CTU-CIIRC building, which in turn gave prominence to the eye-catching images of CTU photographer Jiří Ryszawy with layout providedby the studio of professional graphic artist Jáchym Šerých. At the same time, an online version of the exhibition was available on the MS Sway platform, promoted on the CTU website and social networks.

The content of the exhibition and of the accompanying catalogue was organised into several chapters, in which the visual documentation was supplemented by short texts written by the staff of the CTU Archives. Presented in this way were chronicling activities, construction of CTU, student indexes and certificates, textbooks, student registers, student drawings, student periodicals, records of students' screening, famous students and estates of some of the CTU professors, graduation insignia and gowns and celebrations of CTU anniversaries. The staged exhibition, which was financially supported by the CTU All-School Activities Support Fund for 2020, is part of the regular activities of the CTU Archives aimed at reminding the public of the University's historical role in shaping technical education in the Czech lands, as a complement to its current achievements.

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THE STORY OF THE FACULTY IS ALSO THE STORY OF THE PEOPLE WE HELP

In December 2019, we opened the Robotic Rehabilitation Laboratory at the Faculty of Biomedical Engineering, which is used for teaching future physiotherapists and for scientific work. Its head is our graduate Ing. Aleš Příhoda. The laboratory is equipped with the most modern devices and technologies worth millions of crowns, necessary for the therapy of restoration of walking or hand grip functions in patients with neurological and post-traumatic diagnoses or other musculoskeletal disorders. There are also technologies for complex therapy of the entire musculoskeletal system with feedback sensors, motion analysis systems, visualization or interfacing with virtual reality. This significantly increases the effectiveness of treatment. No domestic university has such a comprehensively equipped physical therapy laboratory.
After the news of its opening was reported in the media, relatives of people with various diagnoses started contacting us in the hope of reversing their severe health conditions. And we gladly accept such challenges.

Here are two of the many stories.
A native of Kladno, a professional hockey player, suffered a severe spinal cord injury after hitting his head on a curb and ended up confined to a wheelchair for the rest of his life. He lost the use of his upper and lower limbs, the ability to move his body and sensation from the chest down. Our goal was to restore his ability to sit up independently. After less than a year of hard work, this was accomplished. Upper limb support function has been restored, and the patient is able to lift and brace himself for independent sitting. Thanks to intensive training in our laboratory, his weight and lower limb muscle tension have been significantly reduced. The time of tolerated load has increased by more than 300%. This enormous progress is satisfying not only for the patient, but also for the family members whose lives were turned upside down by an unfortunate event three years ago.

A young patient, 4th year medical student at the Charles University Medical School, contracted a serious infection in Kenya (apparently from the local monkeys) and within a week went from full health to being unconscious and on extracorporeal circulation at the General University Hospital in Prague. Due to massive brain haemorrhage, she lost a large part of her cerebellum (responsible for ensuring movement and maintaining balance), which was removed at the Motol Hospital. A young, talented and healthy lady who loved to dance and sing became a severely ill neurological patient who had to learn to walk, write and even speak again. Following a report about our lab on Radiožurnál, her father contacted us and less than a year and a half after the tragic incident, her parents began bringing the patient to our lab. She came for her first therapy with a walker and the "support" of both parents. After only three weeks, the patient was able to walk independently without support in the hallways of the building, and after five weeks, she was able to climb the stairs to the second floor without the use of a handrail for support. In addition to improving standing stability and gaining confidence in independent ambulation, we were able to use high-power laser therapy to correct the asymmetry of the facial muscles that resulted from facial nerve palsy after a haemorrhagic stroke. It must be said that the tremendous progress she made in such a short time was at the cost of great self-sacrifice, as the (often painful) therapy often took over 4.5 hours of intensive work. The great determination and progress in recovery was fulfilling not only for the patient and her relatives, but also for the entire therapy team of Ing. Příhoda.
We believe that these two of many stories of our patients are proof that our work is meaningful. That our laboratories and research are meaningful. That our faculty has a purpose. Scientific research in the field of robotic rehabilitation does not mean just the development or design of new technologies, but also the verification of their effectiveness in clinical practice. The clinical part goes hand in hand with the technical part, in every laboratory, in every activity we do. This has been the creed of the Faculty of Biomedical Engineering of CTU since its foundation.

THE UNIQUE CORONAVIRUS24 PROJECT

Jan Šafařík, Tomáš Bašta and Tomáš Stanovčák, students of the Faculty of Information Technology at CTU, created a web application www.koronavirus24.cz in their start-up WaldoBot, where a computer program, the so-called chatbot, answered questions about the coronavirus 24 hours a day during the spring wave of the pandemic in 2020. They were awarded the Minister of Education, Youth and Sports' Outstanding Student and Graduate Student Award for 2020.

Thanks to their experience and study skills, the students managed to launch the service just days after the idea was conceived. In just two weeks, the chatbot, which drew up-to-date information only from verified sources, i.e. the websites of the Ministry of Health, the State Health Office and the CT24 news portal, answered 12,600 queries about coronavirus, helping to raise awareness more quickly during the first wave of the pandemic. It offered a simple and human approach to the most needed information, such as typical symptoms of the disease, protection and prevention options, an overview of current restrictions, rules for the quarantine process and instructions on how to care for cloth masks.

"Our aim in this complex pandemic situation was to contribute to the rapid availability of coronavirus information from validated sources. We created the project free of charge and at our own expense, because we think that only mutual help will enable the whole crisis to be successfully overcome," says Jan Šafařík, one of the creators of the service.

The students believed that the service would help make the work of the hotlines easier. They realised that people were confused by the new information about the coronavirus situation and had many questions to ask the hotlines, which led to overload.

"The chatbot helped solve this problem, as it is available to everyone, 24 hours a day, seven days a week, and uses artificial intelligence to find the most appropriate answer," explains Jan Šafařík.

"I am very positive about the fact that these difficult times bring challenges in the form of helping others. I am glad that our students have capitalized on the knowledge acquired at the faculty and thanks to their selfless initiative a project was created to help the public find answers to questions about the coronavirus. I am proud that we have such students and that the knowledge they gained at the faculty helped them in their endeavour," says Doc. Marcel Jiřina, dean of the Faculty of Information Technology of CTU.

The coronavirus24 project was discontinued in the second wave of the pandemic because its function was replaced by an information chatbot created by the Ministry of Health of the Czech Republic.

WEB APPLICATION OF THE LABE-VLTAVA WATERWAY TECHNICAL MONUMENT

The web application Technical Monuments of the Labe-Vltava Waterway developed by the Faculty of Civil Engineering of Czech Technical University presents the history of this 324 km long waterway. It is one of the results of the project "Documentation and Presentation of Technical Cultural Heritage on the Labe-Vltava Waterway" (running in 2018-2022 within the framework of the Czech Ministry of Culture's NAKI II programme). The application https://www.lvvc.cz/ was created under the leadership of doc. Dr. Ing. Pavel Fošumpaur at the Faculty of Civil Engineering of CTU, Department of Hydrotechnics. A total of 24 experts participated in the project, in addition to specialists and students from the Faculty of Civil Engineering of CTU and representatives of the Labe River Basin, the Vltava River Basin, the Waterways Directorate and the State Navigation Administration. Its implementation is beneficial for both the professional community and fans of tourism and technical monuments.

The detailed mapped waterway covers the 240 kilometres of the Labe River from Pardubice to the state border with Germany and the 84 kilometres of the Vltava River from Štěchovice to Mělník. The application documents the existing technical historical structures on the waterway and their structural and technological elements and makes them accessible to the public. Visitors to the website will find a clear and very detailed database of water works, including, for example, the time of construction of a particular structure, the history of its creation, information about the weir construction, information about the hydroelectric power station, the lock and the fish passage or the sports pass. The persons behind the creation of the work are also listed. In addition, the application offers tips on tourist attractions in the riverside area, presents the temporal development of the waterway's modern modifications from the late 19th century to the present day in animation, introduces important personalities associated with this technical monument, features a glossary of technical terms, and provides history enthusiasts with a wealth of digitised historical documents, maps and drawings. Those interested in history will be delighted by documents such as maps, references in old publications and other information that the team has managed to track down. Many of them are unique. Another interesting feature of the site is the glossary, which introduces lay visitors to the technical terminology associated with waterway construction and explains specific terms in an easy-to-understand way.

The application also presents the Labe-Vltava Waterway as an important multifunctional work, the components of which are still in use today and, after minor modifications, meet the parameters of a modern waterway forming the EU's trans-European transport network. It shows that the Labe-Vltava Waterway and the structures on it are important not only for navigation, but also for flood protection, water retention in the landscape, renewable hydroelectric power generation, surface water abstraction and recreation. The project should culminate in a major exhibition in 2022, and a series of lectures at secondary schools and universities is also planned.

Technical monuments web application Elbe-Vltava Waterways maps 324 kilometres in detail long waterway.

On 18 December, the team of the Faculty of Mechanical Engineering of CTU in cooperation with GE Aviation launched an experimental engine for the first time on its flying testbed, which is preparing for its first flight. The team has thus achieved another key milestone in collaborative research.

COOPERATION WITH GE AVIATION CZECH

Remarkable results were achieved in 2020 within the framework of cooperation with General Electric Aviation Czech. First and foremost, it is about building an ecosystem for aerospace technology as mandated by the Czech government to strengthen research and teaching competencies at CTU. In this way, we contribute to supporting the development of aerospace activities as an important segment of industry, which can also diversify the Czech Republic's automotive specialisation. Furthermore, it is about performing the collaborative research agreement between the faculty and GE Aviation Czech as the first partner of the ecosystem being built. A number of other global and European manufacturers of aircraft engines are interested in cooperation with the faculty.

Construction of aviation test facilities as the core of this ecosystem saw three important achievements in 2020. The first occurred in February. Before the pandemic, 50 engineers worked in the test facility. Within two weeks, we were able to ensure that all but five in the control centre worked from home and monitored and managed engine experiments online in real time from, say, Italy or Poland. This may sound simple, but ensuring sufficient throughput of the internet connection and its cyber security was a big challenge for the IT specialists at CTU and GE Aviation Czech.

The second achievement was the takeover and successful operation of the aircraft engine core test facility, the last and most complex of the four ground test facilities. It was handed over in the summer and in the autumn we conducted the first actual experiment there.

The latest success was the progress in building a flying testbed by converting a King Air 350 into experimental aircraft equipped with a measuring station for measuring hundreds of engine signals, which is being carried out by the BBA firm in Berlin. And it was on this flying testbed that the first successful launch of the new GE Catalyst engine, installed on the modified left wing, took place in December. Sensors on the engine, the new FADEC digital control system and the aircraft were successfully linked to a data centre with hundreds of channels. The flying testbed is expected to arrive in the Czech Republic in 2021.

ORIGINS AND ATTRIBUTES OF HERITAGE VALUES OF HISTORIC TOWNS OF CZECH REPUBLIC

Meeting in Telč over a prototype of a medieval delineation device - groma

Working meeting in the former Franciscan monastery in Kadaň

Launch of the publication of the critical catalogue of the Bethlehem Chapel

In the autumn of 2020, the team of Prof. Jan Jehlik from the Faculty of Architecture of Czech Technical University and Ing. Arch. Tomáš Drdácký from the Institute of Theoretical and Applied Mechanics of the Academy of Sciences of the Czech Republic completed a five-year research project entitled Origin and Attributes of Heritage Values of Historic Towns of the Czech Republic. The project was financially supported by the Programme for the Support of Applied Research and Experimental Development of National and Cultural Identity for the years 2016 to 2020.

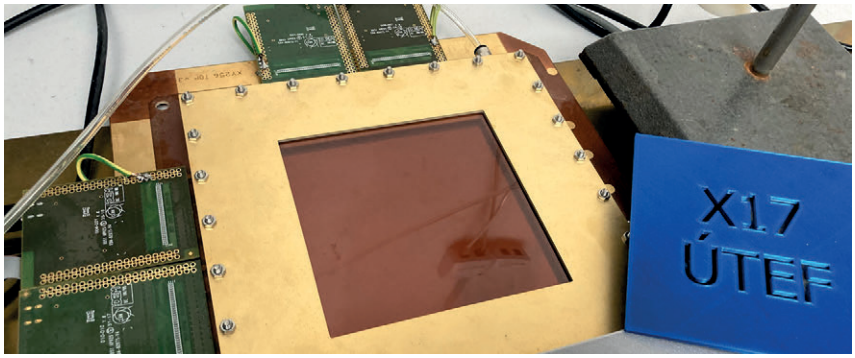
The project offers the perspective of leading Czech urban architects on the values of historic cities (NAKI II). Its most important output, intended for both the professional community and the broad public, is the travelling exhibition Hidden Order and the Inner Essence of the Uniqueness of Historic Cities of the Czech Republic, the first stop of which was inaugurated on 1 October 2020 at the Jaroslav Fragner Gallery in Prague. When the epidemic situation permits, the exhibition will be on display in other cities of our country. During the opening ceremony, a book of the same name (critical catalogue) was also officially christened; other project outputs include a series of expert articles and the Methodology for the Comprehensive Identification and Protection of the Attributes of the Values of Historic Towns certified by the Ministry of Culture of the Czech Republic in 2020.

The extensive research project was divided into four stages with two main areas of research. The first, which was undertaken by a department of the Academy of Sciences, was the reconstruction of the triangulation of medieval settlements and the methods used in their location and foundation. As part of this, the researchers created a delineation device called groma, which they used to verify the measurement procedure in the field and determine its accuracy. The starting point for their research was the geometric construction of the plan, the economic reasons for the establishment of the town, and the contemporary technical limitations of field surveying. They used triangulation analysis to describe the basic procedures of city founding. At the beginning they divided the right angle into 12 or 16 parts. They then selected a site for measurement, made a basic delineation of the city and calculated its approximate area and perimeter, then precisely defined the city and laid out its streets and marketplaces.

The second area that tCTU was involved in was research into procedures for identifying complementary phenomena and attributes important for the sustainability of the cultural values of historic cities. The research team of the Faculty of Architecture designed and tested tools for the protection of these values, which are, among other things, applicable in the processes of urban management, spatial planning and conservation. At the core of the research was the development of a standard set of analytical maps, the practical use of which will enable a significantly more precise argument for the preservation of the essential elements that make up the authenticity of historic cities. In the applied part of the research, the teams subsequently analysed in detail a sample of 26 towns with conservation areas. For six of them (České Budějovice, Litomyšl, Telč, Jihlava, Pelhřimov and Kadaň), Maps with expert content - comprehensive were prepared, for the others Maps with expert content - comprehensive - locational were prepared.

For the resulting evaluation, the researchers used four types of analyses: a comprehensive analysis of the urban structure using the Basic Mapping method in the GIS environment, analysis and interpretation of the city image using expert methods, analyses of the use of the urban core based mainly on statistical data and surveys, and targeted interviews based on sociological methodology.

Summary exhibition of the project at the Jaroslav Fragner Gallery



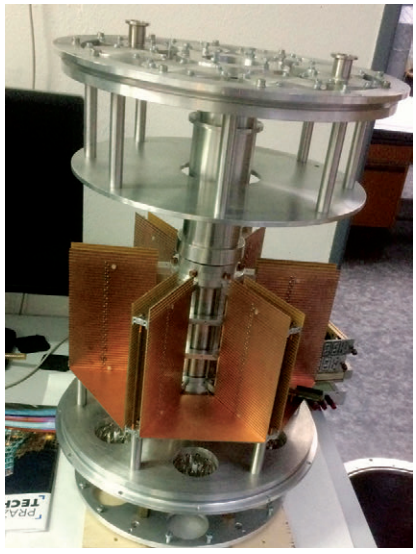
Detail of a triple GEM (gas electron multiplier) foil with the first part of the readout electronics attached

SEARCH FOR DARK MATTER PARTICLES USING THE VAN DE GRAAFF ACCELERATOR

The current inability of science to explain the nature of the structure of dark matter, whose existence is not in doubt today and is thought to account for up to 85% of all matter in the universe, represents one of the greatest current challenges in particle physics. While a number of theoretical proposals for the particle composition of dark matter have emerged, no authoritative experiment has yet found a new particle. However, attention is naturally drawn to experiments where a fundamental discrepancy between results and theoretical expectations persists, and there are many such experiments. For the Institute of Engineering and Experimental Physics, the measurements of scientists from the ATOMKI Institute in Debrecen, Hungary, became interesting, as they published a paper in 2016 describing the significantly anomalous angular distribution of electron-positron pairs produced during the deexcitation of an excited 8Be nucleus produced in the 7Li(p, e+e–)8Be nuclear reaction. The offered explanation of the anomaly assumes the existence of a new boson particle with a rest mass of about 17 MeV/c2, a possibility still not ruled out by other credible experiments. With the equipment available to the Institute, or which can be developed in a reasonable time thanks to experience, it is possible to repeat the measurements and confirm or refute the anomaly. However, an independent measurement minimising the possibility of a systemic error in the original experiment has not yet been carried out in any laboratory. With this justification, a grant proposal was submitted in spring 2020 to the Grant Agency of the Czech Republic for funding research on this issue, including the construction of a suitable detector for this task. The grant was approved at the end of the same year.

The detector being developed within the Institute is based on the design of an unfinished prototype loaned by ATOMKI (which ITEF staff visited twice) and contains six gas time projection chambers (so-called TPC detectors) with magnetic fields as particle calorimeters as its main part. The particles generated in the target placed in the accelerated particle beam first pass through the Timepix3 pixel semiconductor detector assembly to then enter the position-sensitive wire chambers (MWPC) in the aforementioned TPC calorimeters. The signals produced in the calorimeters are amplified by physical multiplication processes in the so-called triple GEM foils and are read out by specialised electronics developed at CERN. A number of scientists with experience in many fields are involved in the construction of the detector, and the funding grant foresees a close collaboration between ITEF and the University of West Bohemia in Pilsen. It should be noted that the detector being developed is fundamentally different from the detector used in the original Hungarian studies and its expected parameters (namely angular and energy resolution) should be significantly better than those of the original detector. ITEF consults theoretical and practical issues, besides the ATOMKI Institute, with the University of Montreal, Canada which brought the issue to the attention of the Institute a few years ago and is preparing its own measurements of the same using the method closer to the original ATOMKI setup.

Several experiments are being prepared around the world, which in the next two or three years will give a reliable answer whether the ATOMKI anomaly has a real physically interesting background, or whether it is an effect that can be explained even within the framework of contemporary theories, but some important aspect of the phenomenon has been omitted. Either way, it is encouraging that even on a relatively small basis (compared to large experiments like ATLAS at CERN) it is possible to work on a problem that may have a fundamental impact on understanding the composition of the world around us. The fact that we are bringing an interesting physics program to an old (but well-functioning) facility like the Van de Graaff accelerator in Prague is just the proverbial icing on the cake.



Physical form of the detector under construction. The six TPC chambers can be seen. In the gaps between the chambers, strong permanent magnets are attached, causing the paths of charged particles to become twisted, from which their energy can be calculated.

IEEE SMART CITIES SYMPOSIUM PRAGUE 2020

Spring 2020 was not kind to large events where scientists exchange experience and present their scientific results. In spite of all the difficulties and governmental restrictions, the team of the Faculty of Transportation Sciences headed by Prof. Ondřej Přibyl and Prof. Miroslav Svítek managed to organize the 6th international conference IEEE Smart Cities Symposium Prague, which in its relatively short history has already earned a firm place among professional events in the field of Smart Cities. It is very popular among visitors, not only thanks to its interesting programme, but also thanks to the beauty of the historical places of Prague, where it takes place every year.

This time, however, it was necessary to adapt to all the constraints in place in May, so the conference was partly held in the picturesque surroundings of the Prague ARA Palace, where a small group of participants mostly from Prague and other Czech cities gathered, but the majority participants from abroad joined the conference virtually. At this renowned event, under the auspices of Minister of Transport Karel Havlíček and Prague Mayor Zdeněk Hřib, many interesting papers were presented, such as invited lectures by Professor Anders R. Müller from the University of Stavanger, Lutz Heuser from Smart City Forum Germany, and Porie Saikia-Eapen from the Metropolitan Transportation Authority New York. The programme also included musical performances by two of the main figures of the conference, Prof. Svitek and Prof. Přibyl, who perform as Duo Profesores and delighted the visitors with several accordion and cello pieces.

Although the conditions were difficult, almost 120 guests attended the international symposium and were extremely satisfied with the conference and took away a collection of papers presented, which are indexed in both Scopus and WoS databases. The organizers will be able to use the experience gained also in the 7th IEEE Smart Cities Symposium Prague scheduled for May 2021. Given the current situation, it will again take place mainly in the virtual world, which will not be surprising for most participants.

ROBERTA AND DAVID – TWO NAMES ON THE FORBES 30 UNDER 30 LIST

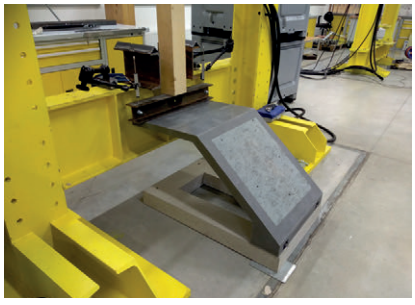
In the prestigious Forbes magazine 30 under 30 ranking, i.e. thirty talented, capable and successful people under 30, there are also personalities associated with the Faculty of Nuclear and Physical Engineering - our student Roberta Bimbová and graduate David Klečka.

Roberta Bimbová scored points with the optical space debris detector; she wasengaged in its development in the Department of Physical Electronics. For her presentation, she won the Outstanding Student Presentation award at the SPIE Optics+Optoelectronics international conference in late 2019. When she chose "Detector Control Circuit Modification" as her undergraduate thesis topic, she had no idea where it would take her. A term that would scare anyone seemed like the best one. "I didn't want to lie in books, pounding out theory and spawning more theory. What I liked about this was that it was practical," she says. And indeed, Roberta was soon soldering circuits and tweaking the functions of the optical detector at the measuring table, which aims to detect even small pieces of previously unlocalized space junk in orbit. There are millions of pieces of various rocket and satellite debris in orbit, flying at a barely imaginable speed of 28,000 kilometres per hour, and a collision with a satellite or space station can be fatal. The detector from the Jaderka workshop, which Roberta had fine-tuned to perfection, proved to be the most reliable, and after laboratory tests it was sent into space. It would even become the basis of a future profession - a kind of space garbage man, using magnets, nets and glue-coated surfaces to pull waste from orbit.

The second Nuclear Man on the list was David Klečka, a graduate of the mathematics department. David is one of the founders and head of Yieldigo, considered by many to be one of the most promising Czech start-ups today. The company helps global retailers adjust the prices of goods through various data inputs to keep both customers and retailers happy. In the Czech Republic, the company is backed by investor Tomáš Krsek and the Patero group, but Yieldigo has ambitions globally. David currently lives in San Francisco, where he approaches US investors with the support of the prestigious Alchemist accelerator.

Roberta Bimbová scored points with her optical space junk detector, and David Klečka is one of the founders and head of Yieldigo, considered by many to be one of the most promising Czech start-ups today.

DESIGN CONCRETE FURNITURE LEVITEE



Bench load tests

The University Centre for Energy Efficient Buildings of CTU has developed a design set of concrete urban furniture Levitee with the possibility of installing smart technologies. Residents and visitors of the capital city can already try out the novelty in a test mode in several public places.

Three benches with smart technologies were installed in the streets of the capital city in 2020 as part of the Technology Transfer for Smart Prague project (funded from the Prague Growth Pole Operational Programme). Two of them are part of JRD's development projects called Zelená Libuš and Ecocity Malešice III. The third bench, along with other similar-looking accessories from the Levitee furniture set, was placed near the entrance to the Pražačka sports facility.

The "Levitee" bench can provide its users with additional services beyond comfortable rest. Depending on the level of smart technology equipment, it can charge phones via a USB connector, connect mobile devices to Wi-Fi for a short time free of charge to the user, or even measure air quality using various sensors supplied according to the end customer's wishes, making it a perfect fit for the Smart City concept. The demonstration samples offer all functionalities. In addition, after registration, they allow the installation of trauma points in highly visible and illuminated locations.

"Our team was present during the development of the prototype of the first smart bench in the country called CapaSitty, which was also presented at the EXPO 2015 World Exhibition in Milan, Italy. We then decided to go ahead and develop a new bench devoid of previous solutions that could function and attract people to rest without the installation of smart technologies, but at the same time would allow their easy and variable installation and would not disturb its surroundings," says project leader Tomáš Vlach.

The emphasis in the development was on a design that looks interesting without being garish, because the designers' goal is to make the bench blend in with its surroundings. The UCEEB CTU team therefore prepared an original mould and mix of high-grade concrete for the production of the presented prototype. Instead of conventional steel reinforcements, they used technical fabrics made of carbon fibre impregnated with a polymer matrix. The base of the bench below the ground surface was designed with a significant proportion of recycled material.

The Levitee urban furniture was successful in a business plan competition called Awesome Idea, winning the 2020 Best Innovation category. The aim of the competition, organised by PowerHUB, the Pardubice Business Incubator and other partners, was to find new business projects, give their leaders the opportunity to consult their solutions and gain new experience and attract potential business partners and investors.

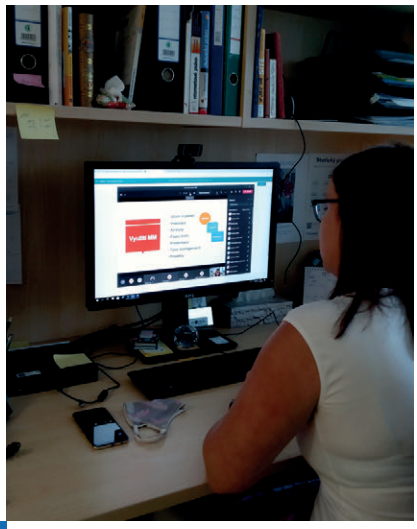
THE POSITIVE IMPACT OF ADVERSE TIMES ON THE SUPPORT OF DOCTORAL STUDENTS

The tradition of Information Courses for doctoral students dates back to 1998. That is when the Faculty of Mechanical Engineering Library started organising them. At the Central Library of CTU we have been systematically supporting doctoral students since 2010 and every semester we open an Information for Science and Research course. Its aim is for participants to acquire knowledge and skills that may be useful to them as future scientists and authors of scientific publications.

Initially, it was exclusively classical teaching at the faculties. But the need to attend regularly was proving to be a problem for the mostly busy doctoral students. Therefore, an e-learning alternative was created in 2015. This made the courses flexible time-wise and available to interested students from all faculties and components of CTU. At the same time, face-to-face teaching still took place at the request of the faculties. Thanks to the existence of the e-course, it was possible to operatively switch from direct teaching at the Faculty of Electrical Engineering to its online option in the spring 2020. In the autumn, the course for the Faculty of Architecture opened directly in e-form.

However, even in the e-version it became apparent that completion of the course was not the goal for everyone. Some were "just" interested in familiarizing and orienting themselves in a certain field, or did not have the time to devote to the assignments. That is why we came up with the so-called Doctoral Days (DD) in the fall of 2019. These are based on the course Information for Science and Research, but in the form of half-day thematic blocks (Information resources, Copyright, Science Publishing, Open Access, Science and Research) implemented during the academic year. Registration is open to all interested parties, not only doctoral students.

We also started to organize DD "traditionally". Two blocks were held in that way, with attendance of 34 people. Success! The third block was scheduled for 12 March 2020. Unfortunatelya state of emergency was declared and the event was cancelled at the last minute. As late as 16 April, when the next block was to take place, we were still hesitating how to approach the situation. In the end, we took the plunge and organised a webinar on R&D evaluation. The interest was unexpected and 64 people attended the arranged repeat. A double success! It also turned out that the majority of the attendees were from faculties outside of the Dejvice campus, which made us even more pleased.



Based on this experience, we concluded that the form of direct lecturing and direct contact with the audience have their charm, but if we do not want to discriminate against those who, for various reasons, cannot come to Dejvice, we need to organize everything differently. Therefore, in autumn 2020 we prepared classic lectures for online transmission. How it turned out in the end is anybody's guess. The class switched to distance learning and with it the three blocks of DD scheduled for the winter semester. These were also recorded and saved for future reference. 307 students from all faculties and components of CTU and individuals from other universities and CAS participated!

It is evident that for doctoral students and staff scattered in time and location, the distance learning option can be of great benefit. Based on our experience with this form and feedback from participants in our virtual events, we can assess what has worked well and what could be done better or differently. We are planning various improvements to take advantage of the positives of distance learning, but also to be as close to our users as possible.

CZECH REPUBLIC HAS THE FIRST SELF-DRIVING ELECTRIC FORMULA

Enthusiastic student teams around the world have been building electric racing single-seaters for the Formula Student series since 1980. Ten years ago, they were joined by the eForce FEE Prague Formula team, consisting of sixty students from the Faculty of Electrical Engineering and the Faculty of Mechanical Engineering of Czech Technical University.

Even though in 2020 all Formula Student races were cancelled due to the Covid-19 pandemic, the development did not stop and the student team prepared the competition vehicles for the next season. In addition to the new FEE 0.9 electric formula, they also developed a completely new self-driving racing formula, which eForce was the first ever to build in the Czech Republic. Both cars won several awards at online alternatives to international races this summer, temporarily replacing the traditional Formula Student competitions.

To make a self-driving single-seater, codenamed DV 0.1 Driverless, the creators used the self-supporting body and axle from the successful electric formula of the 2018 season. Due to the coronavirus pandemic, they decided to use already proven composite monocoques (called chassis), as the production of new ones was significantly delayed due to safety restrictions. However, the sensor system for sensing the car's position and surroundings is completely new, using an inertial navigation system and stereoscopic cameras that enable spatial orientation and LiDAR. In cooperation with the Centre for Machine Perception at CTU, the eForce FEE Prague team developed control and planning algorithms and a set of actuators that can control the formula, which meets the most stringent requirements of the automotive industry, in complete safety. Data evaluation is provided by powerful hardware designed specifically for the purpose of autonomous driving - a compact Nvidia Jetson AGX Xavier computing unit. It is also the first car in the history of the Czech eForce student formula whose aerodynamics was solved using fluid dynamics with a simulator.

Wednesday 30. 9. Technical Street the public were presented during exhibition rides student projects of CTU within the framework of the event, which is called Day with formula cars and racing CTU 2020.

The presentation of the ninth generation of the electric formula and the first generation of the autonomous electric formula (DV01) took place on 5 September 2020 in the High Voltage Laboratory at the Faculty of Electrical Engineering of Czech Technical University in the presence of guests, journalists and virtual live viewers.

"Thanks to all team members for actively devoting every spare moment to development and work in the workshop. Even though they could go to parties or spend time with their loved ones, the project is stronger and they are fully committed to it. A big thank you also goes to the sponsors and the school, the Faculty of Electrical Engineering of Czech Technical University, which provides us with facilities and mentoring," said team captain Josef Med after the unveiling of the latest single-seaters.

The eForce FEE Prague team is planning to prepare even more diligently for the coming seasons during the pandemic by using the simulator to train pilots and test the characteristics of the formula. "We have defined the key characteristics. We will use pedals from an older formula and modify them to be able to communicate with the simulator software. We'll make a new monocoque and aero kit and add wheels to make the simulator as close to a race car as possible. We'll put a professional steering wheel base in the monocoque with a response that mimics real driving, and fit it with a steering wheel straight from an actual formula car model. Everything will be connected to a powerful computer and a large widescreen display at the front of the simulator," the student team representative sums it up. The technology has opened the door not only to training pilots, but also to testing the car's characteristics and optimising the structural design. With its help, the students hope to take their performance up another notch.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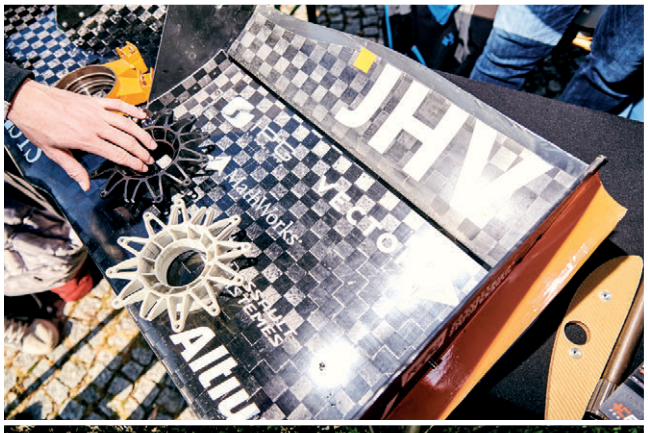
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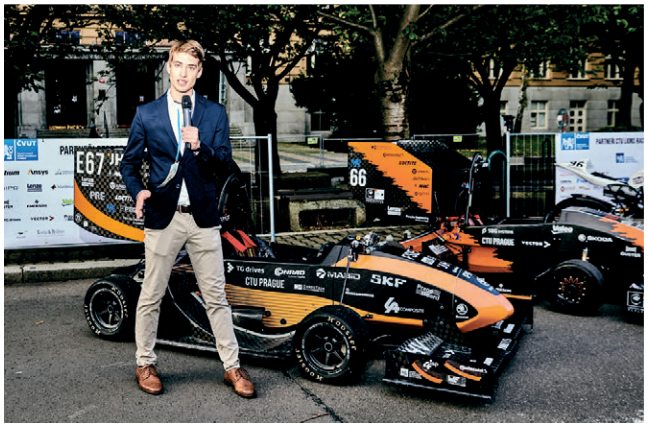
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CTU PRAGUE

FACULTIES, HIGHER EDUCATION INSTITUTES AND OTHER COMPONENTS OF THE UNIVERSITY

In 2020, we became much more aware of the importance of the personal presence of students at the faculty. We miss them in the lecture halls as well as in the laboratories, studios and study rooms. We feel that we are missing a significant part of the academic community and we rightly wonder whether the university can sufficiently meet the requirements of its basic function - to contribute to the development of education and progress through the interaction between teachers and students.

I am convinced that we can answer in the affirmative. The faculty was able to move quickly and without major problems to remote teaching. In subjects where lectures predominate, this was not too difficult. However, I see it as the greatest success that we managed to provideteaching in laboratories, practical teaching, projects and studios. I speak in the plural because it is the success of the whole academic community, students and teachers.

I wish, as I guess everyone does, that we could return to a normal way of life as soon as possible. However, we do not know when this will happen and what "normal" will actually be. There is still a long way to go and we may have to get used many new things that will permanently accompany our lives. But we must look to the future with hope, there are many interesting things and challenges ahead of us that we would like to realise. I believe that we will soon complete the institutional accreditation of the Building Construction education field, we are preparing the reconstruction of Building B, we would like to increase the number of foreign students, especially in master's and doctoral study programmes we have to amend some internal regulations of the faculty. There is a lot to do, so getting back to normal soon is really the key.

Prof. Ing. Jiří Máca, CSc.,
Dean of the Faculty of Civil Engineering, CTU

FACULTY OF CIVIL ENGINEERING

Study programmes

Construction is a specific area of education which cannot function well without the interdependence of teaching and practice. The application sphere prevails over the theoretical base and with the development of practice it is necessary to introduce new elements into teaching, so we continue to introduce BIM (Building Information Modelling) and VR (virtual reality) in particular. In 2020, due to the coronavirus pandemic, we had to completely change the method of teaching and move fully into distance learning without prior preparation. The faculty stood this test well beyond expectations, it was even rated as the best among faculties in a survey conducted for the whole CTU.

The new bachelor's academic programme Management and Economics in Construction and the master's academic programme Intelligent Buildings were successfully accredited. More accreditations are being prepared, especially for new master's programmes that build on the traditional teaching of construction and engineering-related disciplines.

The faculty places great emphasis on the involvement of practitioners in teaching - through participation in lectures or teaching, participation in the preparation of assignments for seminar and final theses, participation in expert committees or preparation of referee opinions. Even with the limitations in teaching, it was possible to continue to develop mutual cooperation - student competitions at local and international level were organised together with experts from practice, while students also participate in professional practice.

Projects

Scientific, research and development activities are among the key priorities at the faculty and the faculty achieves excellent results in this field. The research teams engage in a number of projects of funded by Czech Republic Grant Agency, Technology Agency and other grant systems. The faculty has a long tradition of cooperation with commercial entities in the form of contractual and applied research within the projects of Technology Agency or other providers. Last but not least, it also offers a wide range of services of authorized laboratories and expert services. External collaborations with other universities, Academy of Science institutes, departmental institutes, companies and foreign organisations are also important. Funding of scientific research activities is mainly based on domestic grants and projects. The faculty actively supports young scientists, awards grants within the Initiation Fund for their stabilization at the faculty, establishing international contacts and preparing competitive international projects.

International cooperation

One of the priorities of the faculty's development is cooperation with more than a hundred foreign universities and selected prestigious institutions from all over the world. It takes place mainly in the form of study stays of students and

academic staff. The Erasmus+ programme is the dominant one, but there are many possibilities for foreign studies and some remain unused. The majority are offered in Europe, but there are also a number of long-term study stays in more distant destinations and we have good representatives in the joint degree and double degree programmes, which we support financially, as well as programmes based on international agreements. However, we are lagging behind in the number of visiting teachers, which is to some extent hampered by the scale and form of teaching (we do not normally have block teaching); the near-term goal is to encourage and popularise this type of international activity. Teaching in a foreign language (English), coordinating and supporting the teaching of so-called "visiting professors" will be an important part of the modernisation of international cooperation. The growing interest and number of international students, especially in doctoral programmes, is encouraging. Many of them have come to study on the basis of the activities of the departments and their visiting staff, as well as university-wide activities (e.g. Study at CTU, Study in Prague).

Awards

The International Federation for Structural Concrete awarded Prof. Petr Hájek, Head of the Department of Civil Engineering, with the prestigious Medal of Merit 2020 for "Merits for the development of the field".
Jan Sedláček, a student of bachelor's degree, was part of a five-member international team that won the International Real Estate Challenge 2020.
Doctoral student of the Department of Indoor Environmental and Building Services Engineering, Ing. David Staněk, placed second in the European Student Thesis Competition REHVA 2020 with his thesis on "Utilization of Waste Heat from Computing".

Significant events and developments

The year 2020 was significantly impacted by the coronavirus pandemic and most of the planned events were postponed or moved online, while virtual computer labs were created for students allowing remote access to the faculty's state-of-the-art classrooms.
It was also possible to organise two Open-House Days for prospective students. One held in January was a classic form of contact. The autumn event, for which a DOD online web application was created, was fully remote. More than 40 videos and complete faculty documentation in the form of virtual tours were provided for the aforementioned application. The Faculty Ball took place held in February and was very popular with students and academicians. The Student Grant Competition and the TZB summer school took place. The INSPIRELI AWARDS international architectural competition was held online. Students stayed in touch with practice and our partners when we converted the so-called Technical Thursdays into an online format and provided eight presentations. We prepared video interviews about the results of the professional activities and the success of our students under the banner Builders at Heart.
After a demanding complete reconstruction, the indoor laboratory of the Water Management Experimental Centre of the Faculty of Civil Engineering of CTU was reopened and the reconstruction of two main large lecture halls in Building B was started.

The faculty's Third Mission

Within the scope of local development, the faculty actively cooperates with regional authorities both within the framework of direct cooperation and within the framework of operational programmes (OP Research, Development and Education Prague Growth Pole). Cooperation in the region of Kladno and Buštěhrad through the active involvement of the faculty in the University Centre for Energy Efficient Buildings (UCEEB) is also important.
The faculty is also active commercially. It offers the services of an accredited laboratory and makes effort to commercialise protected intellectual property by selling licenses to patents and utility models. It has also set up a programme of cooperation with construction companies in the form of different levels of partnership, which creates space for a two-way feedback between the needs of the faculty and practice, leading to improved teaching and graduate employment.
The Faculty of Civil Engineering responded flexibly to the current developments in the situation with Covid-19. Timely handling of related hazards, rational assessment of the situation and crisis planning were key in its approach. It was actively involved in addressing the problems associated with the pandemic, in particular by collaborating in the development of protective equipment (shields, masks) and the production of disinfection.



Personalities of the Year 2020

Prof. Ing. Milena Pavlíková, Ph.D.,

from the Department of Materials Engineering and Chemistry started the production of disinfectant gel at the department right at the beginning of the pandemic and significantly facilitated the university's operations at the time of shortage of such products on the market.

Doc. Dr. Ing. Pavel Fošumpaur,

from the Department of Hydraulic Engineering significantly helped to promote the faculty and its activities among the general public with his approach to the communication of the project "Web Application of the Technical Monuments of the Labe-Vltava Waterway".

Doc. Ing. Lukáš Vráblík, Ph.D.,

from the Department of Concrete and Masonry Structures, has long been contributing his comments to the media to raise awareness in the field of bridge structures and thus helps to co-create the image of the faculty in terms of high professional credit.

The Faculty of Mechanical Engineering of CTU in Prague has been active in the market of research, education and industry since 1864 and has always had the same mission. It consists in the preservation and improvement ofthe knowledge gained and the enhancement of creative activity in the form of science, research, development and innovation, as well as providing education and cooperation with industrial enterprises. Of utmost importance is the social role, nowadays known as building collaborative ecosystems, i.e. a shared environment, of university and industry. Often the university's unique instrumentation and experimental facilities enable partners to make otherwise inaccessible measurements. Researchers and academicians have industry knowledge and a different perspective on the issues, and so it is also valuable for industry to develop discussions to spark reflection and informal research on long-standing industry problems that can and sometimes do result in unexpected solutions and innovations. Of course, students are also an asset, as they have youthful enthusiasm and bring new perspectives on life and the industry, and as potential employees. And this is the fundamental advantage of the university over companies - every year a new generation of students comes in with fresh perspectives as a counterbalance to employees who have stayed in the company much longer with their outlook on life. The aim of building these and other ecosystems is to contribute to making industrial enterprises already operating in the Czech Republic competitive in global markets with benefits for our economy and standard of living, and to make the Czech Republic a sought-after attractive country for research, development and production of new high-tech products with high added value. Our faculty is in fact becoming a catalyst for the development of the Czech economy.

prof. Ing. Michael Valášek, DrSc.,
Dean of the Faculty of Mechanical Engineering, CTU

FACULTY OF MECHANICAL ENGINEERING

Study programmes

In 2020, the Faculty of Mechanical Engineering first of all received renewed accreditation for doctoral studies, which had to be divided into five study programmes according to the new rules of the National Accreditation Office, and started educating doctoral students within the programmes. It also obtained accreditation for a new follow-up master's degree programme in Robotics and Production Machines and started teaching the programme. This is in response to the growing importance of robotics in industry and other practical applications - the new programme brings education combining both its computational and physical aspects. The correctness of this direction was confirmed very soon - by several important inquiries from the Czech industrial sector.

Projects

Although the research projects of the Faculty of Mechanical Engineering were also affected by the impact of the Covid pandemic, the tasks of the national competence centres were successfully fulfilled and were generally extended by two years. Furthermore, in 2020, it was still evident that industrial companies were interested in research collaboration, and a number of applied research projects were submitted. In addition to these, the faculty was involved in the submission of three major research infrastructure projects. The first is the 21st Century Mechanical Engineering Research Infrastructure project, the second is the Advanced Aerospace Technology Research Infrastructure project and the third is the Advanced Industrial Manufacturing Research and Innovation Centre project.

International cooperation

The Covid pandemic does not favour international contacts and, therefore, international cooperation. Nevertheless, the faculty's cooperation with GE Aviation from the USA continued successfully. Before the pandemic, 50 engineers worked in the testing room. Within two weeks, we were able to ensure that all but five in the control centre could work from home, such as in Italy. They could all see and share measurement data and control the engine experiments online in real time. Another achievement was the takeover and successful operation of the core aero engine test facility, the latest in a series of ground test facilities in the CTU ecosystem. Also worth mentioning is the first successful launch of the new GE Catalyst engine on a CTU test aircraft representing the flying testbed in Berlin.

Awards

In November 2020, CTU was evaluated by the International Evaluation Panel according to the Methodology 17+ and the Faculty of Engineering was rated as excellent, which, among other things, confirmed our attitude towards cooperation with industry and the function that the faculty holds in society.
The students of the Faculty of Mechanical Engineering scored success also outside CTU. Examples include the essay awarded in the international competition within the EIT Manufacturing project or the victory of a team of students of the faculty in the Coca-Cola HBC Management Challenge.
The solution of the GA Czech Republic grant "Active multidimensional vibration absorbers of complex mechanical structures based on the delayed resonator method" led by Prof. Vyhlidal was awarded as excellent.
After last year's excellent evaluation of the Josef Božek Centre of Competence for Automotive Industry, the Centre of Competence - Mechanical Engineering Manufacturing Technology also succeeded with an excellent ranking.

Other major events and developments

A dissertation representing the next step in research on the use of hydrogen for internalcombustion engines was defended at the Faculty of Mechanical Engineering in early 2020. It does not mean a replacement of gas and diesel with hydrogen, but a combination of the two. A small addition of hydrogen to a very lean mixture of traditional fuels (diesel or gas) causes this mixture, which would not normally ignite, to be ignited by hydrogen. This process makes it possible to further reduce emissions and CO_2 production to the required limits, even though this already seemed physically impossible. It will thus be possible to reduce emissions from internal combustion engines directly in real terms, not just as a result of statistics from the combined sales of electric and internal combustion engine cars.
A Memorandum of Understanding on cooperation in the University Centre was signed with UCHT and Unipetrol Litvínov. It is about building another ecosystem, this time in the field of industrial chemistry with a path to waste treatment and circular economy.
Significant application events include the acquisition of three notable patents. The first is the European patent "Wheel with variable characteristics, especially for motor vehicles", which, by placing shock absorbers and force actuators in the tyre, resolves the permanent conflict between ride comfort and vehicle handling so that the optimum of both criteria can be achieved simultaneously.
The second is the US patent "Portable device for measuring object geometry and spatially varying reflectance function on a sample surface with multiplication of elements involved in imaging and sensing systems on movable arms to enable field measurements", which describes a device for rapidly measuring the geometry of an object and the reflectance of its surface to obtain a virtual reality model of it.
The last is the European patent "Nanocomposite layer based on collagen nanofibres and method of its preparation", which describes the production of a nanocomposite layer with antibiotics deposited in it for their more efficient release without increasing cytotoxicity for orthopaedic and dental implants.
Finally, two research centres (the Centre for Engineering Technique and Technology and the Centre for Internal Combustion Engines and Automotive Technology) marked their 20th anniversary.

The faculty's Third Mission
As part of its Third Mission, the faculty played a significant role in dealing with the pandemic situation. It produced 3D printed interconnections of various masks and filters, e.g. for neurosurgeons at Na Homolce Hospital, and also built an inspection robot to service the large field hospitals built in the Czech Republic.

Memorandum of cooperation at the university centre with UCHT and Unipetrol Litvínov, a unique pontoon system and an experimental flying laboratory.

Personality of the Year 2020

Prof. Ing. Jan Hrdlička, Ph.D.,

delivered his professorial lecture in 2020 and in the same year he was also appointed Professor of the Faculty of Mechanical Engineering for Structural and Process Engineering. His specialization is energy engineering. Within the framework of an OP RDE project, he deals with fluidized bed combustion of, for example, biomass with oxyfuel technology and subsequent capture and storage or utilization of CO_2. This is another example of the faculty's contribution to constructive and practically feasible solutions to carbon-free energy.

Prof. Hrdlička also represents the interdisciplinarity of the Faculty of Mechanical Engineering. He completed his engineering studies at UCHT in Prague, where he studied Chemistry and Technology of Fuels and Environment, and earned his Ph.D. degree there. He spent his studies abroad at Lunds Tekniska Högskola in Sweden and at Universität Stuttgart in Germany. After his return, he started working as an assistant professor and associate professor at the Department of Energy Engineering of the Faculty of Mechanical Engineering. Since the beginning of his tenure here, he has been involved in research and teaching activities in the field of promising energy solutions to reducing the carbon footprint of our technology-oriented civilisation. He has published a number of papers on this topic, including the international monograph "CO_2 Separation, Purification and Conversion to Chemicals and Fuels".

The Faculty of Electrical Engineering consists of seventeen departments located within the main campus of CTU in Dejvice and in the historical premises on Charles Square. It provides first-class education in electrical engineering and computer science, electronics, telecommunications, automatic control, cybernetics, robotics and computer engineering and power engineering.
The history of our faculty dates back to 1950, and it acquired its "de jure" status in 1951. We began commemorating our seventieth anniversary during a period significantly affected by the coronavirus pandemic. The unprecedented situation and the associated long-term restrictions tested us in all aspects - organisational, technological, and human.
In spite of all the teaching responsibilities, my colleagues were able to mobilise their forces promptly in research and volunteer work. The latter includeda spontaneous initiative of 75 students and teachers who offered their help to primary and secondary schools in the form of tutoring, providing teaching content or donating computer equipment. The research work resulted in a number of innovations that helped health professionals and the general public alike to cope with what is undoubtedly the most challenging period in decades.
I am pleased that even in these difficult times the Faculty of Electrical Engineering maintained the high quality of teaching and research, which is reflected in our international ranking. According to prestigious rankings, FEE is the highest ranked electrical engineering and computer science faculty in the Czech Republic. This is a great commitment for us and we are working to continue to push this bar higher.

Prof. Mgr. Petr Páta, Ph.D.,
Dean of the Faculty of Electrical Engineering, CTU

FACULTY OF ELECTRICAL ENGINEERING

Study programmes

All programmes are closely linked to research activities. There are only eight students per teacher on average at the faculty, so we have enough time to devote to them individually in semester projects or bachelor's and master's theses. There are 2,915 students from 50 countries enrolled in the faculty on a full-time basis, and nearly 400 more on a short-term basis. We are gradually opening innovative doctoral programmes: Acoustics, Applied Physics, Bioengineering, Energy and Electrical Economics, Electrical Engineering and Communications, Cybernetics and Robotics, and Aerospace Engineering. In cooperation with partner universities, it is also possible to study on double or joint degree programmes in cooperation with RWTH Aachen, Tomsk Polytechnic University, National Taiwan University of Science and Eurecom SophiaTech - Grenoble Institute of Technology, or to enrol in the Space Master programme with University Lulea and Universität Würzburg. Due to the pandemic situation, the double degree programme conducted with Kazan Federal University was interrupted.

Projects

The trend in filing new patent and utility model applications was similar to the previous year. The faculty obtained thirteen utility model applications, five national patents and ten international patents in 2020. In total, 14 new research results were filed for protection. As part of complementary activities, the staff was engaged in research and development for industry as well as for organisations and institutions from other segments. The projects with a total volume of CZK 33 million comprised 174 contracts up to CZK 1 million and nine contracts over CZK 1 million. Twenty courses and trainings were conducted, ten expert reports were registered and five were drawn up. In 2020, a total of 258 grant projects were implemented - 22 foreign, 133 domestic, 28 funded from structural funds and 75 projects of the student grant competition. Major grants included European grants H2020 AERIAL Cognitive Integrated Multipurpose Robotic System with Extended Operational Range and Safety, research team of Dr. Martin Saska, and BIOFMET New Metrological Methods for Biofuel Analysis, as well as ERC.cz grant for doc. Ondřej Chum's project "Generalized image and image relation search", and the GA CR support for Dr. Matěj Hoffmann within the framework of Excellence in Basic Research Projects - EXPRO for tasks using whole body surface awareness for safe and natural interaction: from brain to collaborative robots.

Also interesting is the project of Prof. Daniel Sýkora from the Department of Computer Graphics and Interaction. The programmer with a penchant for visual arts had previously developed algorithms to turn a 2D animated film into a 3D plastic spectacle. After the Hollywood spectacle The Lion King, in 2020, thanks to Prof. Sýkora's students, the algorithms were again put into artistic practice as they added a third dimension to Alphonse Mucha's paintings at the iMucha exhibition.

International cooperation

Despite the unfavourable conditions caused by the SARS-CoV-2 pandemic, the faculty continued to develop its activities with foreign partners. In 2020, together with FNSPE, FBME, FME and FIT, the Faculty of Electrical Engineeringwas involved in negotiations between CTU and the Weizmann Institute of Science (Israel) regarding the launch of research cooperation, including the development of joint research exchange programmes for students and staff. As a result, a Memorandum of Understanding was signed.

Projects in international consortia continued, e.g. IMOVE Unlocking Large-Scale Access to Combined Mobility through a European MAAS Network, ELECTRIFIC - Enabling seamless electromobility through smart vehicle-grid integration, and SESAR - Controller Tools and Team Organisation for the Provision of Separation in Air Traffic Management. In addition, FEE is engaged in foreign development cooperation within the framework of the Czech Ministry of Foreign Affairs programme Strengthening Capacity of Public Universities in Developing Countries, specifically in Ukraine. The CTU ESF II project continued within the Operational Programme Research, Development and Education (European Structural and Investment Funds), which is aimed, among other things, at developing international cooperation and internationalisation of the environment at FEE, including strengthening academic and research cooperation with prestigious higher-education and research institutions from South Korea and Israel. As part of the Nikola Šohaj Scholarship Programme, FEE supported three foreign applicants in 2020. The faculty also participated in the International Visegrad Fund Scholarship Programme.

Awards

The JUNIOR STAR grants, awarded by the Grant Agency of the Czech Republic at the end of 2020, are intended to promote excellence in emerging outstanding scientists. As a result, two of our researchers, Doc. Miloslav Čapek from the Department of Electromagnetic Fields and Dr. Giorgios Tolias from the Department of Cybernetics, will be able to fund their basic research projects over the next five years, which are expected to have a significant scientific impact on a global scale.

Of the 30 carefully selected projects, only four pertain to the field of engineering and computer science, and two of the four belong to the FEE.

The prestigious Werner von Siemens Prize in 2020 also went to a FEE graduate. The best thesis of the 22nd year of the competition was presented under the supervision of Prof. Jiří Matas by Ing. Denys Rozumnyi, whose thesis focused on the search and tracking of objects moving at high speeds, such as balls in various sports disciplines. Another significant achievement is the first place of Ing. Šimon Mandlík in the IT SPY 2020 competition for the best thesis. The graduate of the OI programme scored among

1,400 competitors with his thesis on internet mapping.

Last year, CzechInvest's Hackthecrisis.cz prize was awarded to the team of doc. Tomáš Krajník from the Department of Computer Science for the project FreMEn contra covid. Their application kdynakoupit.cz (formerly Nebojsa) can advise on how to avoid queues in shops and large concentrations of people in public places. The innovation also scored points in the Best anti-covid IT project category organised by the Asian Institute of Technology.

Covid-19

FEE researchers and students responded to the pandemic with a number of technological innovations that have contributed to the development and production of protective devices against coronavirus. The faculty developed a special process for printing protective masks that anyone can make on their own 3D printer. In addition, an algorithm developed by FEE scientists helped automate coronavirus testing at Motol University Hospital. The aim was to enable the hospital's pipetting robots to handle samples quickly and safely so as to avoid contaminating each other. One of the biggest challenges was coping with remote teaching. Specific examples of solutions include the innovative LEO lab developed by the Measurement Department, or the remote lab model that allows students to perform more challenging measurements remotely.

Personalities of the Year 2020

Prof. RNDr. Petr Kulhánek, CSc.,

from the many FEE personalities that 2020 has brought to the fore, we mention only a few. The first of them is Prof. Petr Kulhánek. The theoretical physicist, who works at the Department of Physics, created during the state of emergency a comprehensive set of online courses dedicated to physics, especially for first-year students, which has had over 60,000 views on the faculty's YouTube channel alone. In addition, through the Aldebaran association, he promotes astrophysics and plasma physics not only among CTU students. Due to his long-term popularisation and teaching activities, Prof. Kulhánek was selected as one of the five laureates of the Ministry of Education and Science Award for outstanding educational activities at the university for 2020.

Prof. Ing. Tomáš Svoboda, Ph.D.,

another personality from our faculty is Prof. Tomáš Svoboda, Head of the Department of Cybernetics, who will complete his professorship in 2020. He also manages a team from the Department of Cybernetics and the Department of Computer Science under the banner of CTU-CRAS-NORLAB. His team was awarded USD 1.5 million for research funded by the U.S. Department of Defense Advanced Research Projects Agency (DARPA). This will allow the researchers to purchase advanced robotic hardware to be fully competitive in the DARPA Subterranean Challenge, the final round of which is scheduled to take place in the fall of 2021.

2020 was the year of the 65th anniversary of the faculty's founding, but it was also the year of the virus that affected us all.
Among the events that we will benefit from and that will influence our future students and research teams is the positive decision of the State Office for Nuclear Safety, which allowed the construction of a second nuclear facility to proceed.
We opened a number of new study programmes that will be in place for the next ten years. Furthermore, the faculty (and our entire school) was evaluated by an international evaluation panel, which awarded us the highest honours. The big challenge of the year was the transition from contact teaching to virtual space. What would otherwise take months or even years to implement, we had to master in weeks.
The faculty also had the honour of hosting two major scientific meetings of global importance, the ICHEP conference on particle physics and the Europhoton conference targeting laser physics and its applications. Both were eventually held in virtual space. The negatives associated with this format were more than offset by the opportunity to offer participation to a much larger number of interested parties.
One of the outputs of the Centre of Advanced Applied Sciences project was a ballet evening on the theme of Physics and Ballet at the CAAS Gala Assembly on the eve of the onset of the second wave of covid.
What to wish for in the coming year? I'm sure we can all agree - reunions. The year 2020 has taught us, through everyday life, what can be replaced with digitisation and advanced communications. But what we were missing and will probably miss again is meeting students, colleagues and the creative atmosphere of people who enjoy sharing their ideas.

Prof. Ing. Igor Jex, DrSc.,
Dean of the Faculty of Nuclear Sciences and Physical Engineering, CTU

Virtually overnight, the Department of Nuclear Chemistry began production of AntiCOVID disinfectant.

FACULTY OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING

Study programmes

During the year, the faculty completed the accreditation of eleven new programmes to be offered to prospective students. Among them, Nuclear Decommissioning is worth mentioning, which is unique in the Czech Republic in its complexity and will educate experts from foreign countries, as does the Quantum Technologies programme.

Projects and international cooperation

FNSPE is currently running several large projects with university-wide engagement. The centre also facilitated unique fusions of art and physics, such as the art competition for secondary school students at the ICHEP conference, or the full-length performance Physics and Ballet by choreographer Marika Blahoutová, who collaborated on the various themes with Prof. Igor Jex, Dean of FNSPE. Due to the pandemic situation, the performance was not only performed live in the Bethlehem Chapel, but in cooperation with IIM and an external provider, the entire show was filmed and broadcast on TV9P.

Also in 2020, the international Horizon 2020 project Scintillating Porous Architectures for Radioactive gas detection, SPARTE, was launched in cooperation with Universite Claude Bernard Lyon (France). SPARTE will focus on metrology for the detection and activity measurement of indicators related to nuclear activities worldwide.

In addition, the faculty collaborates with more than a hundred international entities, ranging from universities to commercial companies, for which we provide expertise or train personnel.

Awards for our doctoral students

Denisa Štěpánková won the Crytur Award for the pulse optimization of a high-power picosecond laser system. In the Joseph Fourier competition for the best research paper in computer science, Jitka Kostková,

a doctoral student from the Department of Mathematics, won the top award. Her research on invariants could help car body designers increase the speed and reduce the fuel consumption of vehicles. Last year, Marek Matas, a student from the Department of Physics, came first in the French Becquerel Prize, which recognises the best achievements of young scientists in the field of nuclear physics. Marek impressed the jury with his research into the phenomenology of high-energy quantum chromodynamics. A list of all the staff and students awarded can be found on the faculty's website.

"Jaderka" helps fight the epidemic

On Sunday, 1 March 2020, the first three cases of Covid-19 were confirmed in the Czech Republic. On 10 March the rector of CTU restricted teaching, a day later all schools were closed and on 12 March the government declared a state of emergency for a month. Within a few days, disinfectants and respirators demanded by customers virtually disappeared from shops.

Virtually overnight, the Department of Nuclear Chemistry began production of AntiCOVID disinfectant. The first tens of litres were available for the needs of CTU on Monday, 9 March 2020, but then the volumes grew and FNSPE supplied disinfectant not only to CTU, but also to other institutions, especially organisations of the capital city Prague - Integrated Rescue System, Transport Company, Motol University Hospital and others. It also provided assistance to doctors, children's homes and retirement homes.

After a month and a half, on Friday, 24 April 2020, the statistics of the manufactory production stopped at 112 thousand litres! The faculty thus helped until the companies prepared their lines to produce disinfectant in large volumes and were able to saturate the market.

"As scientists, we mostly work with pipettes and tubes with millilitre volumes. With disinfection, we have experienced what it is like when we have to multiply production. In the first week we went from tens of litres a day to a thousand, then to three thousand, and ended up producing up to seven thousand litres of disinfectant a day. It is an interesting experience for us to convert chemical processes from laboratory to operational scale," explains

One of the outcomes of the CAAS project was a ballet evening on the theme of Physics and Ballet at the CAAS Gala Assembly on the eve of the onset of the second wave of covid.

ICHEP Conference on Particle Physics.

Professor Václav Čuba. A total of 34 people - from scientists to students - worked over 3,600 hours, i.e. 451 eight-hour shifts.

Emergency sterilization has become a hit

Advice on how to sterilise a respirator in emergency, provided by Václav Čuba literally spread like wildfire. This was again in response to the severe shortage of protective equipment.

It was the most shared and commented post on the FNSPE Facebook page in history and the text of the advice appeared in various media throughout the spring of 2020.

In 2020 we commemorated the 100th anniversary of the modern history of CTU. At the Faculty of Architecture we decided to contribute to the mapping of our past by approaching Prof. Vladimír Šlapeta to write a book dedicated to the teaching of architecture at CTU over the past century. "Looking back at the past reminds us of the richness of our history and helps us not to take the current long period of peace, freedom and prosperity as a permanent state that we do not need to develop, protect and care for."

The reminder of the richness of history was tied to the political and social aspects of our development, which we can influence by our attitudes and prudence. However, even today, in the almost unnatural, essentially artificial and increasingly virtual world of the information age, the fragility of our existence is still partly dependent on the vagaries of nature. At times, the natural world of the wilderness strongly asserts itself and distracts us from watching screens and seemingly controlling the apparatuses by which we are in fact increasingly controlled.

Perhaps it is in this artificial age, when we are slowly becoming unaware of how cut off we are from the reality of the natural world we are transforming with such force and intensity, that these catastrophic mementos are a useful and necessary reminder of our true position. Which we forget in our daze from technical and technological possibilities and conveniences and the opportunities they present.

The Covid-19 pandemic has not only reminded us of the fragility of our destinies and the vulnerability of our certainties, systems and degrees of freedom, but also taught us to use new forms and methods of teaching and the devices and programmes needed to do so. Let us learn to use and further develop the positive aspects of the impact of the pandemic, not only at the more easily implementable level of applying new methods and programmes in teaching, but also at the subtle level of seeing and perceiving the fragility and vulnerability of our existence and of the whole Earth, which we are influencing and changing more and more intensely and significantly. Previously unconsciously, gradually more and more deliberately, and more recently unintentionally, and yet more and more significantly. This is also thanks to the contribution of our graduates - urban planners, architects, landscape designers and designers.

In the past years, on important round anniversaries, we commemorated the "richness of our history", and the parity of totalitarian and democratic principles and social systems during the hundred years of our country's existence. Let us not forget that totalitarian and despotic thinking and principles are not only reflected in the political and social plane, but also in our everyday attitudes, such as our relationship with the landscape and nature. In this respect, we are perhaps still at the level of totalitarian regimes, or even colonizers and slave-owners, which are passé in political, social and "human" terms. So much so that we don't even understand how such a thing was possible, and this makes it easier for us to take a judgmental distancing stance when we are reminded today of the imbalance of the scale set in the past and the need for respecting other races, nationalities or classes. The lack of respect for the landscape persists because we do not yet perceive it sufficiently and therefore participate in further upsetting the equilibrium without restraint.

Let us not close our eyes to the past, let us learn from it, but let us not judge the old sins of the past with today's eyes, be it the sins of the slave-owners or the communists. Rather, let us honestly imagine how we might have behaved in those times and conditions, and let us focus our distance and any distance on the present. It does not take courage to distance ourselves from the past; it is necessary for our current attitudes and approaches. Let us focus on recognizing and not participating in the present sins by acquiring the ability to judge them through the eyes of our descendants.

Everything bad is good for something. Among other things, catastrophic years in hindsight help us to navigate through the past, during the timeless space of untroubled and prosperous periods. We will not easily forget 2020. The constraints and impacts of the global pandemic will become a defining event in history and its gauge, just like the floods in the summer of 2002.

Floods cannot be prevented just by building flood barriers, but can be much more effectively and meaningfully prevented by removing the causes of floods that we often artificially construct and by halting further escalation of the "development" of these causes. Let us learn from the past and from our own mistakes and errors, but not for the purpose of condemning and distancing ourselves from our past and our ancestors. Let us use the lessons of the past to see through and expose the mistakes of our time in which we are complicit. Let us orient our thoughts and actions forward, towards the future, with respect for the world, both built up areas landscape, seeking to do no harm.

We boast unprecedented advances in science, research and engineering disciplines, advances in education and technology, and we have at our disposal a previously unimaginable capacity for our own and artificial intelligence. So let us use them to avoid having to apologise in the future for our mistakes and errors, in which we often invest in ‚good faith' - with the ‚intelligence' and associated ‚providence' inherent in our times - so much effort, energy and investment. So that our descendants do not have to pay dearly for our mistakes when they clean up and eliminate their harmful and catastrophic effects.

If the degree of intelligence and potential capacity and capability is inversely proportional to the foresight and providence of our decisions and actions, as empirical evidence often shows us, we need to finally learn from these crisis developments in society and landscape of recent years. Intelligence alone, including artificial intelligence, nor technical and techno-logical prowess, is obviously not enough if it is not accompanied by wisdom and its attendant prudence, humility and sensitivity.

The paradigm shift in land reclamation and straightening of meanders and strengthening of river banks is evident. Let us try to observe and reflect it even in the less gaudy and visible positions and areas of urban planning, architecture, landscape and design. Our task is not only to learn to recognize what we have already seen, but also to see ahead and not lose the humility inherent in our relation to the world.

Prof. Ing. arch. Ladislav Lábus, Hon. FAIA,
Dean of the Faculty of Architecture, CTU

FACULTY OF ARCHITECTURE

Projects

The Faculty of Architecture engages in a number of scientific research projects, mostly in applied research. In 2020, three large-scale projects were launched, funded by the Ministry of Culture of the Czech Republic within the NAKI II programme: "Architecture of the 1980s in the Czech Republic. Specificity, Identity and Parallel Reflections on the Background of Normalization" (P. Vorlík). Projects run in cooperation with the Institute of Theoretical and Applied Mechanics of the Academy of Sciences of the Czech Republic included: "Origins and Attributes of Heritage Values of Historic Towns of the Czech Republic" (J. Jehlík) and "Industrial Architecture. Industrial heritage as a technical-architectural work and as an identity of place" (L. Beran).

The faculty was also involved in projects of TA ČR, e.g. "Search for new methods to support the implementation of the principle of universal design in the investment support of housing" (I. Šestáková), "Revitalization of urban housing estates with an emphasis on the solution of their spatial arrangement and organization of public space" (M. Kohout) and "Valuation models of public goods for spatial planning purposes" (J. Vorel).

International cooperation

2020 was a year of surprising changes. We were preparing for an intensive spring and working summer, but at the beginning of March the faculty closed down from one day to the next, the coronavirus epidemic hit the Czech Republic and all international activities stopped. We managed to maintain the tradition of foreign teachers leading the studios, with Till Rehwaldt from Dresden and Mirko Baum from Aachen continuing their work, unfortunately only online. The studio led by Mirko Baum also produced Vojtěch Rudorfer's diploma project Hangar for a research airship in Spitsbergen, which won the 6th Kaplicky Internship 2020 competition.

Awards

Faculty teachers received a number of awards in the XXVIIArchitects' Grand Prix: V. Sosna won the main prize for the design of the City Hall in Modřice, P. Melková and M. Cikán won the Architectural Design and Reconstruction Prize for the design of the Jan Palach Memorial in Všetaty, Š. Valouch received the Award for Reconstruction with his design of the headquarters of Lasvit. With this project he also won the Czech Architecture Award 2020 announced by the Czech Chamber of Architects.

M. Pospíšil graduated with honours from his doctoral studies at the Sorbonne in Paris. He completed his five-year study of the history of technology at Czech Technical University in Prague and at the Centre d'Histoire des Sciences et des Techniques at the Université Paris 1 Panthéon Sorbonne.

Honourable mentions in the Architects' Grand Prix - National Architecture Award 2020 competition went to two teams from the Hlaváček-Čeněk studio - J. Kopecká, A. Blažková, E. Ebringer, M. Košař and M. Křižáková for Kømen, a shelter at Balvan Waterfall, and T. Minarovič, M. Bílek, J. Binter, T. Chvojková, O. Králík, M. Kulhavý, P. Lávová, E. Müllerová and P. Struhař for the footbridge over the Hluboká creek in the Giant Mountains.

P. Matoušů won 2nd place in the Grand Mobitex 2020 design competition, the student section, for his design of porcelain coffee cups and saucers. N. Mikulecká won the Best in Design competition in the Product & Industrial Design category for her design of a tap stand and beer coasters made of porcelain.

The students of the Landscape Architecture programme, H. Enochová, P. Stojaník, M. Kratochvíl, J. Trpkoš and D. G. Tesárková, were also successful in the competition for the best exhibition design and will have the opportunity to present their designs at the prestigious International Garden Festival in Chaumont-sur-Loire in France in 2021.

Important events and developments

The international conference "How did our workers wish to live? Sociological Expertise and Housing 1945-1989" was held on 9 October 2020 in a distance format. In addition to architectural historians and sociologists from the Czech Republic, papers were presented by experts from Hungary, Germany, Poland and the United States. The keynote speaker and member of the scientific committee was Hubert Guzik from the FA CTU.

The faculty's Third Mission

The faculty enters into mutually beneficial cooperation with the public and private sectors. Students get the opportunity to implement novel ideas and enrich the quality of public space. We have been cooperating with the KRNAP Administration for a long time. Atüln, Jenga, Kømen, Oko, Silo and Stan, the six shelters designed and built for the Krkonoše National Park by the students of the four ateliers of the Design Institute II, have been in place since autumn 2020. The information kiosk Piškot, the latest result of the cooperation between the institute and the national park, was placed on the Golden Hill for a few months in August 2020.

As part of the cooperation with the Landscape Festival 2020 in Prague, students of the Seho and Mádr studios designed and realised two water feature objects in Žižkov, Prague. The waterlevel object was placed in the public space of the intersection of Rokycanova and Prokopova streets, while the Joy to Lie project functioned as a seating and misting area in the Radost Park.

Personalities

Zdeněk Zavřel headed the CTU FA as its dean from 2006 to 2014. During his tenure, he brought it closer to European standards, as he learned them during his internship with Van den Broek and Bakem in the Netherlands. He graduated from the faculty in 1966, from 1970 he was a member of the SIAL Liberec School. In 1978 he emigrated and built up an architectural office in Rotterdam and realized a number of residential and civil buildings, while also teaching at TU Delft. Until 2018, he was the head of the Institute of Design II at the FA CTU. In 1998 he was awarded the Grand Prix of the Architects' Association for his lifetime achievement. He is the recipient of the Felber Gold Medal (2013) and the ČKA Honour Award (2020).

Even in 2020, the Faculty of Transportation Sciences fulfilled its primary role of transportation education in all accredited forms of study, but this was affected by government measures and moved almost completely to a virtual environment. In spite of these complications, it was possible to fully implement the teaching programmes and to impart all the necessary knowledge to the students.
We also focused on strengthening know-how and knowledge in the field of transportation sciences and research. A large area for faculty development was identified in excellence in science and research, which has been assignedthe highest priority, both in staffing considerations and in the search for incentive programmes and projects. We believe that the implementation of the principles of HR Awards will facilitate individual personal growth and bring about much needed success in doctoral, habilitation and appointment processes. The life of the faculty continues to be significantly influenced by the ongoing generational renewal, with incoming young academic professionals taking responsibility for the implementation of the faculty's development vision and solutions to scientific research projects.
Professional activities for the state administration and local governments at all levels can be considered of great importance. Traditionally, there are also a very close links to the industrial sector and commercial companies, with which we carry out research and consultancy activities. In addition, close cooperation with the commercial sector allows us to involve practitioners in the teaching and projects of our students.
In the coming period, we will face a number of challenges, such as institutional accreditation and the preparation of National Centres of Competence programmes. I believe that as one team we will manage all this and continue to be a quality and integral part of CTU.

Doc. Ing. Pavel Hrubeš, Ph.D.,
Dean of the Faculty of Transportation Sciences, CTU

FACULTY OF TRANSPORTATION SCIENCES

Study programmes

In 2020, the accreditation process of a number of bachelor's, masters and doctoral study programmes was successfully completed. The National Accreditation Office granted accreditation to the bachelor's programmes Technology in Transportation and Telecommunications and Professional Pilot, and to the follow-up master's programmes Transport Systems and Technology, Intelligent Transport Systems and Logistics and Transport Process Management. The doctoral programmes Logistics and Transport Process Management, Air Transport Operations and Management and Intelligent Transport Systems were also grantedaccreditation. In 2020, a completely new study programme Smart Cities was also accredited at the level of a follow-up master's and doctoral programme, which was devised in cooperation with the Faculty of Architecture of Czech Technical University in Prague and the University of Texas at El Paso.

Projects

The most important projects under way in 2020 included the Universal Training Simulator for Public Transit Vehicles, funded by the Operational Programme Prague - Growth Pole of the Czech Republic, and C-ROADS, funded under the European CEF programme.

The training simulator project is aimed at improving the safety of public transit vehicles (metro, bus, tram), where a high level of responsibility still lies with the driver. One of the key objectives is the development and implementation of a unique prototype of the simulator for the training of drivers of public transit vehicles and the methodology for the implementation of the training of these workers, where the primary and target user will be the Prague Transit Company. The project includes preparation for the production of the final product, which will be commercially purchased by the Transit Company.

The main objective of C-ROADS is to develop cooperative systems on the motorway network and in cities in 18 EU countries and to improve road safety by providing up-to-date locally and temporally relevant traffic information. Within the scope of the project, the Faculty of Transportation Sciences in the Czech Republic addresses the issues of safety, testing and evaluation, while at the European level it represents the Czech Republic in working groups and cooperates in the development of C-ITS systems security, their evaluation and personal data protection.

International cooperation

As part of our long-term cooperation with the University of Texas at El Paso, we are implementing a Dual Master's Degree Program in Smart Cities valid until 2024. In cooperation with the US university new Master's Degree Program SC - Smart Cities taught in English was also inaugurated in 2020. At the end of the year, communication was initiated with representatives of the National Taiwan University of Science and Technology (NTUST) to establish cooperation on a new doctoral programme S - Smart Cities.

Awards

The year 2020 was specific in many ways and most events were cancelled en masse, yet it did not pass without success for the Faculty of Transportation Sciences. In a poll for the best athlete

of CTU, the first-year bachelor student Antonia Galušková, who competes in canoe slalom, scored many successes in 2020 - 1st place in the team competition and 9th place in the individual race at the European Championships in Prague's Troja, 3rd place in the individual race and 3rd place in the team competition at the European Championships in Krakow in the category of up to 23 years old, and overall 3rd place in the nomination to the senior team for the Olympic Games in Tokyo, Japan.

Significant events and developments

Although the year 2020 was not very favourable to large events where scientists exchange experience and present their scientific results, the organizing team headed by Prof. Ondřej Přibyl and Prof. Miroslav Svítek managed to organize the 6th organize the 6th international conference IEEE Smart Cities Symposium Prague, which in its relatively short history has already earned a firm place among professional events in the field of Smart Cities. Part of the conference took place at Prague's ARA Palace, where a small group of participants gathered but, due to the epidemic measures, most of the foreign participants joined the conference virtually. At the event, held was under the auspices of the Minister of Transport Karel Havlíček and Prague Mayor Zdeněk Hřib, many interesting papers were presented, such as invited lectures by Professor Anders R. Müller from the University of Stavanger, Lutz Heuser from Smart City Forum Germany, and Porie Saikia-Eapen from the Metropolitan Transportation Authority New York.

The faculty's Third Mission

Although the faculty has experienced a generational change in recent years, it can be said that new experts are gradually emerging who are successful and respected in their fields, without changing the intensity of cooperation with state and local governments. Traditionally, the faculty has also had very close links with industry, allowing for significant collaboration of practitioners in our project-based learning, and it is perceived as an important professional authority in the field of transportation.

Personalities of the Year 2020

Prof. Ing. Petr Moos, CSc., dr. h. c.,

founder and long-time dean of the Faculty of Transportation Sciences at CTU, who still works there as a lecturer and supervisor of doctoral students. His entire professional life has been devoted to the field of systems theory, radioelectronics and telecommunications. He is the author of more than 120 scientific articles, several monographs and dozens of university textbooks. In 1998, he was the Minister of Transport in Josef Tošovský's government, and in the following years he participated in the development of transport in the Czech Republic in various advisory and executive roles (advisor to the Minister, member of the Minister's expert group, etc.).

Prof. Ing. Ondřej Přibyl, Ph.D.,

head of the Department of Applied Mathematics at the Faculty of Transportation Sciences, CTU, has long been involved in the field of traffic simulations, data processing and Smart Cities. He is also a member of the CEN/TC 278 standardization committee for intelligent transport systems and co-founder of the IEEE Smart Cities Symposium Prague, which has gained prestige and recognition in the professional community during its six years of existence. He has published dozens of technical articles and several monographs, and is also a successful researcher in projects implemented under the H2020 TA CR Transport 2020+ and other programmes.

The year 2020 was a difficult year for the faculty, yet successful in many ways. In the fight against the pandemic, the justification for the establishment and existence of an interdisciplinary faculty was proven once again. The development of new technical solutions and complex instrumental technologies suitable for applications in clinical medicine is only possible in cases of long-term research work by engineers who must have very good medical knowledge of anatomy, physiology, pathological physiology, etc. Technical engineering skills must be in symbiosis with knowledge of basic medical disciplines. The result of the work of such specialists from our faculty is a unique protected pulmonary ventilation solution designed for treatment of the Covid-19 disease. Based on this solution, the CoroVent pulmonary ventilator was developed in a very short time, saving the lives of the most severely ill Covid patients. We offered this unique device, in which the UN and other partners have shown interest, to the state to save the citizens of the Czech Republic.

Hundreds of our students are helping on the front line, they can be found at Covid patients' bedsides, taking samples and testing, many work as paramedics, and their help is used by state agencies and in tracing. From the small list of our activities, it is clear that the faculty worked one hundred percent, both our students and our staff.

We are also successful in robotic rehabilitation, for example, putting people with brain disorders back on their feet. Our athletes strive to participate in the Olympics, and our students and alumni win numerous awards for their scientific and research work. It is a pleasure to work or study at such a faculty.

Prof. MUDr. Jozef Rosina, Ph.D., MBA,
Dean of the Faculty of Biomedical Engineering, CTU

FACULTY OF BIOMEDICAL ENGINEERING

Study programs

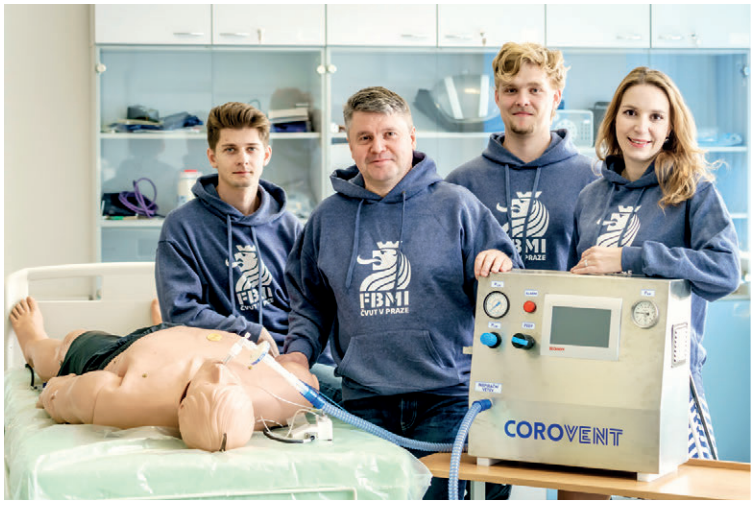
In 2020, the faculty completed a major extension of accreditation of all health and safety study programmes for 10 years, i.e. until 2030. These were Biomedical Engineering, Biomedical and Clinical Engineering, Public Safety and Security, Optics and Optometry, Radiological Assistance, and Biomedical Technology. In all cases, these are highly desirable professions not only in the Czech Republic, but also abroad. There is a great interest especially from the side of health care institutions, as these are so-called regulated professions subject to approval of the Ministry of Health of the Czech Republic or the Ministry of the Interior of the Czech Republic. The faculty holds an exceptional position in selected study programmes, both at the level of CTU and the whole Czech Republic.

Projects

In 2020, the faculty worked on 96 interdisciplinary projects, of which 37 were newly acquired across many sponsors. Very important projects with international engagement include the Irish-Israeli-Czech Horizon 2020 project, Fast Track to Innovation, LAA-Start by doc. Dr.-Ing. Jan Vrba, M.Sc., focusing on the design of an innovative cardiac implant for reducing the risk of blood clots, the GA project Electrically Readable Quantum Diamond Sensors for Nuclear Magnetic Resonance and Chemical Detection by Prof. RNDr. Miloš Nesládek, CSc., and also three MIT projects focusing on the application of nanotechnology for wound care by Prof. MUDr. Jozef Rosina, Ph.D., MBA.

International cooperation

An example of international cooperation with significant added value is the project of assistance to Cambodia in the field of neonatology within the cooperation of the Czech Development Agency, General University Hospital and CTU FBME. The faculty is represented by Ing. Petr Kudrna, Ph.D., not only in the area of providing appropriate instrumentation, but also in the preparation of training of new biomedical technicians and engineers. We can also mention an international project called Innovative Teaching Education in Mathematics - ITEM (Erasmus+: Higher Education - International Capacity Building) involving 16 foreign partners, initiated by RNDr. Eva Feuerstein, Ph.D., in cooperation with Israel and Greece. Its aim is to implement and validate a new approach to teaching mathematics based on good teaching practice, the principles of Problem Based Learning, the use of IT and frequent and systematic testing or verification of knowledge



during the semester with the possibility of an individual approach, which will help to increase both the academic success of students and their motivation. An example of mutually beneficial cooperation in the field of introduction of microwave technologies into medical therapy and diagnostics is the cooperation with Thomas Jefferson University Hospital, Philadelphia, represented by Prof. Paul Stauffer, Ph.D., under the leadership of Doc. Ing. David Vrba, Ph.D.

Awards

The team led by Ing. Jakub Ráfl, Ph.D., participated in the 2nd Milan ESICM's Datathon and ESICM's Big Datatalk organized by the European Society for Intensive Care Medicine (ESICM), where they won the second place. Dissertation of Ing. Ondřej Fišer, Ph.D., was included among the 13 best dissertations of the Czech Republic in the Siemens Prize competition, and Ing. Matouš Brunát won the award for the best thesis in the IEEE EMB competition. The CoroVent lung ventilator won the second place in the European hackathon EUvsVirus, initiated by the EC, and at the same time placed second in the Hack the Crisis Czech Republic hackathon.

Other major events and developments

The faculty acquired a new building in Kladno in the former Barracks area. This will allow further dynamic development of the local campus, for which the current two buildings are no longer sufficient. This was a "gift" for the 15th anniversary of the faculty, which has achieved very significant successes in all areas of its activities.

The faculty's Third Mission

The year 2020 has shown that the faculty can respond very quickly in crisis situations and thus be a significant asset to the population of the whole country. A significant example is the development of the CoroVent emergency lung ventilator by a team led by Prof. Ing. Roubík, Ph.D., in a record time. On 17 March, the intention for the production and delivery of the device was published, a week later the development was completed and in November it was already helping patients on the basis of a permit from the Ministry of Health of the Czech Republic for emergency use. The help of students, both volunteers and those deployed within the framework of the faculty's health and safety study programmes, was also crucial. One of the expressions of gratitude was, for example, awarding student Ing. Denisa Ralbovská during the NATO Days. The faculty joined the charity project Computers for Children by donating twelve computers. As part of a long-term effort to involve selected secondary schools in mutually beneficial cooperation, a contract was signed in February 2020 to confer the title of Faculty School on the Postupická Grammar School in Prague, which is the fourth such school to receive the title. At the Global Science Café organized by the Czech Centres, Bc. Šimon Walzel, student of the faculty and coordinator of the CoroVent team, discussed research and innovation in fighting the Covid-19 disease on behalf of the faculty. Last but not least, we should mention the filing of four patent applications in the field of medical devices, whose main author is doc. PhDr. Ing. Jaroslav Průcha, Ph.D. et Ph.D., which have a significant potential for application in clinical practice.

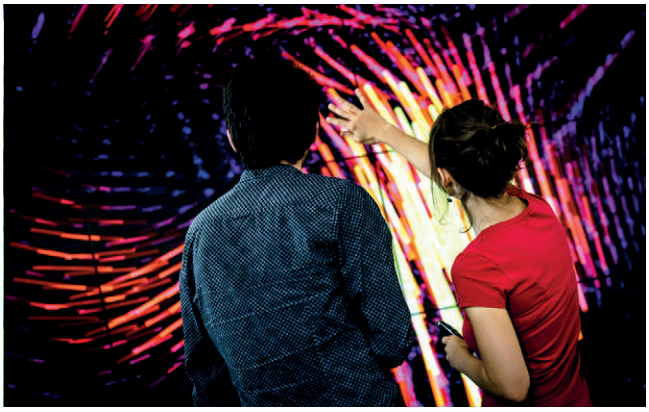
Personalities of the Year 2020

Prof. Ing. Karel Roubík, Ph.D.,

the outstanding personalities of the faculty in 2020 include prof. Ing. Karel Roubík, Ph.D., as the initiator of the idea and team leader for the development of the CoroVent emergency pulmonary ventilator. Professor Roubík started his career in the 1990s at the Institute for Mother and Child Care, where he designed unconventional ventilation techniques. He used this experience in the spring of 2020, when there was a severe shortage of ventilators in hospitals. With his team, he desined a prototype, which was produced in record time, also with the help of fundraising.
Doctoral student Mgr. Slávka Neťuková achieved the third best results at the faculty in terms of publications, applied results, citations (185 without self-citations) and grants. She has submitted her dissertation and her h-index is 6. In addition, she is the author and administrator of the PROJECTS system, which manages assignments and submissions of various types of projects and bachelor's and master's theses, and which has been in operation at the faculty since 2009.
Other personalities worth mentioning are PhD graduates Ing. Jan Dudák, Ph.D., and Ing. Ondřej Klempíř, Ph.D. Their dissertations and results, or their contributions, were evaluated by the committee as very significant and excellent. Both graduates are among the talented and motivated postdocs with considerable scientific potential, which predestines them for the role of supervisor or specialist supervisor.

The faculty was established on 1 July 2009 as the eighth faculty of CTU. It currently has six departments and one research facility built from an ERC grant and is housed in two interconnected buildings on the CTU campus in Prague - Dejvice.
FIT is a nationally and internationally recognized faculty in the field of education, science, research and innovation. It is open to a modern style of cooperation with a focus on information and communication technologies. As a result, it provides quality technical instruction in the main fields of computer science at all three levels of education, from bachelor's studies to follow-up master's to doctoral studies.
Education at FIT has a balanced ratio of theoretical fundamentals and engineering-technical disciplines with a sufficient degree of project-based learning and electivity. All this together allows for the necessary individual profiling of students.
The faculty actively cooperates with leading industrial, business, research and development institutions as well as public and state administration. This cooperation with partner institutions allows us to follow new trends and adequately innovate the content of courses and seek new forms of student education.
From the beginning of the year, the faculty, like many other organisations, had to deal with the epidemiological situation caused by the Covid-19 disease. Thanks to its focus on information and communication technologies, it was able to deal with this unexpected situation very well and quickly. The transition to distance learning was thus smooth.

Doc. RNDr. Ing. Marcel Jiřina, Ph.D.,
Dean of the Faculty of Information Technology, CTU



FACULTY OF INFORMATION TECHNOLOGY

Study programmes

FIT offers new specialisations for students of Bachelor and Master of Informatics. In addition to the recently modernised master's programme with nine specializations, ten bachelor's specialisations in both Czech and English have been added. Computer science is also taught as a doctoral programme. Specialisations as artificial intelligence, management informatics or computer security are a continuation of the faculty's efforts at ongoing modernisation.

The bachelor's degree covers all areas of computer science. It allows the selection of specialisation from the second year onwards, the possibility of a paid internship while studying, and cooperation with leading IT companies. The master's programme is a follow-up to the bachelor's programme. It offers professional studies in a selected specialisation as well as cooperation on scientific projects.

Projects

FIT participates in many projects and grants from various providers (TA CR, GA CR, European Commission, CELSA). Among important projects we can highlight Evolving Language Ecosystems (ELE) and Big Code, Image Processing Laboratory, Intelligent Embedded Laboratory or the international project Research Center for Informatics in which FIT participates in cooperation with other faculties of CTU.

International cooperation

The ICT department utilised the computing capacity of CloudFIT and ClusterFIT platforms in the Folding@home project. It is used by development teams around the world for computations and simulations in research of therapeutic agents against coronavirus and other diseases. As a result, FIT took the top place in the ranking of teams from Czech academic institutions that provided their computing power to this project. Cooperation with Stanford University continued in 2020 within the framework of an intensive course for secondary school students called Introduction to Computer Science, and in a new development, talks were initiated on a double degree programme with Baylor University - Texas, USA.

Awards

A scientific paper published by a team of scientists including doc. RNDr. Pavel Surynek, Ph.D., from FIT won the Outstanding Student Paper Award at the prestigious ICAPS 2020 world conference. The paper was an outcome of collaboration between FIT CTU and the University of Southern California.

Bc. Pavel Jahoda achieved an exceptional success in the form of presentation of a technical paper at the European Conference on Computer Vision 2020. The paper is based on his bachelor thesis.

Important events and developments

As part of university-wide activities, the faculty also participated in events for the general public, such as Museum Night, Science Festival and Night of Scientists.

Several educational activities were also aimed at secondary school students, the vast majority of which were conducted online. One example is the third year of the Introduction to Computer Science programming course, which took place from 4 to21 August. One of the few events held at the faculty was the Open House Day on 29 January. Its online version took place on 21 November and was comparable to the face-to-face version in terms of information provided. A number of students and lecturers took part, answering questions about their studies live. The annual Czechitas IT Summer School was also organised on the faculty premises from 2 to7 August 2020.

Secondary school students could also participate in the 7th edition of the FIKS competition - the FIT Computer Correspondence Seminar. The faculty organised or co-organised hackathons for students, namely HackFIT, HackPrague or UniHack. LAW FIT or COFIT ONLINE were other important events.

The faculty's Third Mission

FIT offers courses for combined forms of study, in addition to organising lifelong learning courses for the public. The faculty also supports education within the framework of the so-called University of the Third Age. In addition, it is active in the field of technology transfer to practice, especially intellectual property licensing. These activities bring the faculty not only financial resources, but especially links to companies that provide long-term cooperation in the field of applied research and development.

Within CTU, FIT participates in the prg. ai initiative, established jointly with Charles University, the Czech Academy of Sciences and the City of Prague. This initiative promotes cutting-edge science and research in the field of artificial intelligence.

In the fight against coronavirus, the faculty has engaged in several major projects, while students themselves are coming up with their own ideas to

help in this situation. FIT produced an independent assessment of the mobile app eRouškathat confirms that the app respects user privacy. The faculty also participates in the Folding@home project, which is used by development teams around the world for computations and simulations in researching therapeutic agents to combat coronavirus and other infections. With the support of the Capital City of Prague and prg.ai, it also organised the innovative online hackathon UniHack on 1-3 May where talented students joined forces with experts to help the Czech economy cope with the consequences of coronavirus.

Student Tomáš Dostál created the website potrebujurousku.cz, summing up the latest regulations issued to prevent the spread of Covid-19. FIT and FEE students developed the logistics platform GoDeliver, which helped provide food and parcel delivery to senior citizens and people in quarantine. FIT staff and students were involved in the development part of the Neighbourhood Outreach project, which aimed to make it easier for volunteers to deliver food and medicine to people most at risk of coronavirus infection. A team of medical and IT students developed the Smart Triage app to help triage patients in hospitals, which is time-consuming and increases the risk of transmission.

The faculty also joined the VODAN (Virus Outbreak Data Network) initiative. It is an optimization of data management that will provide valuable data related to Covid-19. Three FIT students applied their IT knowledge in the fight against coronavirus by launching the service coronavirus24.cz. They created a new communication channel where the public could ask questions about coronavirus. In cooperation with FIT students, the Wowee web application project was created, which works on the principle of fundraising.

Personalities of the Year 2020

Prof. Ing. Pavel Tvrdík, CSc.,

professor Tvrdík is the founder and first dean of FIT. He is currently the Head of the Department of Computer Systems. He is the guarantor of several study programmes and leads the Parallel and Distributed Computing research groups at FIT and the HPC and Big Data research team within the Research Centre for Informatics (RCI) at FEE CTU. In 2020, his team under RCI, in collaboration with the Astronomical Institute of the Academy of Sciences, developed a unique active deep learning method to identify rare and previously unknown space objects in large astronomical databases.

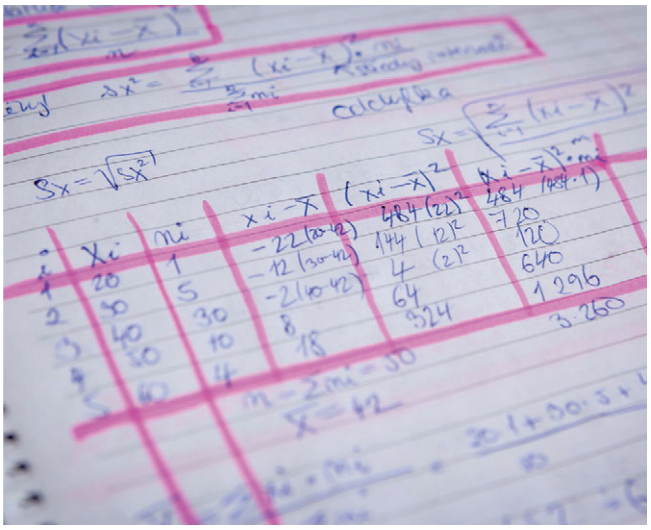
Bc. Martin Mazanec,

together with his friend Matouš Skála, they founded Fitify Workouts, a company developing fitness apps. Thanks to his idea, Martin was selected by the prestigious Forbes Czech Republic magazine for the 30 under 30 list. Nevertheless, within a short period of time, he "got the hang of it" and started working on his own project. At first it was just a student side project but, step by step, Fitify Workouts was born. They have reached more than 10 million people worldwide with their app to date. It's also the reason they made it to the main page of Apple's AppStore.

2020 was a year of radical changes at the Masaryk Institute of Advanced Studies (MIAS). When in January 2020 its former management announced their decision to move to University of Chemistry and Technology in September and take most of the academic staff with them, it seemed that the Institute would not live to see its thirtieth anniversary (April 2022). Moreover, the new management appointed at the beginning of March 2020 (Prof. Vladimíra Dvořáková, Doc. David Vaněček) had to cope not only with the crisis at the Institute, but also with the pandemic and, as a result, with the transition to online teaching. In spite of these difficulties, the activities of the MIAS were maintained at the necessary academic and administrative level. Overcoming the crisis also became an impetus for broader discussions about the future and profile of the Institute, which, in addition to providing accredited study programmes and related professional and research activities, also emphasises its social role. This means that it must respond to the needs of society, whether it is the newly developed concept of education of teachers of technical disciplines, participation in lifelong learning of CTU employees and the wider public, the quality of language preparation of foreign students for studies in the Czech Republic, or the expansion of pedagogical, psychological, didactic and other competencies of existing teachers. It should also undeniably fulfil the mission of universities as centres of education that communicate with the broad public, open discussions on society-wide issues and strengthen civic culture.

Despite the ongoing crisis and pandemic situation, the Masaryk Institute of Advanced Studies is heading into the future with a clear vision, a dynamic team and an appetite for further work.

Prof. PhDr. Vladimíra Dvořáková, CSc.,
Director of the Masaryk Institute of Advanced Studies, CTU



MASARYK INSTITUTE OF ADVANCED STUDIES

Study programmes

The Institute continues to rely on three basic pillars - teaching, economics and quality language teaching, but the overall concept is being transformed, modernised and more closely linked to other parts of CTU. In the pedagogical studies, focused on the so-called "engineering pedagogy", the study programme of practical teaching and vocational training was devised and prepared for accreditation, and at the same time, discussion opened on the preparation of teachers of professional technical subjects directly at the CTU faculties, using the pedagogical, psychological and didactic expertise of MIAS. The preparation of secondary school teachers of technical subjects has long been underestimated in our country, and along with this, the interest and motivation of students to pursue technical study programmes has been declining. The conceptual innovation and thus the improvement of the quality of education of future teachers should have a longer-term effect in terms of an increased level of qualified technicians and an increase in the interest of secondary school students in technical subjects; in the end, candidates enrolling in technical universities should enter the first year better prepared and motivated.

The economic study programmes - the bachelor's programme Economics and Management and the follow-up master's programme Innovation Project Management - prepare future managers for middle and senior positions, especially in large technology-oriented companies. It is impossible to survive in the 21st century without a good knowledge of foreign languages and a good orientation in intercultural relations in a globalised international environment.

Internationalisation

The promotion of internationalisation of the teaching and learning environment is linked to language learning and the acquisition of social competences for internationalisation. Although it is difficult to develop international relations in times of the pandemic, the number of foreign teachers working at the Institute has increased slightly as the academic environment has changed, and Czech language courses that prepare foreign students for studies in Czech degree programmes have been maintained. Teaching in the ERASMUS programmes was also ongoing, although it certainly did not meet all the expectations of the students in terms of experience and knowledge of everyday life in the countries concerned. On the other hand, participation in online international conferences became a standard, and the input of "visiting professors" into the teaching of foreign universities is also developing. While we are all looking forward to the full restoration of international contacts in their physical form, the experience of how easy it is to invite an interesting personality to teach or, conversely, to enter the courses taught in foreign countries, brings new impulses for the development of international cooperation.

Projects

Ongoing projects continued despite the difficult situation. At the same time, it was clear that systemic changes were needed to increase the scope and quality of research and scholarly work and publication outputs. The basic framework for these changes envisages professional support in the search for and processing of projects and contract research, as well as professional language editing of texts that are to be published in high-quality indexed journals. Above all, however, it is necessary to create a creative environment and research nuclei within and across institutes, thus exploiting the potential of the staff to the maximum extent. This is facilitated by newly funded small research projects designed to develop professional activity in relation to the subjects taught

and to support the prerequisites for successful submission of research or contract projects.

Public activities

In spite of the Covid-19 pandemic, MIAS did not interrupt its public activities, but had to transfer them to online platforms. Our Institute participated in the Week of Science and Technology of the Academy of Sciences of the Czech Republic, which took place from 2 to 11 November 2020, with two contributions: an interview with Czech Television presenter Daniel Stach on the meaning and forms of popularisation of science in today's society and an analysis of the 2020 presidential election in the United States prepared by Prof. Vladimíra Dvořáková. The changes in society in connection with the development of new technologies and the risks of social networks were discussed at MIAS on Friday, 27 November 2021, as part of the Night of Scientists. The Institute also presented itself to the public on Open House Days in an online form, and during 2020 developed a format that has become a model for other institutions and will be used by MIAS in future in parallel with the physically held Open House Days. In the area of public activities, the Institute seamlessly transitioned to online formats without content or technical complications.

Awards and other significant activities

During the pandemic, other activities were considerably curtailed, yet our students persevered to pursue sports activities whenever possible. And they did so with not inconsiderable success. In the poll for the Best CTU Athlete for 2020, two MIAS students, Vít Přindiš and Barbora Betlachová, came second and eighth respectively. The victory of the floorball team at the international tournament in Košice and in the national finals of the university floorball leagues showed not only the quality of the team, but also that a good team and sports spirit endure even in difficult conditions. And let's add to that the Stanislav Hanzal Award for excellent academic results and for outstanding socially beneficial activities went toour student Markéta Grbavčicová.

Personality of the Year 2020

Prof. RNDr. Emanuel Svoboda, CSc.,

focused on molecular physics, thermodynamics and the theory of teaching physics (didactics of physics). From 1969 to 2015, he worked at the Department of Didactics of Physics at the Faculty of Mathematics and Physics of Charles University in Prague, and at the same time, from 1994 to 2020, he worked at the Masaryk Institute of Advanced Studies of Czech Technical University, Department of Pedagogical and Psychological Studies. He was engaged in teaching didactics of vocational subjects for students with technical education, and he was widely known as a leading author and reviewer of physics textbooks for grammar and secondary vocational schools. His legacy includes fundamental publications for his students in the field of didactics. He was among the personalities who were awarded honorary membership of the Union of Czech Mathematicians and Physicists. He served as the president of the Physical Education Society and pursued many other social activities. He was an excellent scientist, an enthusiastic teacher and, above all, a kind, empathetic and helpful person. His colleagues and students will always remember him for his enthusiasm. Passion for his work and vitality radiated from him and he positively influenced those around him. He also contributed in a fundamental way to the conceptual issues of the international development of engineering pedagogy and thus continued the work of its spiritual father and founder, the scientist of Czech-Austrian origin, Ing. Dr. Phil. Adolf Melezink, CSc, Dr.h.c.
Prof. RNDr. Emanuel Svoboda, CSc., was born on 24 June 1940 in Pelhřimov and died at the age of nearly 80 on 18 April 2020.

The past year was notably more challenging than previous years due to the Covid-19 pandemic. Please allow me to thank my colleagues for the way they handled the situation and have managed it so far. Our work requires frequent personal participation and meetings with each other and with our partners, as well as visits to places of activity outside the Institute, e.g. during design diagnostics, work in laboratories, etc. In spite of all the obstacles, the Klokner Institute's employees continued to contribute without interruption to a complex set of science and research activities as well as to the development of close cooperation with the industrial and commercial sectors.

In 2020, we worked on grant projects announced by a number of providers, such as the Czech Technology Agency or the Ministry of Transport of the Czech Republic. The Institute also participated in the OP VVV project for international mobility of staff of research organisations.

We also successfully participated in many public tenders, which resulted in a number of agreements with key partners, e.g. a framework agreement with the Road and Motorway Directorate for inspections and diagnostics of bridges and load tests, or a framework agreement with the Technical Road Administration of of the Capital City of Prague for diagnostics and extraordinary inspections of bridges.

As in previous years, in 2020 our employees were able to apply the results of research and development in major commercial contracts. For example, we are the authors of a complex numerical model for the assessment and control of column deformations after the reconstruction of the Negrelli Viaduct.

In conclusion, let me remind you that the Klokner Institute is entering its 100th year of existence in 2021. I hope that, despite the difficult situation, our Institute will be able to properly celebrate this anniversary and step into another successful hundred years.

doc. Ing. Jiří Kolísko, Ph.D.,
Director of the Klokner Institute, CTU

KLOKNER INSTITUTE

Study programmes

Graduates of the master's degree programme can continue their studies at the Klokner Institute in two fields of the doctoral programme in Civil Engineering: 1) Science of Nonmetallic Materials and Building Materials and 2) Theory of Structures. The aim of the first field of study is to offer the highest university education in the field of building materials and testing of building materials and structures, and structural diagnostics to the graduates of the master's degree programme. The study programme includes comprehensive scientific training, on the basis of which the graduates will master the methodology of independent scientific work and expand their knowledge in the field of their specialisation, under the guidance of leading experts. Graduates of the doctoral studies in the second field will apply the acquired knowledge in research activities including attestation of reliability of new and existing building structures, design of models of standard and extreme loads and load effects, experimental analysis of structures, risk assessment of technical systems, and in the field of pre-normative research. During their studies, students work together on domestic and international collaborative research projects. Graduation from the PhD programme is a key step for further career growth in both research and practice. Graduates also win positions in foreign countries due to gaining language and professional knowledge during their internships abroad.

Students in both disciplines are supported in their research activities. They lead individual projects funded by the Student Grant Competition and participate in the implementation of research projects in order to gain experience in the technical solution of more complex projects and in the project management of entire research groups.

Projects

The research activities of the staff are partly financed through grant projects and operational programmes. In the past year, five scientific projects were launched - two standard projects financed by the Grant Agency of the Czech Republic, one project of the Ministry of Culture of the Czech Republic (NAKI II), one project of the Ministry of Transport of the Czech Republic (DOPRAVA 2020+) and one project of the Technology Agency of the Czech Republic (TREND 1). In addition, twenty-two other projects from various domestic providers were in progress. In the past year, five scientific projects were successfully completed.

International cooperation

In 2020, Klokner Institute staff served as members of editorial boards of prestigious professional journals (International Journal of Safety and Security Engineering, Structural Concrete - the Official journal of the fib, International Journal of Heritage Architecture, International Journal of Structural Glass and Advanced Materials Research) and on committees of a number of international conferences (ESREL, International Probabilistic Workshop).

The Klokner Institute participated in the call for international mobility of research, technical and administrative staff of research organisations within the framework of the university-wide project of the Operational Programme Science, Development and Education. The purpose of this project is to support the internationalisation activity of universities. Following a selection procedure, a foreign researcher was chosen to start a one-year internship at the Klokner Institute in the first half of 2021.

In 2020, Klokner Institute staff participated in international research on materials engineering and structural reliability (RILEM, IABSE, fib, WTA, JCSS). They also took part in international COST research projects and collaborated with prestigious research institutions (JRC Ispra, Politecnico di Torino, Torroja Institute, Madrid, TNO Delft, TU Ghent, de Coimbra - Polo II, University of Stellenbosch, South Africa) and major industrial partners (LafargeHolcim Research & Development, France).

Awards

As a result of the Covid-19 pandemic, a number of major symposia and events with associated professional awards were not held in 2020. Nevertheless, a young researcher at the Klokner Institute, Ing. Milan Holý, Ph.D., defended his dissertation thesis at the Faculty of Civil Engineering of Czech Technical University in the field of wood-concrete bridge structures using UHPC cement composite. In his work he used the extensive experimental and technological facilities of the Klokner Institute. His work was awarded the main prize by the Czech Concrete Society.

Important events and developments

Due to the ongoing Covid-19 pandemic, the organisation of professional events was postponed.

The Institute's Third Mission

The range of activities of the Klokner Institute and its staff is very wide. In addition to scientific activities, the staff was also involved in expert, innovative, teaching, forensic and standardisation activities in 2020.

Many of the outputs of the Klokner Institute's scientists are used in everyday life and are widely used by the commercial sector. Technology transfer is the alpha and omega of the work of scientists today. It is essential that the results of research find application in practice. This can only be achieved through close cooperation with renowned industrial partners. In 2020, the Klokner Institute cooperated with a number of them (TaK Architect, s.r.o.; AED project, a.s.; KOLTEX COLOR, s.r.o.; SUDOP PRAHA, a.s.; Geotec spol. s r.o.; Pontex, spol. s r.o.; VALBEK-EU, a.s.; STRABAG a.s.; HOCHTIEF CZ a.s.; Metrostav, a.s.; Skanska, a.s.; ČEZ, a.s.; Českomoravský beton, a.s.; KŠ PREFA, s.r.o.; Studio Federico Díaz s.r.o. and many others).

Furthermore, close cooperation was established with state administration authorities. This was carried out not only through grants and projects, but also under public contracts. Klokner Institute employees participated in contracts for the Railway Administration, where they developed, for example, a complex spatial numerical model of the overhead line on the Negrelli Viaduct for the evaluation of deformations. A large number of diagnostic surveys of bridge structures were also carried out. The Institute implemented research projects for the Technical Road Administration of the Capital City of Prague. In addition to a number of diagnostic surveys of bridges, continuous measurements of the temperature course and measurements of the movements of the joints of the Libeň Bridge as well as the temperatures of the Hlávka Bridge and the Legion Bridge were carried out.

In the second half of the year, major framework agreements were concluded with The Road and Motorway Directorate concerning diagnostics and inspections of bridges. A framework agreement was also concluded with the Technical Road Administration of the Capital City of Prague on diagnostics and emergency inspections of bridges.

Another key area where the Klokner Institute saw significant development during 2020 is in innovation. An indicator of development in this area is the number of utility models, patents and industrial designs obtained. In 2020, the Klokner Institute and its commercial partners had three scientific results protected in the form of utility models. In total, the Klokner Institute (at the end of 2020) held 35 valid IP protection decisions, of which 16 patents, 15 utility models, two industrial designs and two European patents.

Klokner Institute staff were involved in standardisation activities within the European Committee for Standardisation (CEN) and the International Organisation for Standardisation (ISO). For example, in 2020 they co-authored an ISO standard for determining the effects of abnormal loads on building structures (explosions, vehicle or ship impacts, floods). In addition to the activities mentioned above, the Klokner Institute was involved in the development and amendment procedures of Czech Technical Standards.

The above information represents only a part of the complex mosaic of activities in which the Institute's employees engage. The national and international presence of its staff is evidence of the Institute's supra-regional influence and confirms its important role in the construction industry.

The year 2020 was in many ways a turning point, and that applied to the Czech Institute of Informatics, Robotics and Cybernetics as well. It was the final year of the long-term project of the Ministry of Education, Youth and Sports (2016-2020) to build and develop the CIIRC CTU as a centre of excellence, where we achieved two key milestones dictated by the project: the opening of the new building, which took place in 2017, and 278 employees - researchers, PhD students and others. CIIRC CTU is now a fully sustainable institution with a significant share of income from competitive projects, both national and European. Thanks to this, we also reported a profit of CZK 4.9 million last year.

The year 2020 was largely influenced by the global Covid-19 pandemic. We are very proud of our employees who have contributed to the fight against this disease with a number of new solutions.

We are delighted with the excellent result of our institute in the Ministry of Education's 2017+ Methodology assessment. We have been rated as one of the best performing components of CTU. This demonstrates the successful combination of our international strategy, research vision and result-oriented management, implemented by our academic and administrative staff.

Resilience, flexibility and adaptability have become an integral part of our internal processes. 2021 will bring new challenges. We will continue to focus on research that strengthens interdisciplinary collaboration and the positive societal impacts of new technologies.

Mgr. Ondřej Velek, Ph.D., Director,
Prof. Ing. Vladimír Mařík, DrSc., dr. h. c.,
Scientific Director of the Czech Institute of Informatics, Robotics and Cybernetics. CTU

National Industrial Summit 2020

CZECH INSTITUTE OF INFORMATICS, ROBOTICS AND CYBERNETICS

Instruction of PhD students

In the past years, a number of CIIRC CTU employees have been involved in the instruction of students in PhD study programmes, supervising almost 90 PhD students at various faculties and universities in the Czech Republic and abroad. The Institute does not have its own doctoral study programmes.

Projects

CIIRC has long been successful in attracting large-scale projects, thanks to the clear strategy and vision of the design office. The amount of funding that these projects - European (H2020, ERC, etc.) and national (ESIF, GA CR, TA CR) - bring in is continuously growing and in 2020 reached more than CZK 280 million, which accounts for 68% of the budget of the whole Institute.

International cooperation

Industry 4.0 and artificial intelligence are very important topics for the Institute: in recent years, it has joined the leading European initiatives for artificial intelligence, CLAIRE (Confederation of Laboratories for Artificial Intelligence in Europe) and ELLIS (The European Laboratory for Learning and Intelligent Systems). Both platforms have their Czech branches at the CIIRC. Together with DFKI and other partners, the Institute is building an international centre of excellence for advanced industrial manufacturing, RICAIP. CIIRC has also become the EIT Manufacturing Hub for the Czech Republic, which opens up direct involvement and subsidy opportunities for Czech companies within the European manufacturing ecosystem.

Awards

In the global competition of universities and research teams, the scientists from the Automated Reasoning Group led by Dr. Josef Urban, who are involved in the development of Vampire, MaLARea, Enigma and Satallax systems, achieved excellent results. The championship in automatic reasoning, The CADE ATP System Competition, was held online in July 2020. The Vampire system was most successful due to winning in three categories. The second place in the First Order Theorems category went to Jana Jakubův's Enigma system. Enigma is unique in that it

augmented the existing E system with machine learning and was able to solve 50 more problems out of 500.
The paper "CosyPose: Consistent multi-view multi-object 6D pose estimation" by co-authors Yann Labbé (Inria), Justin Carpentier (Inria), Mathieu Aubry (ENPC) and Josef Šivic (CIIRC CTU) won five awards in the 6D object pose estimation competition at the ECCV 2020 conference. The Alquist conversational robot devised by CTU students led by Jan Šedivý from CIIRC won the bronze at the prestigious global Amazon competition - Alexa Prize. It also placed among the best in the previous two years, when it took second place each time.

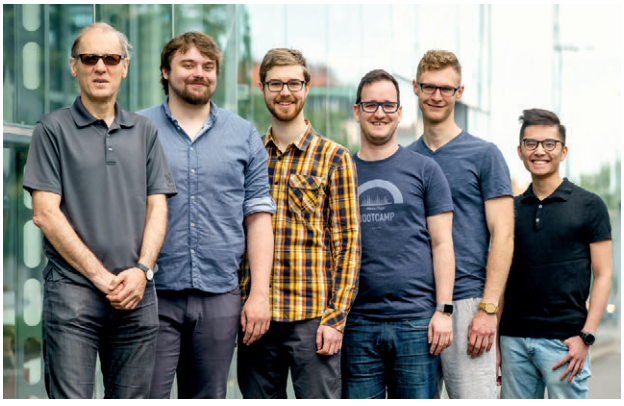
Significant events and developments

The coronavirus pandemic, limited international mobility and the impossibility of organising mass events meant that most of the scheduled events were postponed to 2021 (or 2022) or organised in a modified virtual form. Nonetheless, we managed to realise the first annual meeting of academia, industry and government representatives at the highest level, the National Industry Summit, with 450 guests and several thousand spectators connected remotely. The National Centre for Industry 4.0 and RICAIP organised a series of online seminars and professional workshops. The Institute also conducted a virtual programme as part of the Night of Scientists.

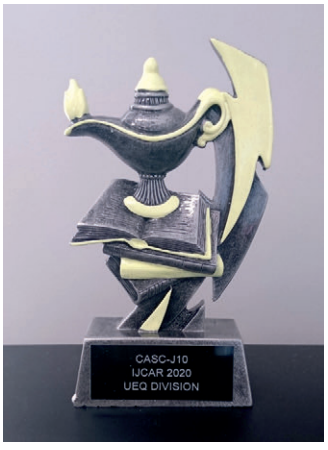
The Institute's Third Mission (Covid-19)

Scientists demonstrated during the coronavirus pandemic that their contribution to society is undeniable. The CIIRC research team developed a cutting-edge protective deVICe - the "CIIRC RP95-3D" half-mask, manufactured using 3D printing, fully certified. The print data, freely shared with owners of special 3D printers, has reached 30 countries and more than 100 institutions. For more information on this project, see page 15 with the story.
As early as in the first days of the Covid-19 pandemic, the robotic workstation "Pipeťák" (pipetting robot) was deployed in Prague's Na Bulovce Hospital and later in other hospitals, which made it possible to replace manual pipetting in PCR testing and thus to cope with the rapid increase in tested samples. Financial support from the GAMA and NCK programmes of the Czech Technology Agency contributed significantly to the implementation.

Detail of the pipetting robot



Alquist team



Trophy from the Automated Reasoning Championship

Dr. Tomáš Mikolov and Dr. Torsten Sattler

Dr. Vít Dočkal

Personalities of the Year 2020

Attracting young talent and supporting scientists from abroad is also part of the Institute's long-term strategy. Thanks to RICAIP, several outstanding researchers joined the CIIRC in 2020 on the tenure track, including Tomáš Mikolov and Torsten Sattler.

Dr. Tomáš Mikolov, a world-renowned scientist, focuses on the development of powerful artificial intelligence at CIIRC CTU. He is the recipient of the 2019 Neuron Prize for Distinguished Discovery in Computer Science. Mikolov is renowned for his research on neural networks and has leapfrogged Google's machine translator. He previously served on the research teams of Facebook AI Research and Microsoft Research.

Dr. Torsten Sattler, a leading expert in computer vision, came to CIIRC from Chalmers University in Sweden. At the Institute he researches 3D reconstruction and localization with applications in robotics.

Dr. Vít Dočkal, head of the CIIRC design office, led the development team and together with Pavel Burget, Alexander Lazarov, Jaroslav Lískovec and Petr Kadera developed and certified the CIIRC RP95 protective half-mask. They also established a spin-off company to take it into mass production. In 2020, Dočkal was ranked by the Czech Management Association among the TOP 10 managers of the year.

University Centre for Energy Efficient Building (UCEEB) is committed to promoting energy efficient buildings that are both environmentally friendly and provide a healthy and comfortable indoor environment for their occupants.
Our facility for recovering water from the air in desert conditions S.A.W.E.R. has attracted the greatest attention to our work. In 2020, we launched a second prototype at the Dubai EXPO and followed this up with the development of MAGDA, an autonomous mobile device that fits in the back of any van and serves as an emergency source of water produced from air humidity with a daily output of around 10 litres.
Another interesting product of ours is Levitee, a design set of concrete urban furniture with the possibility of installing smart technologies. The novelty can already be tried out by residents and visitors to the capital in a test mode in several public places. Three benches with smart technologies have been installed as part of the Technology Transfer for Smart Prague project, two of which are part of the development projects of JRD Zelená Libuš and Ecocity Malešice III. The third piece was placed near the entrance to the Pražačka sports complex, together with similar-looking accessories from the Levitee urban furniture set.
The WAVE 120 micropower plant development project underway at the UCEEB CTU was placed on the market in 2020. Official measurements confirmed that the plant's parameters meet the requirements for obtaining the Ecodesign label and can be installed practically across the European Union. It can be simply imagined as a fully automatic biomass boiler with associated electricity generation. While conventional boilers consume electricity for their operation, the WAVE unit generates the necessary electricity and is able to supply the excess to the connected building or the distribution network.

doc. Ing. Lukáš Ferkl, Ph.D.,
Director of the University Centre for Energy Efficient Buildings, CTU

UNIVERSITY CENTRE FOR ENERGY EFFICIENT BUILDINGS

Projects

In 2020, we worked on more than 70 grant projects and over 140 research contracts. Our most significant projects include the CAMEB National Centre of Competence, which aims to address the future shortage of non-renewable resources and the associated impacts on the building industry. Together with our partners, we are therefore working on the efficient use of materials using life cycle methodology and expanding our knowledge of the circular economy. UCEEB is the main partner of the NCK CAMEB, and the Director of UCEEB is the project leader.

Through grant projects we also try to operate at the regional level. One of our key projects, for example, is the international SPARCS project (Horizon 2020 programme), in which we are helping Kladno on its path towards future carbon neutrality - as part of this strategy, the town will develop an energy self-sufficient district. With the help of the UCEEB and other European cities involved in the project, Kladno will develop its own vision tailored to local needs over five years. The specificity of the project is the search for ways to use a large underground water reservoir for heat management in a friendly and efficient way.

An interesting contract research project was, for example, the development of intelligent lighting for a leading Czech manufacturer of lighting fixtures. We integrated a combined indoor environmental quality sensor into light fixtures designed for luxury meeting rooms, which monitors the entire room using the Internet of Things (IoT). The integrated sensor can be connected to the control system to ensure high air quality.

International cooperation

The year 2020 was a pivotal year for UCEEB and international collaboration, as we tackled seven major international projects, the highest number in the centre's history to date. Let's take a look at two of them.

The aim of the international project PLURAL (Plug-and-use renovation with adaptable lightweight systems, H2020 programme) is to design and test a range of prefabricated facades for residential renovation. Its participants are tasked with achieving an optimal integration of heating, cooling, heat collection and ventilation systems with smart windows using 3D printing and state-of-the-art nanomaterials. The proposed solutions will be tested on three real and three virtual buildings covering all European climate zones and constituting representative residential typologies. Reductions in production and renovation time and costs, energy savings and user acceptance will be verified.

Together with the Centre of Competence for CHP Technology at OTH Amberg-Weiden, we are developing small turboexpanders for biomass CHP systems or waste heat recovery based on the Organic Rankine Cycle (ORC) principle. We have tested the developed experimental turboexpanders in a number of configurations in the compressed air and air-driven technologies laboratory at OTH Amberg-Weiden. The analysis and evaluation included testing and comparing different materials and 3D printing technologies. On the basis of the excellent cooperation, another joint project between CTU UCEEB and OTH Amberg-Weiden called "Energy Efficiency Network - a cross-border energy consultant training", funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, was also launched within the framework of the EU Climate Initiative call.

Awards

In the business plan competition called Cool Idea, CTU UCEEB scored with the Levitee urban furniture. It consists of a cantilevered bench and accessories that should bring a wide variation in placement in the public space. The bench offers various functionalities such as Wi-fi connectivity, mobile deVICe charging or air quality measurement.

The WAVE 120 microgrid development project is significantly closer to the stage of its real market application. Official measurements have confirmed that the device has achieved the parameters required to obtain the Ecodesign label and can be installed practically across the European Union.

The Buštěhrad seat of the CTU UCEEB occupies a prominent position among the realisations presented at the exhibition entitled Aesthetics of Sustainable Architecture. The exhibition and the accompanying publication of the same name present over sixty examples of Czech and foreign architecture with an ecological focus.

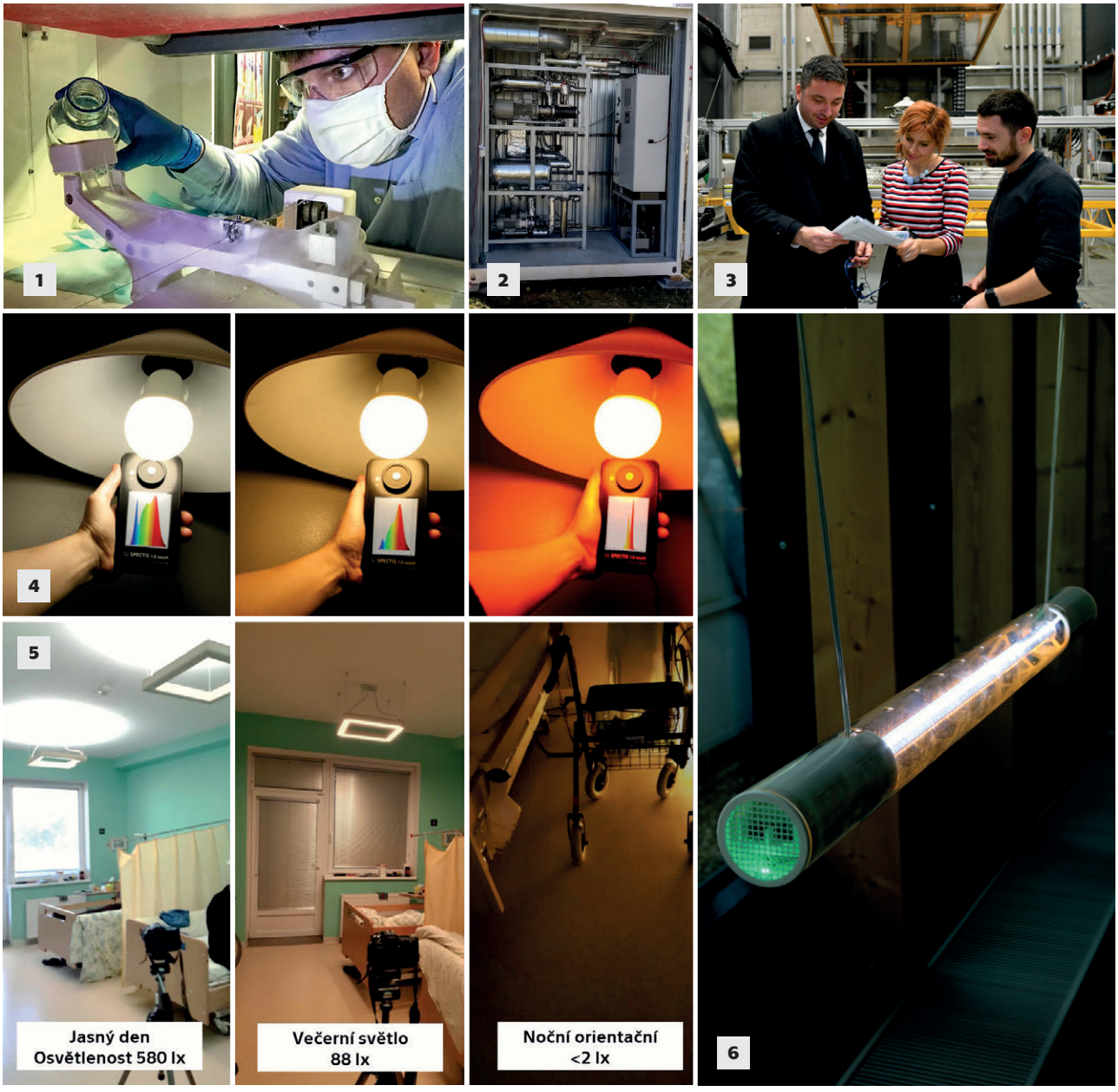
Important events and developments

In June 2020, a scientific council composed of renowned experts from foreign universities and research institutions as well as representatives of the Czech government and industry met virtually at our Buštěhrad headquarters. The aim was an annual evaluation of the activities of the CTU UCEEB to date, combined with a discussion on the further development of the university centre and the possibilities of future international cooperation.

The Centre's Third Mission

Our primary focus is on cooperation with practice, 95% of the centre's turnover is attributable to joint projects with industrial partners, of which 20% is contractual cooperation (more is not possible due to legal restrictions), representing over 140 individual contracts with more than 70 partners. About 15 different products can now be found on the market, which were developed in 2020 at the University Centre for Energy Efficient Buildings of CTU.

Although our activities in 2020 were significantly affected by the Covid pandemic, we managed to keep the vast majority of projects running without



<1>Nanotextile production;
<2>Micro 120; <3>Solar lab;
<4> <5>Lenka Maier's light project;
<6>Sensor

experiencing major delays. Of course, we anticipate with concern what 2021 will bring when the full impact of the pandemic is expected to affect the entire economy.

Covid-19

The total investment in relation to the coronavirus pandemic at UCEEB in 2020 was CZK 250,000. Spending on projects in progress cost us approximately CZK 60,000. Investments included: materials, man-hours and overhead.

The most significant output was the production of nanotextiles used as filter membranes for textile masks, where nanofibre textiles were developed by the Laboratory of Advanced Biomaterials of CTU UCEEB in cooperation with ProNanoTech and Nanuntio. It was produced by the electric field wetting method on the Nanospider™ NS 1S500U machine from an 11% PVB (polyvinyl butyral) wetting solution dissolved in ethanol.

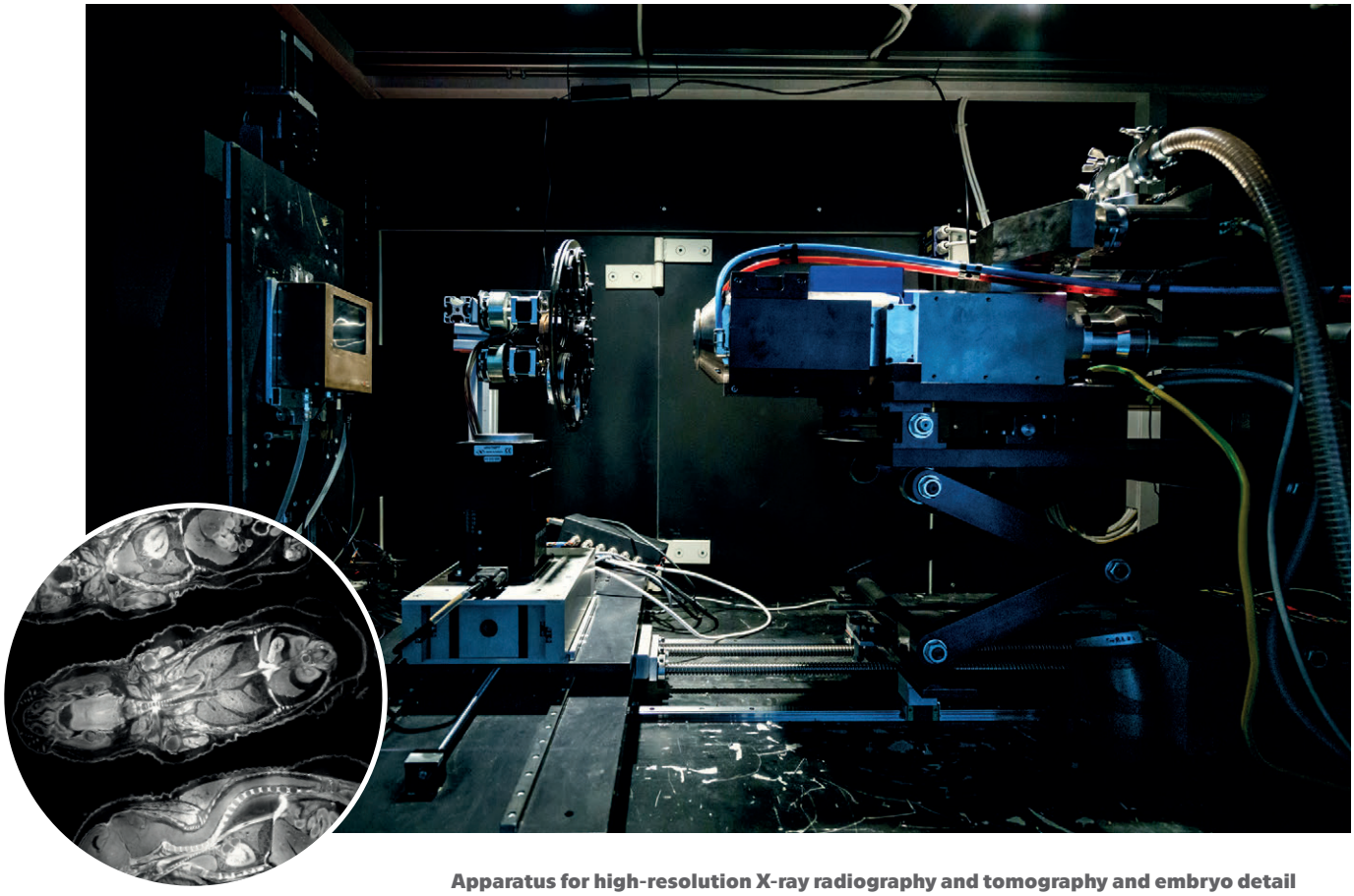
Personality of the Year 2020

Ing. arch. Lenka Maierová, Ph.D.,

architect and expert in the field of lighting, especially in the effect of light on visual comfort and human health. Lenka Maier solves interdisciplinary projects in the field of lighting technology, chronobiology and architecture. She is the graduate of the Faculty of Architecture of Czech Technical University (2004) and PhD studies at the Faculty of Civil Engineering of Czech Technical University (2015). The experimental part of her doctoral studies took place at the Swiss University EPFL in Lausanne, with which she still cooperates. Since 2014, she has been working at the University Centre for Energy Efficient Buildings (UCEEB) of CTU, where, among other things, she leads the Platform for Healthy Lighting. He is also a lecturer at the Faculty of Civil Engineering of CTU and the Faculty of Arts and Architecture of Technical University of Liberec (TUL). She is a member of the international professional society Daylight Academy and the International Commission on Illumination (CIE).
She focuses on the process of non-visual light perception and its influence on regular daily rhythms in the human body, such as the alternation of sleep and wakefulness, activity and regeneration. Along with health aspects, she also assesses the quality of the lighting environment inside and outside buildings in terms of visual comfort. In unique studies conducted at the Na Pražačka Grammar School in Prague and the TGM Senior Citizens' Home in Beroun, in cooperation with the National Institute of Mental Health, she has been able to demonstrate the positive effect of pro-cognitive and biodynamic light on improving mood, alertness, work performance, ability to concentrate and learn new things, and in the long term, sleep quality and overall health. She is currently working with the same team to design and assess the effectiveness of lighting systems for the prevention and support of treatment of affective disorders.

The Institute of Experimental and Applied Physics (IEAP) serves as an experimental base for research in particle and nuclear physics. In conjunction with fundamental experiments, modern detector technologies are developed (mainly semiconductor pixel and strip detectors, scintillation detectors) and their applications in imaging of living and inanimate nature (X-ray radiography and tomography with very high resolution at the micron level), to measure mixed radiation fields and in satellite experiments (detection of cosmic radiation, sensors for X-ray telescopes). One of the major achievements is our cosmic ray detection device, which has been pre-selected for placement on a Taiwanese satellite that will orbit the Moon. It is also worth mentioning that in the past year, the IEAPbecame a member of the International Astronautical Federation (IAF). In connection with its participation in experiments at the LSM underground laboratories in France and SNOLAB in Canada, the Institute is developing technologies used in low-level experiments focused on neutrino physics and the search for dark matter in space. As a follow-up to fundamental experiments in particle and neutrino physics, relevant theoretical physics disciplines are also being developed at the Institute.

doc. Ing. Ivan Štekl CSc.,
Director of the Institute of Experimental and Applied Physics, CTU



Apparatus for high-resolution X-ray radiography and tomography and embryo detail

INSTITUTE OF EXPERIMENTAL AND APPLIED PHYSICS

Teaching activities

Although the Institute of Experimental and Applied Physics does not have its own accredited study programme, it is also active in the field of education. Last year, it focused on supervising the professional work of students from other faculties of CTU, other universities in the Czech Republic and abroad and on their involvement in attractive international research projects. It also served as a training centre for two foreign students sent to CTU by IAESTE. Two students working at the Institute defended their dissertations.

After last year's successful internship of the Physics Olympiad winners at the Joint Institute for Nuclear Research Dubna, we were planning a similar event for this year, but the coronavirus pandemic interrupted our plans. We have therefore prepared a replacement plan an internship of secondary school students, winners of the national round of the Physics Olympiad, at the Institute of Physics. Six secondary school students participated. Three IEAP staff served as lecturers at the XXI Jorge André Swieca Summer School on Experimental Nuclear Physics 2020 held in Sao Paulo and the IEEE NPSS Instrumentation School, held online from Jakarta and Dakar. The University of the Third Age hosted the popular lectures Secrets of the Microworld and Laws of the Microworld, which aim to provide a comprehensive overview of microworld knowledge, including a layman-friendly interpretation of relativity theory and quantum mechanics.

Projects

The largest project, now in its fourth year, is Engineering Applications of Microworld Physics, supported (in the total amount of CZK 200 million) under the OP RDE Excellence in Research programme. This project covers the majority of the Institute's research activities and is carried out in cooperation with many co-researchers from universities and institutes in the Czech Republic (CTU: IEAP,

FBME, FTS, CIIRC; 3rd Faculty of Medicine of Charles University; FEE WCU; SURO; UTAM AS CR).

One of the most successful areas of scientific activity of the Institute is the application of detection technologies in space. In 2020, the ESA-funded Miniaturised Radiation Monitor (MIRAM) project was successfully completed at the Institute. The aim was to design, develop and test prototypes of miniaturized radiation monitors. The device developed within the project was so successful that it was selected by ESA for the GOMX-5 satellite with a planned launch in 2022. Space technologies are also targeted in the second year of the H2020 Penetrating Particle ANalyser (PAN) project, which aims to develop a particle detector for space missions. The project also involves the University of Geneva (Switzerland) and the Istituto Nazionale Di Fisica Nucleare (Italy).

International collaboration

Almost all of the Institute's scientific activities have been carried out within the framework of broad international cooperation. In the field of fundamental experiments in (astro) particle and neutrino physics, these include mainly the international research institutes CERN (Switzerland), SUJV (Russia) and the underground laboratories LSM (France) and SNOLAB (Canada). The development and application of semiconductor pixel detectors was carried out within theinternational Medipix collaboration (CERN), while activities focused on satellites and space missions were carried out in cooperation with the European Space Agency (ESA) and the Japanese Space Agency (JAXA). IEAP became only the fourth organisation in the Czech Republic to become a member of the International Astronautical Federation (IAF) in 2020. The aim of our membership is intensive cooperation in space research and development with international leaders in the field. In autumn 2020, our Institute was visited by Taiwanese Ambassador Liang-Ruey Ke and Dr. Hong-wei Yen, Head of the Science and Technology Department of the Taiwanese Embassy in Prague. They signed a Memorandum of Scientific Cooperation between the Institute and the National Space Agency of Taiwan (NSPO) at the Institute.

Awards

The winner of the Albertus Prize for teachers of physics and computer science, awarded in October in Brno, was IEAP employee Vladimír Vícha who, in addition to his work as a physics teacher at a grammar school in Pardubice, has long been involved in activities related to experiments in the field of cosmic rays and semiconductor pixel detectors developed at the Institute.

Our employee Fedor Šimkovic won the ESET Science Award in the category "Exceptional Personality of Slovak Science 2020", sponsored by the Slovak company ESET. He also received another award when he and an international team of ten collaborators, including other IEAP staff members Andrej Babič and Adam Smetana, took the second place in the "JINR Prizes for 2020" in the category Research in Theoretical Physics for their ten years of scientific activity in the field of neutrino masses, double beta decay and nuclear structure. The competition was organised by the International Institute for Nuclear Research in Dubna, Russia.

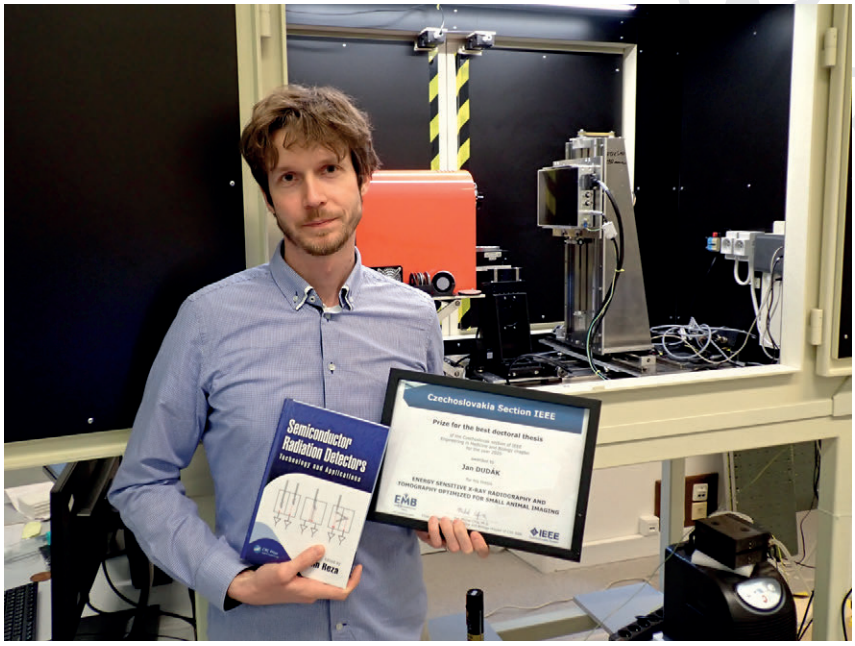
The dissertation of our colleague Jan Dudák entitled "Energy Sensitive X-ray Radiography and Tomography Optimized for Small Animal Imaging" won the "Prize for the best doctoral thesis" for 2020 announced by the Engineering in Medicine and Biology (EMB) Specialty Group of the Czechoslovak Section of the IEEE.

Stanislav Pospíšil, the Institute's founder and its first director, received the "2020 IEEE Glenn F. Knoll Radiation Instrumentation Outstanding Achievement Award" for his contribution to the development of pixel-based ionizing radiation detectors and the advancement of their applications in medicine, particle physics, and space. The award is presented by the IEEE Nuclear and Plasma Sciences Society.

The Institute's Third Mission

The IEAP collaborates with a number of private companies in the development of advanced detector and low-level technologies. Unique equipment has been developed for underground experiments in collaboration with the private sector for many years. An example is the technology for extremely efficient removal of radon from air and other gases (leading to orders from ATEKO a.s. for a number of laboratories worth more than EUR 5 million). In 2020, ATEKO won a tender for the Belgian laboratory SCK CEN for the design and supply of a unique radon removal device, in the development of which ÚTEF staff are involved.

To implement commercial applications of the detector technologies developed at the IEAP, a spin-off company Advacam was founded several years ago, which has been successful especially at international level. This has enabled successful transfer of scientific knowledge and technology from basic research to practice, which brings the Institute, in addition to the societal benefit, income in the form of royalties for contractually provided know-how. The MIRAM project (see above) is an example of cooperation between the Institute and Advacam in 2020.



Personality of the Year 2020

Ing. Jan Dudák, Ph.D.,

after graduating from the master's programme at FBME (2012), Jan Dudák started a Ph.D. programme at the same faculty and, at the same time, joined IEAP. While working on the topics related to his PhD thesis "Energy Sensitive X-ray Radiography and Tomography Optimized for Small Animal Imaging", he became a key researcher in the Specialized Laboratory of Experimental Imaging - a joint research facility of the 3rd Medical Faculty of Charles University, IEAP and FBME. At that time, he became a respected expert in X-ray imaging with pixel detectors, as evidenced, for example, by being invited to write the chapter "Applications of Hybrid Pixel Detectors for High Resolution Table-Top X-Ray Imaging" in the book "Semiconductor Radiation Detectors: Technology and Applications" published in 2017, or by authoring an invited article for a special issue of the scientific journal Radiation Measurements (2020). He received the Josef Hlávka Prize (2012) for his achievements in the master's programme and his dissertation was awarded last year in the competition for the best dissertation announced by the Engineering in Medicine and Biology (EMB), Czechoslovak Section of the Institute of Electrical and Electronics Engineers (IEEE). Currently, he leads a group at the Institute responsible for the development of applications and methods of high-resolution and energy-sensitive X-ray imaging with Medipix and Timepix detectors in the life sciences.

2020 was a very difficult year for physical education and sport. During this year, we were faced with a number of constant changes both in terms of the organisation of teaching and the operation of our sports facilities, the biggest impact being on the students themselves. Physical and mental health is now being discussed very strongly and the current situation shows how important long-term prevention and adherence to the principles of a healthy lifestyle are for the functioning of our society.

We believe that physical education has always been and continues to be an important part of university life. However, its nature has changed significantly over the last twenty years. More than fitness or performance, the experience of physical and sporting activities and their importance in the development of a healthy lifestyle is emphasised. This significantly influences not only the content and scope of teaching, but also its forms. The activities that people engage in during their studies are usually carried over into their professional lives.

Sports activities are organised at CTU through the Institute of Physical Education and Sport. The basic task is the provision of all forms of physical education teaching at faculties and institutes, supplemented by the organisation of winter and summer training courses. In 2020, the Institute offered 48 sports specialisations in regular semester teaching, with a total of 7,011 students participating before the closure of the sports facilities. The range of sports disciplines is regularly adjusted according to interest and expanded with new directions.

Building new sports facilities and modernising existing ones is very important for the further development and improvement of the university's sports life. In 2020, the multi-purpose field in Chuchle was reconstructed and the flooring in the table tennis room and the lights in the gym in the Pod Juliskou facility were replaced.

doc. PaedDr. Jiří Drnek, CSc.,
Director of the Institute of Physical Education and Sport, CTU

INSTITUTE OF PHYSICAL EDUCATION AND SPORT

Physical education and the impact of the pandemic

The calendar year 2020 started traditionally with winter courses, ten ski and snowboard courses and specialized courses for the field of paramedic training were announced, however, some of the courses were not held due to the pandemic.

After the start of classes in February, they had to be suspended during the summer semester, and all sports activities were prohibited and sports grounds closed. In the summer, it seemed that better times were in the offing and, in addition to foreign courses, 34 training courses were successfully held in the Czech Republic, with 605 students attending without getting infected, and sports facilities were finally filled. From October, however, classes in which more than 7,000 students enrolled were cancelled again. The only option for us was to promote the use of our website, where students and staff could find ample guidance and methodical procedures for physical activities in the home environment. During the semester, under the slogan "CTU exercises at home", we filmed instructional videos that could be used actively in online classes via the Facebook page of CTU. We are continuing this activity. At the same time, we provide streaming professional TV teaching for FBME. A significant contribution to the promotion of physical education and sports activities was the production of the TV9P programme from the Institute of Physical Education and Sport of CTU, which was broadcast on 4 December 2020 and can still be viewed on the Facebook page of the Institute.

Unfortunately, however, it must be stated that all these measures can never replace regular teaching and other sporting activities.

"Amateur" sports

Physical education classes are supplemented by a wide range of one-off sporting events, such as the CTU Rector's Sports Day. Due to epidemiological measures, this event, which is attended by 2,000 students each year, did not take place.

The range of sports disciplines offered at CTU is significantly expanded by the activities of the university physical education units VSK CTU and VSTJ Technika Praha. The sports clubs offer a very varied mosaic ofsports and physical leisure activities and cooperate with the Institute in organising major sporting events such as the 17 November Run, which unfortunately did not take place in 2020 due to the restrictions.

A semester-long course for seniors at the University of the Third Age is also part of the annual programme. Due to the circumstances, this activity took place in a very reduced form.

Representation

In cooperation with the faculties, the Institute also ensures sports

representation of the school at university championships in the Czech Republic and at international sports events. In the past year, most of these sporting events were cancelled, but in those that took place, we rejoiced in the medal successes of CTU students. At the Academic Athletics Championships in Brno, the CTU team won twelve medals. CTU hockey players won a gold medal at the Academic ChamipinshipCzech Republic in Slaný. In Olomouc at the Academic Championship (AC) in swimming and fin swimming, the CTU team won nine medals. In Prague, the AC in indoor athletics was held, where our athletes won the overall first place in the competition of universities.

At the same time, within the framework of the UNIS project of the Ministry of Education, Youth and Sports, we are creating conditions for combining sports and student careers of the representatives and top athletes who study at CTU.

Motto of the Institute:
"Improvement of the quality of lifestyle of students and employees through regular physical and sporting activities."


Relaxpark

COMPUTING AND INFORMATION CENTRE

A number of ICT-related changes and new functionalities have been implemented in the areas of the University's infrastructure and support. A key task for 2020 was to provide support for distance learning (mainly through Microsoft Teams and Moodle applications), including capacity-ready infrastructure with adequate licensing coverage. In the context of the Covid-19 pandemic, we "made operable" more than 5,000 teams on the Office 365 platform in one semester. The University's network infrastructure fully supported and managed the challenging period of remote communication and the security support of the prepared antivirus policy model worked.

In 2020, the centre deployed a completely new Identity Management implemented within the internally developed software product UserMap. This sets the stage for the next period of comfortable role management across most of the University's centrally managed IT systems. It provides users with an overview of assigned roles and approvers with extensive filters to analyse assigned roles.

Another major theme was the ‚computerisation' of the University's processes and procedures. Full electronic circulation means that each document is supported throughout its life cycle and, if trust features (electronic signatures) are used, there is sufficient evidence of the document's validity and "authenticity". In 2020, as part of the PKI implementation according to eIDAS, the signing service with qualified certificates stored in the HSM was launched and VALIDATOR services were also launched and added in operational mode. The document authentication system is now operational at the following levels: ETSI strict policy, qualified policy, recognized policy and universal policy. This has also enabled the deployment of eSPS with the possibility of long-term storage of signed electronic documents. Part of the move to a purely digital environment is the further extension of the AEDO module in faculties and components with the possibility of using electronic travel in the Absence, Substitutions, Reports, Travel Orders, Disposal Sheets, Car Transport and the newly developed Orders modules (piloted at the Faculty of Electrical Engineering).

Building on the prepared e-signature infrastructure, support for a fully electronic admissions process and a mechanism for validating applicants' own emails was launched in the study area. The CAP module was upgraded to support electronic version of invitations to committee members and students. In the area of science and research, the "Implementation of new changes according to Methodology 17+" was implemented (added fields, requirements for RIV control services).

CTU ARCHIVES

Since the professional activities of the CTU Archives and participation in seminars and conferences were curtailed due to the pandemic in 2020, the department focused more on preparing the registration, processing and access to archival materials using information systems, while responding to the needs and trends of the national archival network coordinated by the Department of Archival Administration of the Ministry of the Interior of the Czech Republic. A large-format scanner was purchased for the digitisation of student records and a special photo scanner for professional digitisation of the photographic collection. In response to increasing interest in the history of CTU and its promotion, the CTU Archives held an exhibition "One Hundred Years under the CTU Brand" to mark the centenary of the significant reorganisation of the university, supported by the Fund for the Support of University-wide Activities. Its staff also contributes a regular column to the CTU news magazine Pražská technika. It regularly cooperates with the university-wide PR and Marketing Department as well as with the PR departments of university components. The CTU Archives, established in 1962, is one of the oldest and largest university archives in the Czech Republic. In 2020, it was substantially reorganised and thus its work tasks became more specialised and professionalised. It is responsible for the acquisition of, care for and access to archival collections from CTU components. It publishes professional and popularisation studies on the history of CTU and organises lectures, excursions, exhibitions, etc. The Department of Records Management responds to legislative developments in the field of records management and pre-archival care and develops methodological regulations in the field of records management for CTU.

CENTRAL LIBRARY OF CTU

Supporting and following the latest trends in scholarly publishing and new forms of scholarly communication were among the Library's strategic activities in 2020. The Library provides information support throughout the entire cycle of scientific work, from information support for individual disciplines to support for the publication of results - standards of professional publishing, storage, access and dissemination of scientific outputs. We also advise on copyright issues and ethics (Copyright Act, Creative Commons, etc.). In addition, we follow global developments in the field of Open Access and Open Science, including FAIR data and the issue of "predatory publishers".

In cooperation with the CTU Publishing House, we have ensured the possibility of electronic publishing of textbooks, books,directories, lectures and study materials in the CTU Digital Library in Open Access mode. All materials meet publishing standards (ORCID, DOI, CC license, ISBN, copyright information), have metadata stored in a standard format and are fully interoperable with global search engines and indexes. They are also available through the CTU catalogue and are registered in IS V3S. Furthermore, we help authors to set up all necessary publishing standards.

We can boast memberships in major international associations, for example, we are a member of Crossref (USA), International Association of University Libraries - IATUL (Germany), Ligue des Bibliothèques Européennes de Recherche - LIBER (Netherlands), MDPI - Publisher of Open Access Journals (Switzerland), ORCID - Open Research and Contributor ID (USA) and SCOAP3 - Sponsoring Consortium for Open Access Publishing in Particle Physics (Switzerland), and at the national level we are a member of the Association of University Libraries of the Czech Republic z. s.

CTU PUBLISHING HOUSE

Although for most of 2020 the life of the university was overshadowed by the coronavirus pandemic and measures to protect against the spread of the disease, CTU Publishing House succeeded in meeting all the objectives and, in some areas, even exceeded the expectations. Among the new titles of 2020, there were significant publishing achievements (in terms of authorship and graphic and printing design of books). These include Physics / Encyclopedia of Great Discoveries and Personalities by renowned author Prof. Ivo Kraus (FNSPE), Controlled Thermonuclear Fusion - Past, Present and Future by Ing. Milan Řípa (FNSPE) and the university textbook Database Systems by prof. Jaroslav Pokorný and Ing. Michal Valenta (FIT), which was published simultaneously in printed and electronic versions. Traditionally, the publications of the authors from the Faculty of Architecture sparked great interest, among them the first edition of Architecture on the Red List / Normal is not to Demolish edited by prof. Petr Vorlík and Mgr. Tereza Poláčková, or reprints of successful titles - Libraries in the Age of New Media by doc. Zbyšek Stýbl and Beton, Břasy, Boletice / Prague on the Wave of Brutalism by prof. Petr Vorlík and Ing. arch. Klára Brůhová. The publishing house continues to publish primarily university textbooks and professional books, and produces promotional and informational materials and other publications issued by the university. The titles of the CTU editorial series are realised from contracts to consultations with authors to graphic design of selected publications and pre-press preparation of further production. The publishing house also manages the university-wide ISBN agenda. Its output is often of interest to the wider public, and selected titles have also worked as high-quality PR for the university. In addition to the publications of the CTU edition, in 2020 the publishing house worked on other commissions for the university and its components; among others, it prepared the Annual Report of CTU in a new authorial and graphic form, the magazines Pražská technika and TecniCall and others. The negative impact of the crisis situation and measures against the spread of the disease was manifest in lower sales of publications, despite the fact that at the time of the closure of the university bookstore, which is located on the ground floor of the National Technical Library, sales via the e-shop increased significantly.

SERVICE FACILITIES ADMINISTRATION

The Service Facilities Administration (SFA) provides accommodation and catering for students, staff and commercial clients. It provides full catering and conferencing services in its own facilities, operates the outdoor sports facilities of each dormitory, and manages and leases non-residential premises to businesses. It also manages the New Town Hotel and the Bethlehem Chapel, a national cultural monument which is used year-round for major social, cultural and scientific events.

The CTU dormitories are among the largest in the Czech Republic and are located in several locations in Prague. In addition to accommodation facilities, the dormitories also include cafeterias, sports facilities and recreational rooms. The accommodation capacity is just under 7,700 beds in single, double, triple and quadruple rooms. Some of them have their own bathroom and kitchenette. They accommodate not only students, graduates and applicants from CTU, but in case of free capacity they cansatisfy applicants from other universities. Thanks to the long-standing cooperation with student representatives, the dormitories are involved in creating leisure facilities (hobby rooms, sports activities, support social events). A complementary accommodation activity of the dormitories is the sale of vacant capacity in the form of hostels to the general public. The SFA also offers commercial accommodation with a capacity of around 220 beds.

Catering is provided in the cafeterias of CTU, which are located near the dormitories and classrooms. SFA operates five cafeterias, three dispensaries and the Archicafe café. Another cafeteria is located in the Kokos building in Kladno.

SFA's aim is to continuously improve the quality standard of its accommodation and catering facilities. According to the financial possibilities it ensures renovation of sanitary facilities, regular renewal of furniture, replacement of textiles, purchase of new electrical appliances and technological equipment for food preparation in the canteens, etc.

Efforts are also made to reduce the operating costs and energy consumption of the buildings. Building and energy-saving measures were carried out on 30 buildings in nine campuses of the dormitories and catering facilities managed by the SFA in 2020, with the aim of reducing energy consumption in the amount of CZK 20 million per year. The upgrades will also provide a better environment for students and reduce CO2 emissions by 4,125 tonnes, while 26% of existing energy and water costs will also be saved. Part of the investment is covered by a grant from the Operational Programme for the Environment. Energy and financial savings are guaranteed from the beginning of 2021 until the end of 2031.

In addition to the regular repairs of the dormitory and canteen buildings, a planned capital project is underway to remove dampness from the west and north walls of Bethlehem Chapel, which is causing degradation of the interior surfaces and murals. Its purpose is to establish the appropriate microclimatic conditions necessary for the proper functioning of the organ to be installed in the ceremonial hall.

Preparations for the refurbishment of the Bubeneč Dormitory began in 2020 and will commence in early 2021, to provide improved accommodation and facilities for students. A new cellular accommodation layout will be created - two adjacent rooms will form a double cell. They will be separated from the corridor by a halland each will have its own bathroom, toilet and small kitchenette with a built-in fridge. The total capacity will be 203 rooms - 187 double rooms, 14 single rooms and two rooms for people with reduced mobility, i.e. 390 beds in total. Access to the building and the rooms will be keyless, by chip or personal card. There will be a new gym and two study rooms, and the student club will move to new premises. The anticipated date of commissioning of the dormitory is August 2022.








TEXT PART


1

1 BASIC DATA

CZECH TECHNICAL UNIVERSITY IN PRAGUE
Location
Jugoslávských partyzánů 1580/3
160 00 Praha 6 – Dejvice

Czech Technical University in Prague (hereinafter CTU) is a public university-type institution established under Act No 111/1998 Coll., on Universities. The function of the statutory body is performed by law by the rector of CTU, doc. RNDr. Vojtěch Petráček, CSc.

CTU is composed of eight faculties, six higher education institutes and service facilities, including CTU Rector's Office and other components. The organisational chart, the composition of the decision-making bodies, the representation of the university among Czech universities and other data on the university are listed in the **Table Annex to the Annual Report, Section 1**.

MISSION, VISION AND STRATEGIC OBJECTIVES CTU

In 2020, CTU defined its mission, vision and strategic goals in a completely new document, CTU Strategic Plan 2021+, which sets out development priorities for the education policy area until 2030. It contains university-wide activities to be jointly carried out in the coming years at faculties, higher education institutes and CTU components, introduces specific measures for meeting the set targets and aims to foster the university's strengths. The document creates completely new opportunities for the further development of CTU.

Mission

Long-term maintenance of internationally recognised and competitive excellence in education, science, technology, innovation and application contributing to the betterment of life.

Vision

CTU aims to maintain and develop the hard-earned leading position of a research university, with the attribute of an international centre of excellence in science, innovation and education. It is involved in increasing technological literacy, developing technical knowledge, promoting digital skills and innovation, and engaging in societal challenges, thereby seeking to move towards world class education, science and research.

Strategic objectives

CTU will continue to build an attractive 21st century university with top-level education and research and to participate in addressing global challenges that will have a positive impact on the quality of life in society. It will promote internationalisation, diversity and seek the resources that will ensure the long-term economic prosperity of the university. The key to future growth is to be, among other things, good communication and seeking mutual cooperation not only within the university, but also across the ecosystem of domestic and foreign partners, both academic and industrial.

In spite of the pandemic, CTU took various steps to achieve its mission, vision and strategic goals in 2020. Participation in international projects, collaboration with recognised scientific teams and external partners, including industrial and international ones, was significant, as well as implementing sub-development projects under the institutional plan, the centralised development programme and the school-wide activities fund in line with relevant government strategies. The emphasis has been on transferring knowledge from the scientific environment to the application sphere. The interdependence of these activities in relation to addressing the needs of society in the light of the ongoing crisis was very important. At the time of the pandemic, CTU reaffirmed its excellence not only on the national,, but quite apparently on the international scale, using an interdisciplinary approach with the help of all faculties, higher education institutes and components. It demonstrated that its mission, vision and strategic goals meet the demands of the dynamically changing needs of global society. It confirmed the competitiveness and uniqueness of the solutions offered and rapid response to change capability in both the approach to

education and the use of science, technology and innovation, which in specific applications contributed to improving the quality of life of society at the time of the SARS-CoV-2 coronavirus pandemic in global terms.

CHANGES IN INTERNAL REGULATIONS

In 2020, CTU made several changes to the university's internal rules. The changes made were organisational and financial in nature and arelisted below in chronological order.

With effect from 11 March 2020, the CTU Statute, Article 45, was amended in relation to the CTU official board, and Annex 5 to the Statute was amended in relation to theamount of study fees, as well as the amendment to Article 31 of the Statute concerning CTU components, functions of directors of components subordinate to the CTU rector and their powers. On 11 March 2020, the Study and Examination Rules for CTU students were also amended.

With effect from 1 June 2020, there were partial organisational changes in the competences of vice-rectors reflecting the requirements arising from strategic management and the allocation of competencies. With regard to the requirements, the CTU Organisational Rules were amended.

With effect from 21 October 2020, further amendments were made to the Statute, namely to Article 19 in relation to the membership of CTU students in the CTU Academic Senate and Article 46 governing the enumeration of CTU internal rules. Again, Annex 5 to the Statute on theamount of study fees was amended. At the same time, the CTU Scholarship Regulations were amended as of 21 October 2020.

With effect from 1 November 2020, the Electoral Regulations of the CTU Academic Senate and the Rules of Procedure of the CTU Academic Senate were amended.

PROVIDING INFORMATION PURSUANT TO ACT ON FREE ACCESS TO INFORMATION

During 2020, CTU received a total of six requests for information under Section 18 of Act No 106/1999 Coll., on Free Access to Information. This was a significant decrease from 2019, when a total of 16 requests were processed. There was no rejection of any of the requests submitted in 2020, which was also a drop compared to 2019. As a result, no appeals were lodged against the decision denying the request in 2020 and no court judgment was issued regarding a review of the legality of the decision rejecting the request for information. The cost of litigation relating to disclosure under the Free Access to Information Act was therefore zero. In 2020, no complaint was registered under Section 16(a) of the Act, making the year quite extraordinary in this respect.

2

doc. Dr. Ing. Gabriela Achtenová / Vice-Rector for Bachelor and Master Studies

"Looking back over the past year, a major change for students, studies and teachers was the switch to contactless instruction as a result of pandemic measures. I am very positive about the way in which both teachers and students, as well as individual faculties and higher education institutes and CTU as a whole, came to terms with contactless teaching. The transition to a fully distant form of education happened unexpectedly quickly. The university showed an ability to adapt to change and to use its technical equipment and facilities. The support of the Computing and Information Centre in the creation of MS Teams subjects and linking the app to support learning agendas was admirable. The CTU's extraordinary university-wide electronic survey, contactless, provided valuable feedback on the degree of flexibility and adaptation to new conditions. The data obtained from the students themselves, and provided anonymously, was very gratifying. In the poll, students graded the university's and teachers' adaptation with 2.18, while they rated themselves with a lower grade ofat 2.5. So, they rated the university's ability to adapt far better than their own. The pandemic taught us all many new things, the much-discussed digitisation of activities suddenly became a daily reality tested in practice without any prior preparation. Even though the university has coped excellently with remote teaching, I daresay we are all, students and teachers alike, looking forward to meeting each other again in routine teaching, stronger and more experienced, perhaps even more appreciative of seemingly ordinary days at the university."

2 STUDY PROGRAMMES, FURTHER TRAINING ACTIVITIES

ACCREDITED STUDY PROGRAMMES

In 2020, CTU carried out accredited bachelors, masters and doctoral programmes in accordance with curricula mainly in Czech language, selected programmes in English language, for both domestic and foreign students. Under the double degree programmes, the offer was extended to include, for example, the French and German languages. An overview of accredited study programmes is published on the web. Faculties and higher education institutes provide study programs within Open House Days, virtually during the pandemic. In order to promote internationalisation, the emphasis is increasingly on bilingualism, and on the provision of quality service for foreign students. Bilingualism is ensured, for example, through the website, but also through Dedicated Projects Study at CTU or Study in Prague. The needs of students with disabilities are also taken into account. Support for girls, future engineering students, also plays an important role at CTU. The recruitment process for all types of studies is done electronically, with faculties offering candidates different types of preparatory courses to increase success. Study programmes are designed in such a way that first-year students already engage in research projects as well as collaboration with industry partners and have the opportunity to gain their first experience working with international partners. CTU students use the technology and technical equipment of high-tech laboratories and testing facilities, so very early on they have an opportunity to focus on the application sphere and some achieve awards already in the bachelor's programme.

Surveillance data show that CTU carried out a total of 271 accredited courses in 2020, including 65 bachelors, 99 consecutive master's and 107 doctoral programmes, both in full-time and combined forms. Compared to 2019, there was a significant increase in the number of total accredited courses from 188 to the aforementioned 271, of which 54 were foreign-language. A total of 17,442 students studied at CTU in 2020, of whom 5,327 were women and 3,255 were foreigners, not a significant change from 2019. So it appears that CTU retained the students' interest despite the hurdles caused by the coronavirus pandemic. Detailed statistics from faculties and higher education institutes are provided in the **Table Annex, Section 2**. An overview of the current accredited study programmes of individual faculties and higher education institutes is available on the CTU website.

COOPERATION WITH APPLICATION SPHERE

Support for application-oriented studies is provided at CTU as part of engaging first-year students in research projects and cooperation with industrial partners at the national level and within internationalisation with foreign ones. A wide range of testing facilities and laboratories provides opportunities for first-hand experience. The focus of curricula on practice is considerable. To promote cooperation with the application sphere, faculties and higher education institutes nominate external practitioners to the committees assessing bachelor's and master's theses and involve them in teaching. In concrete examples, the application sphere is involved in the design and implementation of study programmes, assists in the assignment of work topics or engages in consultancy work in project management. Consistency of teaching and experience is a very important assessment criterion when studying at CTU, the requirements of the practice are transferred to the topics of the qualification work in line with the trend in the field. Individual faculties and higher education institutions take a case-by-case and subject-specific approach to engaging practice in teaching.

LIFELONG LEARNING, UNIVERSITY OF THE THIRD AGE, OTHER EDUCATION

CTU also offers a wide range of educational activities in lifelong learning (LLL) and University of the Third Age (U3V). Here, too, in light of the university's focus, attention is being paid to technical disciplines, which are increasingly reflected in social sciences to promote an interdisciplinary approach. Further training is also aimed at the employees themselves as part of improving their qualifications in vocational and preparatory courses, including courses for the public. Courses for the public are intended either to develop knowledge and skills essential to the pursuit of a profession or as preparatory courses for study at CTU. The offer of LLL courses provided by faculties and higher education institutes is published on the CTU website.

The University of the Third Age is a specific, interest-oriented type of lifelong learning with the aim of personal development of the individual, not obtaining a university degree, intended for candidates who are eligible for an old-age pension and have reached the age of 60. An overview of courses under U3V is also published on the CTU website.

As part of the professional growth of staff, the university focuses mainly on training programmes that address real-world situations in practice with a view to upgrading the qualifications of its staff. An overview of staff courses is available on the CTU website in the protected zone of the site.

Last but not least, further education is also focused on the younger generation, within the University Primary School and the Kindergarten. In view of the uniqueness of this education system, it is given autonomous space in the Third Mission chapter.

Faculties and higher education institutes were involved in LLL according to their field specialisation. In view of the pandemic, the Faculty of Civil Engineering, like the other components, organised lectures by practitioners and staff from other professional organisations, conferences, exhibitions, workshops, seminars and student competitions, predominantly in online mode. Worth mentioning are the International Architecture of Light Structures and Gisday 2020 conference, the 11th annual Nano and Macro Mechanics 2020 conference, the Architecture and Civil Engineering students' drawings Telč exhibition in , the Student Science Conference Zapálení 2020, and the Digitisation of Construction Workshop.

At the Faculty of Transport in 2020, the XXXI Year of the International Student Transport-Engineering Project Seminar took place with international participation of university students with transport specialisation MEPS 2020, and two regular training sessions of road safety auditors were successfully conducted.

The Faculty of Biomedical Engineering organized a crisis manager course for students of the bachelor's study programme of planning and management of crisis situations, which contributed to a better understanding of the Czech Army crisis management tasks. A good example is also the implementation of an educational programme to prepare for the certification of project managers according to IPMA, Individual Competence Baseline, where they acquire competencies in biomedical techniques.

At the Masaryk Institute of Advanced Studies, for example, language courses for employees and the public, Czech courses for foreign students, and a specialisation course for coaches were conducted.

The Masaryk Institute of Advanced Studies, Faculty of Mechanical Engineering, Faculty of Transportation Sciences, Faculty of Biomedical Engineering and Faculty of Architecture were most closely involved in the courses preparing for the admissions process. The Masaryk Institute of Advanced Studies was particularly involved in career courses, while professional courses were organised by the Masaryk Institute ofAdvanced Studies, Faculty of Mechanical Engineering, and Faculty of Nuclear Sciences and Physical Engineering. The greatest number of faculties and higher education institutes engaged in the U3V courses, namely the Masaryk Institute of Advanced Studies, the Faculty of Architecture, the Faculty of Biomedical Engineering, the Faculty of Civil Engineering, the Faculty of Nuclear Sciences and Physical Engineering, the Faculty of Electrical Engineering and the Faculty of Information Technology, as well as the Institute of Experimental and Applied Physics and the Institute of Physical Education and Sport.

In 2020, a total of 252 lifelong learning courses were delivered at CTU to a total of 2,890 enrolled participants. Compared to 2019, this means a drop of more than a hundred courses conducted, due to the pandemic. Instruction was conducted remotely, and not all courses were delivered. Even so, the statistics are satisfactory and show that CTU also fulfilled its training role in LLL dedicated courses. Most courses were career-oriented, with 79 courses in the arts and humanities, 64 courses in science, mathematics and statistics, and 64 courses in information and communication technology. A total of 22 courses were focused on technology, manufacturing and civil engineering, while the figures for courses in other fields were in the ranks of tens or single digits. Most participants took courses in the arts and humanities, a total of 1,252, 500 participants in natural sciences, mathematics and statistics, and information and communication technologies, as well as in technology, manufacturing and civil engineering. The other courses had attendance under 100 applicants. We can conclude that the pandemic did not substantially reduce interest in lifelong learning.

3

3 STUDENTS

MEASURES TO REDUCE ACADEMIC FAILURE

The issue of learning failure received considerable attention in 2020, given the obstacles caused by the coronavirus pandemic and the move to contactless teaching. However, CTU has coped very well with these changes, as can be seen, among other things, from the results of a university-wide student survey.

Despite the unfavourable situation, there was no dip in learning outcomes, while the overall learning failure rate fell slightly again from 30.2% to 29.6% compared to 2019, repeating the positive trend of previous years. The Faculty of Information Technology recorded the sharpest decline, with a 6% drop in learning failure rates. The Faculties of Nuclear Sciences and Physical Engineering and Electrical Engineering achieved a reduction in the order of percentage points, while the Faculties of Mechanical Engineering, Civil Engineering and Biomedical Engineering maintained roughly the same learning failure rate. Conversely, the Faculty of Architecture and university-wide organisations saw significant increases. Detailed data analysis and information on student structure across disciplines and levels of education, together with distributed scholarships, are provided in the **Table Annex, Section 3**.

Each year, it is evident that students come from secondary schools with different levels of mathematical knowledge in particular, and it is necessary to make up a huge difference at the outset and prepare them for demanding studies, based primarily on the mathematical sciences. In recent years, various forms of preparatory courses, such as the regular summer Introduction to Computer Science course organised by the Faculty of Information Technology, have proved useful for individual components, enabling candidates to acquire further knowledge needed for successful studies. When working with students in the field of learning failure, increased attention is paid to those who are already applying. Secondary students come for exams with different levels of knowledge each year, especially in mathematics and physics, which is why significant differences need to be reduced before they begin their studies and prepare students for continued studies based on the mathematical-physical sciences. To this end, various forms of preparatory courses are available for both applicants and admitted students before they enter their first years. The Faculty of Civil Engineering offers online intensive equalization courses and preparatory courses for the written Mathematics entrance exam, as well as preliminary exams. In 2020, the Faculty of Biomedical Engineering organised the weekly BioŠrot 2020 course, presenting an introduction to mathematics, biology, physics and chemistry. For Physiotherapy students, an educational course and PhysioTmel 2020 targeted at presenting the teaching of anatomy and improving physical fitness were prepared. The Faculty of Transportation Sciences prepared courses aimed at refreshing knowledge of high school mathematics and physics, preparing for university instruction and getting to know the teachers. Statistical data show generally lower student participation in preparatory courses compared to 2019, attributed to the coronavirus pandemic. The courses were conducted in distance form.

Faculties and components make effort to eliminate academic failure as early as in the first months of studies. By default, optional subjects, "repetitoria", are offered for refreshing knowledge discussed or individual consultations with tutors and study advisers. Refresher courses in other vocational subjects are also a standard part of learning. An important tool for getting feedback from students and finding problem areas is the teaching evaluation survey. Various forms of online mentoring already in place or newly applied have proved to be highly successful, involving both educators and more experienced students.

The Faculty of Mechanical Engineering has implemented a two-speed approach to reduce learning failure. Its bachelor's programme is spread over four years and based on exams at two alpha/beta levels. Students, who pass the exams at the higher, alpha level, will receive a bachelor's degree after three years, and the entrance exam for the follow-up master's degree will be waived. Those, who pass the exams at the lower, beta level, will only receive a bachelor's degree in practice after four years, and will be admitted to the follow-up master's degree after passing an entrance examination focusing on the knowledge gap between alpha and beta levels. The result is a 15% reduction

in failure rates after the first year of the bachelor's programme. The second method, which also worked in times of pandemics, is the use of artificial intelligence. By using machine learning methods, the faculty creates machine-tailored models of the behaviour of a successful and unsuccessful student. The aim is to predict the risk of failure to study and to inform the student at risk in a timely manner with adVICe and assistance (without lowering the level) when still possible. The result is relatively high student achievement even in situations of forced distance learning. The decline in failure rates after the first semester, still taught to attending students, was consistent with previous years. Without the procedures described, first-year student failure rates would have increased significantly, resulting in about 120 fewer engineers to complete their studies in 4 to 5 years.

In order to reduce learning failure, the Faculty of Architecture and the Faculty of Transport ation Sciences are introducing online equalization courses, offering students the opportunity to fill in missing knowledge to take compulsory courses or to practice the subject more thoroughly.

The Masaryk Institute of Advanced Studies makes use of the LMS Moodle application, in which electronic courses are available, covering a range of study support tools, such as texts, worksheets, didactic tests, discussions, methodological guides, tutorial videos, etc. The rate of learning failure within each year, semester and subject is monitored by the KOS Study Information System for the duration of studies, and indicators relating mainly to the percentage of completion of subjects are evaluated. These statistical overviews are used in particular by programme guarantors and coordinators for learning affairs, who regularly assess the rate of learning failure and propose measures such as the introduction of optional subjects or specific arrangements for forms of teaching.

In 2020, a centralised development project for the causes and prevention of learning failure was successfully implemented in cooperation with other universities. Critical parts of a student's life cycle have been identified by analysing relevant data. The most common reasons for dropping out in senior years include failure to meet a re-enrolled subject or the required minimum number of credits, exceeding the maximum length of study or failing the state final exam repeatedly. The recommended measures include, in particular, individual counselling, immediate help in a crisis situation, seminar information service, workshops, personality development sessions, promotion of creativity and learning skills, as well as "students to themselves" initiative, where students are offered the opportunity to share their own experiences and recommendations for successful studies. Preventive measure can also includethe use of e-learning for individual preparation, the application of an even distribution of more demanding subjects in curricula, and receiving direct feedback from students or teacher support in the form of their continuing education and for increasing their pedagogical competencies. This issue will also be addressed in another centralised development project in 2021, which will focus on analysing study data of participating universities and evaluating the success of follow-up prediction and intervention processes to reduce learning failure.

In the course of 2020, no final decision was made at CTU in Prague to declare invalid the performance of the State Examination or part thereof or the defence of the dissertation, or the appointment of Associate Professor pursuant to Sections 47c, 47f and47g, or Sections 74a, 74d and 74e of Act No 111/1998 Coll. on Universities.

MEASURES TO LIMIT PROLONGATION OF STUDIES

In 2020, the focus was on preventing prolongation of studies caused by the pandemic situation. Key to the faculties and components were the transition to online teaching and satisfactory performance during the first months of study. In addition to the tools available, students were offered the opportunity to repeat a failed course in the following semester. Typical exam examples were featured in lectures and exercises, often also available directly on the subject's website. Some specific topics were complemented by lectures from practitioners. For core subjects, the maximum practice capacity was reduced so that the practitioners could accommodate students individually. Also implemented were"Citation Thursdays", primarily for students of final years, providing consultations on quotations, citations, citation managers and copyright.

The Masaryk Institute of Advanced Studies focused on recommending model study plans. The Faculty of Biomedical Engineering conducted a pilot run of innovative teaching education based on the combination of problem learning and object-based learning, using the method of RNDr. Eva Feuerstein, Ph.D., within the scope of the International ITEM Project, Innovative Teaching Education in Mathematics. . The results indicate a marked improvement in the majority of students. At the time of distance learning, the emphasis was on raising students' awareness, through faculty websites as well as specific subjects, where updated presentations and other study materials were available. The Moodle platform was then widely used and expanded. Faculties and components also focused on online accessibility and expansion of fund libraries.

An incentive tool to limit study prolongation is also the charging of study fees for exceeding the standard period of study increased by one year in accordance with the CTU Statute.

FOUNDATIONS, GRANTS, SCHOLARSHIP PROGRAMMES

Scholarships are an incentive intended to support especially gifted or otherwise excellent students at CTU. Support is earmarked for participation in foreign study visits and faculty events as well as a reward for an excellent bachelor or final thesis. The best studio projects are also rewarded in this way. Naturally, the scholarship programme also applies for students in a difficult social situation to help them complete their studies successfully. Each faculty approches the use of scholarship programmes differently, but always in accordance with the CTU Scholarship Regulations. In addition to the traditional reward system mentioned above, many faculties began to support well-performing secondary students or top first-year students for their excellent presentation of the field or faculty, which contributes to CTU's reputation overall.

INFORMATION AND ADVISORY SERVICES FOR STUDENTS

Similar to other CTU services, information and counselling support had to adapt to new student needs and conditions set by regulations at the time of the pandemic, so they operated without contact, in an online mode. Information and counselling services are provided through CTU's Centre for Information and Counselling Services, the CTU Career Centre and the Centre for Support of Students with Specific Needs, ELSA. All these centres are used by all faculties with an emphasis on continuously improving the professional qualifications of the staff of these centres and the quality of the services provided in line with the individual needs of the students.

Centre for Information and Counselling Services of CTU (CIPS)

All activities of the centre are designed to support CTU students to be successful in their studies as well as in their professional and personal lives. CIPS targets first-year students as early as during enrolment, when all those who have a problem upon entering university are provided with individual care. They all are informed that they will find support and help at the centre to solve problems that occur not only in learning and social adaptation to the new environment, but also in the course of further study.

All CTU students are provided with individual study, psychological, social, legal and spiritual counselling, with particular emphasis on dealing with study-related risk situations.

CTU also organises events throughout the academic year with the intention of providing students with the opportunity to acquire the necessary competencies for a learning, professional and personal life. During the semester, seminars, lectures and workshops are organised for students, aimed at promoting learning skills, fostering creativity and personal development.

Under the institutional project, students are offered other forms of counselling: coaching, speech counselling, financial counselling, student support at CTU, group work and PhD seminars.

All the activities of the centre are aimed at creating an environment for CTU students that minimises the obstacles they encounter during their studies and that affects the number of students who would drop out prematurely and unnecessarily. CIPS has a particular focus on working with students who have problems with procrastination and computer addiction. The centre works intensively with the Centre for Support of Students with Specific Needs - ELSA and the study departments of individual faculties and higher education institutions.

CTU Career Centre

Thanks to its unique position and perception by society, and future employers as well, CTU in Prague is a kind of insurance policy for its graduates when seeking jobs in the future. All faculties or higher education institutes work with the private sector as far as they can, so students have the opportunity to join the workforce as soon as they graduate. But, thanks to its Career Centre, CTU also provides services for the personal development of students and their preparation for future career success. In this regard, there is a staff counselling service where it is possible to prepare for a job interview, using video interviewing as one of the modern ways to interview with psychological diagnostics.

Advice on how to prepare a quality CV, along with a letter of motivation, is also an integral part of the services provided. An important service is a career counselling service that recommends professional direction and provides analysis of weaknesses and strengths, along with recommended styles of work and efficiency.

In general, the centre helps students to get to know themselves and to be able to apply their strengths to what they do. It familiarises students with the workings of the labour market and helps make them more attractive to employers, whether by improving self-presentation or gaining experience. It complements the disciplinary knowledge with nowadays much-needed soft skills, that is, communication skills and other skills that are needed in life. It also assists in finding solutions when dealing with career, learning or personal problems, passes on the right contacts and encourages students to address the situation.

Career Centre services can be used not only by CTU students, but also by graduates up to three years after graduation and, recently, by CTU staff. Various methods of coaching, mentoring or personal testing are used at the centre. Last but not least, the centre participates in fairs and student events, manages a Facebook page and a website on which it advertises positions and reports on its serVICes. Working with companies and maintaining awareness of the development and needs of the labour market is essential for it to operate successfully.

SUPPORT CENTRE FOR STUDENTS WITH SPECIFIC NEEDS

Students with mobility, vision and hearing impairments, students with specific learning disabilities including ADHD (attention deficit hyperactivity disorder), students with autism spectrum disorder and students with other difficulties (chronic illness, psychological disorder or illness, impaired speech and other communication skills, etc.) are provided with services by the ELSA – Guidance and Support Centre for Students with Specific Needs under the Department for Education and Student Affairs of CTU's Rector's Office.

The Centre's serVICes, which by their nature go beyond professional counselling, was provided in accordance with an applicable document of the Ministry of Education, Youth and Sports, which defines the general terms and conditions for ensuring studies for students with specific needs and contains a methodological standard for compliance with them. A complementary document was the Methodological Guideline of the vice-rector for Studies on Support for Students with Specific Needs at CTU.

Modifications of study conditions are carried out in close cooperation with CTU faculties and institutes primarily through direct work of instructors, contact persons and study department employees.

Through the Support Centre for of Students with Specific Needs, cooperation is established already during entrance exams. When completing an online application, applicants with specific needs are given the opportunity to ask for changes to the course of the admissions tests and study conditions due to their disability.

Teachers in faculties and higher education institutions are regularly informed about students with specific needs who are registered with ELSA and are provided with guidance from the Centre's experts on how to communicate and work with such students.

In 2020, 89 students with specific needs were registered at CTU. These students are offered access to study literature in suitable form, use of the ELSA Centre's digitisation and library service, visualisation and writing services as well as sign language interpretation, including simultaneous transcription. Personal and learning assistance also plays a very important role, along with technical service consisting of the loan of assistive technology and equipment. The services offered include functional diagnostics, diagnostics of specific learning disabilities and associated regime measures, such as modifications to the course of instruction and examinations, along with individual instruction and time compensation.

As a result of the pandemic measures, the number of students requiring the provision of support measures related to their impaired health and mental health increased significantly. The staff of the Centre also prepared a series of online seminars to promote study strategies and motivation for study as a complementary offer. The Centre's offer of services also extends to incoming foreign students.

SUPPORT FOR OUTSTANDING STUDENTS

Excellence is one of the goals that will take the perception of the university by society to a high level. At all faculties and institutes where young people study, CTU in Prague is aware of the need to support exceptionally gifted students who in the future can be part of excellent science teams not only in the Czech Republic but also internationally.

Support for and outreach to gifted students begins in secondary schools, in the form of field trips, visits and discussions with secondary vocational school students. Secondary school students' placements at specific faculties are also successful search and networking projects. For example, the Faculty of Architecture engages with gifted secondary school students in educational workshops on architecture and its studies. Due to pandemic restrictions, most contact events could not take place. Despite this, the Faculty of Transportation Sciences managed to organise the 12th "Dean's Award" competition for individuals and teams of students in secondary vocational schools and grammar schools. Those who participated in the contest and applied to study in the academic year 2020/2021 were accepted to study at CTU without admissions. The Faculty of Biomedical Engineering organised contact and online Open House Days. The Masaryk Institute of Advanced Studies works with secondary schools in the form of organising students' practice as part of the Specialisation in Pedagogy study programme, where projects are solved whose outcomes increase the attractiveness, competitiveness, or material and technical capability of secondary technical schools. At the Faculty of Civil Engineering, selected students are placed in a "selective study parallel course" where they have the possibility of an expanded offer of selective subjects.

CTU works with gifted students from the first year of studies in the form of motivational scholarships. These students also have the opportunity to participate, for example, in the research activities of individual departments as student researchers, they are awarded various types of scholarships, supported in domestic and international competitions, or sent on assignments abroad, as is the case for students of the Faculty of Architecture, which has long collaborated with major foreign architectural offices and prestigious European studios.

SUPPORT FOR STUDENTS IN DIFFICULT LIFE SITUATIONS

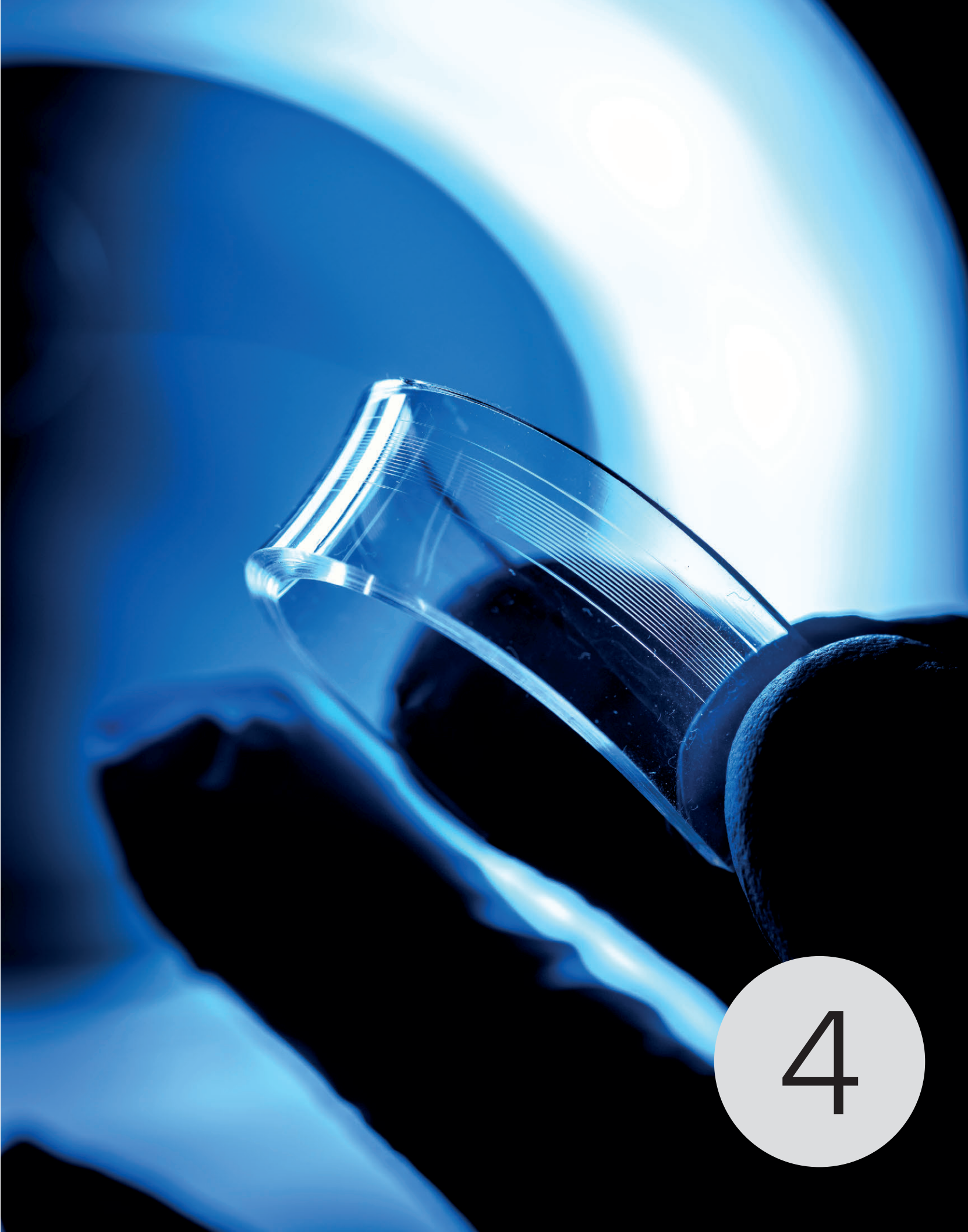
Over 17,000 students attend CTU in Prague, who go through many life situations in the course of their studies that they need to be helped with. Faculties take an individual approach to dealing with each student's individual situation. It is also possible to use the services of CIPS and ELSA centres, offered to students of all CTU components. 2020 was a specific year due to the coronavirus pandemic that has significantly affected the lives of all of us, resulting in the widening of social gaps in society. CTU faculties and institutes individually addressed the situation of each student who asked for help. CIPS and ELSA, with which the components are actively working, also offered assistance within the scope of their services.

Social or special-purpose scholarships are awarded to overcome socio-economic disadvantages, based on the application submitted and evidence of appropriate documents proving a difficult life situation. Students with socio-economic disadvantages are also identified due to the targeted work of the study officers or coordinators with whom they address their specific needs. In addition to financial aid, modifications to study plans or other forms assistance are provided.

SUPPORT FOR STUDENTS IN THEIR ROLES AS PARENTS

The role of the parent means great responsibility toward the whole society. The role of the student parent multiplies this responsibility and and is also up to the university what conditions it will offer to those who assumed this role in the course of their studies or already entered the school as parents. In the previous year, a modification of the Study and Examination Regulations was applied in practice, extending the maximum length of study and extending the period for student-parents to fulfil their studies obligations. CTU components also adopt other measures such as modification of studies, counselling on the development of an individual study plan, considerations regardinginterruptions of studies, or deduction of recognised parenting time from the total study period.

CTU in Prague is the founder of the University primary school and kindergarten Lvíčata (Lion Cubs), which allow students and CTU staff to enrol their children there. The children are educated in these facilities with a focus on promoting technical and natural science talent. They are part of the university, they're involved in its life.



4

4 GRADUATES

COOPERATION WITH GRADUATES

The Society of Graduates and Friends of CTU (www.absolventicvut.cz) is now in its sixth year. Several social and educational events were planned throughout 2020 as they were each year, but most could not take place due to ongoing pandemic measures. Among the planned events were, for example, a tour of the Institute of Intermedia at the Faculty of Electrical Engineering, the laboratories of biomedical engineering FBME, or a lecture by the director of the Klokner Institute, Doc. Jiří Kolíska, on Reasons for the Collapse of the Troja Footbridge. Not everything was cancelled, however, with the Vltava Run sporting event taking place in September, where the CTU alumni team ranked 20th out of a total of 288 teams on the starting list. At the end of the year, lectures and seminars were already taking place online; this form will be preferred for the coming period.

It is customary for social and professional events to be held in individual faculties and institutes to maintain relations with graduates. The Klokner Institute hosts an annual Christmas concert, the Faculty of Information Technology and the Faculty of Biomedical Engineering regularly organise alumni meetings in February and November, where the alumni greatly appreciate the opportunity to meet informally and share their work experience. Like many others, these social events did not take place as a result of the pandemic, for the most part being replaced by contactless platforms in the form of online exhibitions, webinars and expert lectures.

The components continued to maintain regular communication with their graduates, e.g. the Faculty of Architecture circulates an electronic newsletter and systematically aims to present graduates, and thus the CTU brand, in the media, the Faculty of Civil Engineering communicates with its graduates through social networks, and similar tools are used by other components. The Faculty of Transportation Sciences and the Klokner Institute liaise with a number of graduates through direct involvement, e.g. membership in the State Final Examination Commissions. Graduates become opponents of final papers, evaluators and student project leaders, or speakers for both professional subjects and practical exercises, especially in the online form in 2020. The Faculty of Biomedical Engineering receives valuable comments on the content of the study programmes, based on its communication with its alumni, according to which it modifies study plans and curricula of subjects in the framework of newly prepared accreditations.

Many graduates, particularly in specific fields such as optics, optometry and ophthalmology, attend as experts in various professional conferences. In June 2020, for example, an online conference was organised by the Department of Natural Sciences of the Faculty of Biomedical Engineering, which included a block covering both the development of new materials and measurement options in optics and optometry, as well as modern eye examination procedures and other optical phenomena linked to this issue.

The CTU Career Centre also helps keep in touch with graduates by promoting some successful alumni projects, such as the internationally successful travel-tech start-up Smart Guide, which has devised an app that can be used for orientation in the Dejvice campus by domestic and foreign students from September 2020. Maintaining contacts and working with graduates is important for obtaining feedback on the success of studies, mapping graduates' employment and feedback from employers.

An overview of the number of graduates is included in the **Table Annex, Section 4**.

MONITORING OF EMPLOYMENT AND EMPLOYABILITY OF GRADUATES

The employability of CTU students is very important both for the university's feedback on the quality of the study programmes and their links to practice, and for candidates who also consider

their interest in studies with an evaluation of subsequent marketability. In 2020, other university components joined theuniversityl-wide project "Monitoring labour market needs, cooperation with practice, strengthening ties between CTU and alumni" that isunder way at CTU. However, the employability of graduates is also monitored beyond the project, e.g. through a questionnaire aimed at obtaining feedback from graduates in particular in the areas of assessment of higher education and quality of education, relationship of studies to practice and work placement, changes in the curriculum in terms of training preparation, degree of study satisfaction, etc.

Employability is primarily supported by the CTU Career Centre and a database of advertised jobs managed by the centre on www.kariernicentrum.cz. The website is regularly updated with offers of temporary jobs and internships suitable for students and recent CTU graduates. The traditional Mentoring programme is another way of promoting student employability. It helps students gain experience in their field and establish cooperation. In the Mentoring programme we work closely with CTU alumni who act as mentors for selected students. The centre also mediates final thesis topics commissioned by companies.

Another way to boost employability is through HR staff counselling, where students can get information about the job market directly from human resources staff of tech firms.

The employment rate of graduates has been high in the long run, as confirmed by faculty-by-faculty surveys of employers who are particularly satisfied with their good technical knowledge. The Faculty of Information Technology is regularly placed at the top of rankings comparing graduates' success in transition to practice.

But a persistent weakness across all components is the systematic extraction of feedback from employers. A newly introduced measure is the set up ofStudy Programme Boards, where one member of the Board is also a representative from the ranks of employers of the students of the relevant study programme.

COOPERATION WITH EMPLOYERS

CTU in Prague is in its focus closely intertwined with highly professional fields where practitioners often work closely with faculties. Most graduates are employed in the field they have studied and their employability is very good. Students and future employers can get to know each other during studies already when they have the opportunity to meet in professional seminars or in specific projects that both academia and the private sector engage in.

At CTU faculties and institutes, external experts are members of exam and professional boards of state final exams or in the organisation of student conferences. They also act as consultants for bachelor and final theses and dissertations, or even as their direct sponsors where the topic is often related to a job offer for the student/graduate. This is an established practice, for example, at the Faculty of Architecture or the Klokner Institute. The area of compulsory professional practice, which unfortunately was very limited in 2020, is also very significant. Employers and professional organisations are also involved in the process of improving the content of curricula and consultations in the preparation of reaccreditation of study programmes, as is the case at the Faculty of Biomedical Engineering.

Other forms of collaboration with employers with faculties should also be highlighted, such as the primary linking of the offerings of bachelor and final theses and dissertation themes ofthe academic and application spheres, accompanied often by a student/graduate job offer. This is an established practice, for example, of the Faculty of Architecture and the Klokner Institute. The Faculty of Civil Engineering offers companies in the field a contractual form of cooperation and is still actively involved in the project Koordinuj.cz, which organises the so-called Arenas, i.e. professional meetings of selected companies and student candidates. The Technical Thursdays are also a very successful activity, focusing on current issues from the construction sector, organised in collaboration with business representatives and academic experts. They were also held online in 2020. The Faculty of Information Technology offers employers an established FIT Partners and Sponsors Programme (FIT Partner/FIT Sponsor), which allows companies and institutions to influence the focus of students and thus participate directly in the shaping of graduates. On October 19-22, students were able to connect with companies within COFIT ONLINE, browse cooperation offers and participate in COFIT Talks with FIT guarantors and corporate experts. At the Faculty of Mechanical Engineering, meetings were held with representatives of partner firms as part of the student organisation, Engineering Student Club, which also gradually migrated from the auditoriums to the virtual space over the course of the year. At the Faculty of Biomedical Engineering, selected employers had the opportunity to offer graduate and student positions as part of some online seminars. The Masaryk Institute of Advanced Studies has worked successfully with 15 faculty schools, where students in teacher programs can work as teachers after graduation.

As part of the facilitation of employer job offers to students and graduates, the CTU Career Center, www.kariernicentrum.cz, also operates successfully; it regularly advertises current job opportunities for students and recent graduates. The Mentoring programme, in which experts and business managers offer cooperation to selected CTU students (mentoring.cvut.cz), is also highly appreciated. This gives students a chance to get to know not only the company, but also the work of the mentor, and to establish professional contacts during their studies.

The Career Centre also provides students with topics of graduate, bachelor and doctoral theses commissioned by companies. This allows students to work on real projects, and their consultants are business experts.

5

5 INTEREST IN STUDIES

ADMISSION EXAMINATIONS

The admissions exams at CTU in Prague are organised annually by individual faculties, which use their teaching background to set up a system to verify a candidate's knowledge and subsequent assessment. A total of 11,175 applications were submitted for the bachelor's degree in 2020, and 9,407 applicants were admitted. There were 3,501 applicants admitted for the follow-up master's degree programmes. In the end, the total number of students admitted in 2020 was 8,651, including doctoral studies, 8,307 of whom enrolled in bachelor's and master's programmes. The 2020 figures do not show a significant fall or increase compared to 2019. More detailed data analysis is included in the **Table Annex, Section 5**.

The bachelor's exams for most CTU faculties in Prague are aimed at verifying the knowledge of mathematics, where the candidate demonstrates in a written test his or her ability to self--solve tasks in the range of secondary mathematics. Each faculty, as well as the Masaryk Institute of Advanced Studies, prepares its own tests, and their experts draw them up specifically according to their own needs to test the abilities of prospective students for the field. Most entrance exams are one-round, with the exception of the Faculty Architecture, whose two-round admission process is composed of a talent test in the first round (it verifies the prerequisites with an art test, a test for spatial imagination) and other competencies are verified by tests of general knowlege and general academic qualifications.

The Faculty of Mechanical Engineering routinely prepares its own mathematics exam, corresponding to the graduation exam, the so-called Mathematics+, but in view of the difficult situation, it decided to waive it in 2020. In order to avoid lowering the quality and level of students' knowledge upon entry, the entrance exams have been replaced by the Repetitorium course in secondary school mathematics.

We can also see a two-round admission process at the Faculty of Civil Engineering in the Architecture and Engineering programme, when a ticking written test from mathematics is completed with an oral interview on architecture with a presentation of one's own graphic work. As part of the admission procedure for the 2020/2021 academic year, all candidates were granted a pass on the mathematics test, the architecture test was conducted without the applicant's personal participation on the basis of the artwork supplied.

At the Faculty of Transportation Sciences, the conditions of the admission procedure, the standard written mathematics ticking test, were changed due to the emergency situation and candidates were admitted only on the basis of proof of prior secondary education. Only the applicants for the Professional Pilot programme took written maths and English language exams.

At the Faculty of Biomedical Engineering, admissions are conducted in the form of written tests, but only for the Physiotherapy and Civil Emergency Preparedness study programs. These tests were provided with own resources, both for the bachelor's and the follow-up master's degree programmes. The admission process for all other courses was conducted without admission tests. The Masaryk Institute of Advanced Studies requires an admission written test, which is provided with its own resources and evaluated under a license from Acrea-Remark Office OMR, which the Institute owns.

In the case of master's programmes, there are different forms of admission, which aredetermined by individual faculties with regard to their field of study. Again, it is largely a test, the form of which is very individual according to the faculty. Oral interviews are another common form. For example, at the Faculty of Architecture, the admission process is two-round, with a portfolio evaluation in the first round followed by an oral interview. However, these tests were also affected by the ongoing pandemics, and they were modified or waived.

COOPERATION WITH SECONDARY SCHOOLS

CTU's cooperation with secondary schools continues to improve and expand. The Faculty of Civil Engineering continued in 2020

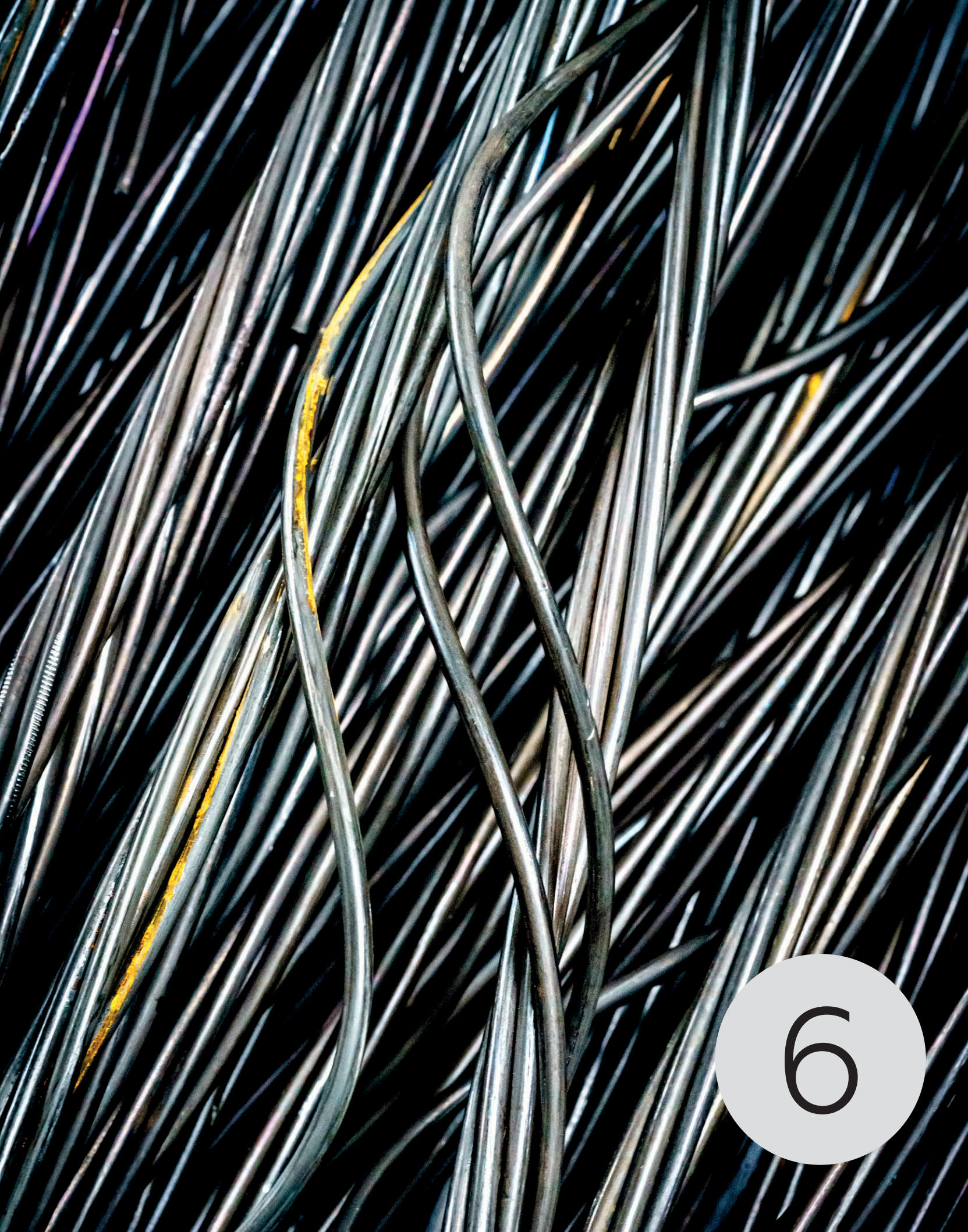
with cooperation contracts with two secondary schools - the Secondary Industrial School of Construction in Prague's Dušní Street and the J. Gočár Secondary Industrial School of Construction. The faculty also has a high-quality social media presentation concept consisting of FB sites and several FB groups, Instagram, YouTube and a LinkedIn account within the CTU platform. The Builders at Heart website, a concept developed in 2020, presents interesting moments from projects, studies, experiments, etc. in the form of videos and podcasts, thus contributing to the popularisation of professional and scientific research activities. Furthermore, the faculty hosted the traditional Open House Day at its premises in January, and launched an online version via the web application Stavarna online in November and February. Both virtual dates had a significant number of applicants. An audiovisual recording was made of the February event and is available at all times to all applicants. Unfortunately, the 14th annual StreTech 2020 conference, a meeting of secondary school students hosted by the Faculty of Mechanical Engineering, could not be arranged, but existing contacts were used to inform secondary schools about changes in the organisation of admissions procedures as well as the study itself at the time of online teaching and exams. The Faculty of Transportation Sciences stepped up social media promotions towards secondary school students. With a view to design-oriented teaching, for 2020, MOTOSTUDENT was used as the main supporting project to promote. The Engineered Motorcycle, with which students took part in international races in Spain, was displayed at all faculty promotional events during the year and it was always met with great interest.

The Faculty of Transportation Sciences also used the Transport Hall of the Faculty of Transportation Sciences to promote its activities, where excursions and specialised lectures are carried out for both Prague and non-Prague secondary schools. The cooperation also works on the Děčín worksite, where secondary school students from the region of northern Bohemia focused on the issues of simulations and visualisations in transport as part of excursions held on the occasion of the Open House Day. Secondary school students could also try, for example, creating transportation models or using software for visualisation, including 3D projections, at the Lab for Simulation and Visualisation. The main magnet was the introduction of a newly built vehicle simulator.

The Faculty of Biomedical Engineering also held Open House Days, a traditional one in February, and an online one in November. Students from Václav Hlavatý Grammar School in Louny performed several experimental tasks in physics, human biology and microbiology under the expert supervision of faculty educators. In February, Postupická Grammar School in Prague became the fourth faculty school.

At the Faculty of Information Technology, there was an online three-week course on the basics of programming, Introduction to Computer Science, attended by 30 secondary school students. The summer school IT Czechitas offered girls aged 14-19 the opportunity to familiarise themselves with the basics of IT technology and visit the faculty's laboratories. The Open House Days were virtual, with a guided 360-degree video tour of faculty teaching areas and vocational classrooms and laboratories. The faculty also managed to organise the 7th FIKS Informatics Correspondence Seminar, whose successful competition solvers were admitted to the faculty without admissions. Long-term cooperation continued with the Grammar School in Arabská Street, which offers the programming/computer science discipline as one of the first secondary schools in the Czech Republic.

At the Masaryk Institute of Advanced Studies, cooperation with secondary schools took place mainly in the Specialization in Pedagogy study programme, and the qualification work covered projects that increase the attractiveness, competitiveness, or material and technical capability of secondary technical schools with their outputs. Furthermore, the Institute invites students and educational advisors to Open House Days and informs secondary schools about study programs and admissions procedures. Participation of CTU components in national and international fairs and use of various communication platforms, including new media, are an integral part of the cooperation.


6

Ing. Jiří Boháček / Registrar

"Academicians and staff are the fundamental drivers of CTU, ensuring its long-term development with an emphasis on quality. Without their erudition, the university could not function on its own, so it is necessary to create suitable conditions for them. With the HR Award last year, there are increased demands on staff and applicants to join academia, so the definition of the Career Regulations, whose approval at the end of the year I consider a major success, was crucial in 2020. In the year ahead, the aim will therefore be to see that it is rigorously observed and implemented. The focus will continue to be on competence, personal research potential and the ability to participate in innovative solutions.

A positive image of collaboration and good communication is the valued improvement of work within academia.

The aspect of ensuring functional administration is also important, with motivated and qualified staff playing a role. Building responsible teams within the university with an emphasis on meeting international standards is not an easy task, but it is a challenge that CTU intends to meet through effective management and seeking paths leading to development in line with the implementation of the HR Award principles."

6 EMPLOYEES

MERIT-BASED CAREER SYSTEM AND MOTIVATIONAL TOOLS FOR ACADEMIC STAFF

Czech Technical University in Prague has subscribed to the principles enshrined in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. As the 2019 HR Award winner, it is also committed to adopting a Merit-based Career System for Academicians within two years. Its implementation is already under way, with the help of the CTU HR Award Action Plan, in order to implement the principles of HRS4R. The implementation phase therefore meant turning all efforts in 2020 towards the approval process of the own Career System, which succeeded.

The Career System provides for continuous improvement of the quality of teaching and creative activity, its evaluation according to European standards, with emphasis on the requirement of excellence to maintain and enhance international competitiveness. Its aim is to adjust the relationship of employees to CTU, to define the content of positions and qualifications of academic staff, and to set the framework of the professional career and its expected milestones for workers and jobseekers at CTU in terms of their expected career growth and motivation. It is designed to enshrine the principles of equal treatment, transparency and reviewability of major employment decisions in relation to employees' career progression, and to establish the basic principles that make it possible to successfully balance professional and personal life. After intense discussions, the Merit-based Career System was approved on 25 November 2020 and came into effect on 1 April 2021. At the same time, a new Internal Pay Code was consulted to help take account of the results achieved.

DEVELOPMENT OF TEACHING SKILLS OF ACADEMIC STAFF

Teaching skills are an integral part of the development of the entire university. Currently, support is provided primarily for young and beginning teachers who need to acquire the basic knowledge, pillars and practices for transferring knowledge to students. The Masaryk Institute of Advanced Studies is a key provider of courses and offers for all CTU components. Some faculties themselves recommend that their staff undertake teaching and psychology courses of at least one semester. The development of academicians also includes the possibility to participate in the courses of scientific article writing and publishing organised by the National Technical Library. Most faculties also maintain communication between the subject's guarantor and the teacher because of the quality and methodology of the teaching.

In 2020, a large part of the institutional development project was dedicated to professional growth of academic staff. At the same time, a survey of employees' interest in self-development courses was conducted, including online courses. University-wide evaluations provided by students also contribute to the development and quality of teaching through feedback to their teachers.

Faculties encourage the participation of their staff in training courses. The specific ofrthe time of the coronavirus pandemic was the need for distance learning. Materials were therefore developed for online learning, coupled with the use of Moodle and MS Teams tools and online training for educators. The dedicated staff then provided support to educators for these platforms.

A new Merit-based Career System will be in place from 2021, so that more statistical data can be obtained beyond the structure of academic, scientific and other staff, including a breakdown among the different components of CTU, which is included in the data in the **Table Annex, Section 6.**

GENDER EQUALITY PLAN, SEXUAL AND GENDER-BASED HARASSMENT

CTU is a technical university where the proportion of women is still lower than that of men. The number of women among both staff and students is growing due to the high level of activity of individual faculties and the positive presentation of successful women in these fields. Women are represented in departmental and faculty leadership, successful in habilitation and appointment processes. Gender equality at CTU comes from the nature of ethical behaviour and adherence to university values. Differences in student composition are not fundamental, the gender ratio is about the same. The CTU gender equality plan will be prepared within the HR Award in 2021.

The main methodologist not only for gender equality is the CTU Rector'Office, where a specially trained person for the issue is based. Discrimination by sex or age would be investigated directly by the senior staff of the component and, if necessary, dealt with by law enforcement authorities.

7

prof. Ing. Oldřich Starý, CSc. / Vice-Rector for International Relations

"CTU represents a wide range of capacities determining the direction of the university's further development in the international concept. CTU faculties and institutes have very well-equipped laboratories, excellent technical facilities and strong scientific teams, which means an extremely attractive environment for foreign scientists and doctoral students. Research and study programmes are carried out with a view to internationalisation; important support is also provided by the CTU Rector's Office through development projects, for example. The improving trend is evident when working with foreign students, the bilingualism of study and foreign departments is beneficial, curricula are adapted to students' stays abroad. A good demonstration of support for internationalisation is the Study at CTU project aimed at potential foreign students, but also the Study in Prague project, which popularises Prague as an excellent city not only for study but also for student life. In order to promote internationalisation in the future, CTU will continue to emphasise quality and professionalism and adapt the organisation and scope of support services so that educators and scientists can primarily pursue their mission and are less burdened with administration. I also see room for improvement in the motivation of students, with the emphasis on changing their mindset so that they see foreign experience as an absolutely essential part of their education that they take pride in being CTU graduates and continue to support their alma mater after graduation in the same way that students of prestigious American colleges do."

7 INTERNATIONALISATION

SUPPORT FOR PARTICIPATION OF STUDENTS IN FOREIGN MOBILITY PROGRAMMES

Support for students is one of CTU's priorities. It is based on strategy documents, has the character of financial support and is mainly implemented through the Erasmus+ programmes, Student Mobility, ATHENS and others. The coronavirus pandemic put the brakes on CTU students' participation in foreign mobility programmes, resulting in necessary changes, but overall mobility was met.

Erasmus+ Programme

Once again, the Erasmus+ programme was the most important international cooperation programme and instrument to support the mobility of CTU students and staff in 2020. This European Union programme allows institutions, by mutual agreement, to exchange students of all levels of study for study or work placements and foreign staff internships for teaching purposes. Non-academic staff have the opportunity to expand knowledge within their fields through foreign training, shadowing colleagues at foreign institutions or participating in workshops. In the academic year 2020/2021, CTU concluded a total of 603 bilateral contracts with partners at 306 foreign universities in 30 countries, with a total capacity to accommodate 1,340 stays abroads and admissions of 1,344 students. There were 777 applications for study visits in the 2020/2021 academic year. A total of 513 students were nominated for study visits based on the applications and the subsequent selection process. Under the programme, 193 CTU students graduated from partner universities in Europe in 2020, most in Belgium (18), Spain (15), the UK (12) and Finland (12). The Faculty of Civil Engineering (29), the Faculty of Electrical Engineering (27) and the Faculty of Architecture (49) sent the highest numbers of students for study visits. Six academic staff went on teaching assignments, most often to Germany, France and Bulgaria. Six CTU staff were trained at partner universities, mainly in Spain and Italy. CTU used all allocated EU sources, including funding earmarked for student mobility in the amount of EUR 348,580, staff mobility in the amount of EUR 7,253 and mobility organisation in the amount of EUR 64,000. The state budget contribution totalled EUR 236,313. The total funding for student scholarships and staff mobility allowances amounted to EUR 592,146.

In 2020, 522 students were admitted to CTU under the Erasmus+ programme, most often from France (185), Spain (93) and Germany (51). The largest number of students arriving were registered at the Faculty of Civil Engineering (125), the Faculty of Mechanical Engineering (101), the Faculty of Electrical Engineering (100), the Faculty of Architecture (77) and the Faculty of Information Technology (63).

Institutional Student Mobility Project

The recurring project follows a long-established model of sending students to foreign partner universities on the basis of bilateral student exchange agreements, concluded mainly with non-European institutions. The project includes the selection of students including language tests for one and two-semester study stays at foreign universities, the award of a scholarship, the organisation of their stay and the final evaluation of the study results obtained. It applies to students of all faculties, including those going to study double degree programmes. In 2020, 86 students travelled for a total of 333 student months under the project, and 129 students arrived for a total of 660 student months. For outgoing students, the most interesting countries are the United States (5 universities, 14 students), Taiwan (6 universities, 15 students) and South Korea (5 universities, 9 students). Other countrie include Singapore (1), Japan (1), Australia (6), Mexico (1), Canada (5), Costa Rica (1), Chile (1), Argentina (1) and Thailand (3). A total of 10 students went on to study double degree programmes at partner universities in Germany, France, Indonesia and Russia. The exchange programmes received the most students from the US (31), Taiwan (19), South Korea (17), Argentina (12) and Canada (12), as well as Russia (6), Singapore (6), Mexico (5), India (4), Australia

(4), Thailand (4), Chile (4), Peru (2), Brazil (1), Panama (1) and China (1) in smaller numbers.

Overall, the lower numbers of incoming and outgoing students than in 2019 were due to the decision of foreign universities to cancel attendance semesters, switch to online classes or repeatedly postpone the start of the semester, which resulted in many students being unable to make their foreign trips. In some cases, the reason for not starting the study stay was restricted entry into the relevant country's national territory. It should be emphasised that all of the allocated funds, which totalled CZK 11 million in 2020, were distributed toto outgoing students for scholarships and never used for wages or bonuses to the research team or material items or any related servic es. Due to a decrease in the number of outgoing students, not all of the allocated funds for this IP project have been drawn, but the project has been extended until the end of June 2021 and it can be assumed that the funds will be used for mobility in the first half of 2021. The project is formally university-wide, co-ordinated by the Foreign Relations Department of the Rector's Office, but the benefits are passed on to students of all CTU faculties and relevant workplaces.

ATHENS Programme

CTU was ready to participate in the ATHENS programme as it does every year in cooperation with UCHT. Two runs were also planned for 2020 at partner foreign universities, in March and November. In March, 183 students (148 CTU + 35 UCHT) were ready to leave, unfortunately due to the unfavourable epidemiological situation, cancellations of prepared courses and also cancellations of stays by the students themselves,after several meetings between ATHENS network partners it was decided on 2 March 2020 to cancel the March run. This decision proved prescient, as ten days later the state of emergency was declared in the Czech Republic and the trips would not have been possible anyway. Bearing in mind that the vast majority of CTU students had already purchased tickets or paid for accommodation, it was decided to reimburse their eligible costs. Throughout 2020, we dedicated ourselves to assisting students with the refund of spent financial resources from individual carriers/boarders and, if necessary, compensation for non-refunds. The epidemiological situation was not favourable during the autumn of 2020 either, so the ATHENS partnership network again voted to cancel the November run in order to protect both teachers and arriving students.

SUPPORT FOR FOREIGN MOBILITY OF ACADEMIC AND NON-ACADEMIC STAFF

For at least two decades, foreign trips by academic and administrative staff have been a standard part of the lives of departments, faculties and other workplaces. These usually comprise participation in scientific conferences, a variety of internships, research stays, work on international project teams or associations. The vast majority of this kind of foreign mobility is covered by the decentralised project or ordinary operational funds of the individual components of CTU.

At the central level, mobility of academic and administrative staff for lecture activities is offered primarily under the Erasmus+ programme. Output rates for educators are not very high, as young teachers in particular are busy with lectures as well as engaging in research work. Limited travel options for most of 2020 reduced numbers of outgoing staff even further. CTU also supports short-term trips abroad of students, doctoral students and post-doctoral students, mainly for selected international conferences. This category also includes trips of science and sports teams or study visits under joint study programmes, where the most widely used are contracts with RWTH Aachen and TPU Tomsk. In 2020, a total of 54 student mobilities were financially supported in this segment, with a total funding of CZK 319,000.

Another tool to support foreign stays is the full-time IP project "Worker Mobility" based on the CTU Long-Term Intent priority. It aims to send to partner universities, in particular non-European, selected young educators and researchers, mostly from Ph.D. and post-doc categories, who can expand cooperation with these institutions. Project funds could not be fully spent in 2020 due to the pandemic situation, therefore the project was extended until the end of June 2021 and unused funds can be expected to be drawn up in the first half of 2021. The project is formally university-wide, coordinated by the CTU Rector's Office, and the benefits remain at the level of all involved faculties and workplaces of CTU.

The ongoing pandemic adversely affectedthis area as well, as the decline in departures and arrivals was much more pronounced in absolute terms and percentag termsthan for students.

The moderate and sustained growth of all types of mobility monitored over the past decade has stopped and there has been an easily understandable decline. In 2020, travel restrictions were in place in the key months (March, April, May, October - December) for international events of all types, reflecting in a drop in foreign trips by teaching, scientific and administrative staff. The "normal regime" applied only in January, February and summer months. The fall in mobility to around 12% compared to prior years reflects this development. On the positive side, work on international projects has not stopped thanks to online communication and the significant reduction in peer visits has not had a negative impact on their ongoing solution.

INTEGRATION OF FOREIGN ACADEMIA MEMBERS INTO UNIVERSITY LIFE

Deepening the internationalisation of university life and increasing the quality of the education process is also significantly influenced by the presence of foreign staff in individual faculties. Under existing cooperation agreements with foreign partner institutions and as required by the faculties, their educators are invited to lectures in standard teaching at CTU for bachelor's, master's and doctoral programmes. Financial support for these stays takes place through the IP Worker Mobility project, which has been a standard part of activities for deepening the internationalisation of life at CTU for eight years. The project is based on the CTU Long-Term Intent, Increase in the

number of foreign educators, the main part of which is focused on organising the arrival of foreign educators, their stay at CTU and the payment of reasonable accommodation costs.

Project funds could not be fully spent due to the ongoing pandemic, the project was extended until the end of June 2021 and it can be assumed that unused funds will be drawn up in the first half of 2021. The project is formally university-wide, coordinated through the CTU Rector's Office, the benefits remain at the level of all involved faculties and workplaces of CTU.

The project in question represents the beginning of permanent tenures of foreign educators in teaching in selected fields of the training process at CTU. The work of foreign experts will increase the attractiveness of teaching at CTU and may also mean an increased interest of student-self-payers in studying at individual faculties, thereby attracting additional financial resources. One can only hope that this process will not be halted by further adverse developments in the epidemiological situation in the world.

ACTIVITIES FOSTERING INTERNATIONALISATION, ENGAGEMENT IN INTERNATIONAL PROJECTS

All internationalisation activities are based on the priorities of the Long-Term Intent of Educational and Scientific, Research, Development and Innovation, Artistic and Other Creative Activities for 2016-2020 and its 2020 update. The aim was to continue to expand the network of international partners with bilateral cooperation agreements.

In 2020, there were exchanges of students with 114 universities from the top 500 of the world's best-ranked universities, according to QS World University Ranking. For cooperation in science and research, contracts have been concluded with 59 universities of this recognised quality assessment of higher education institutions. In 2020, seven contracts were concluded with the following universities:

- University of Maryland, College Park, USA
- National Taiwan University, Taipei, Taiwan
- National Tsing Hua University (extension), Hsinchu, Taiwan,
- Universidade de Sao Paulo, Brazil
- Hochschule für Technik and Wirtschaft Dresden (extension), Germany
- Weizmann Institute of Science, Rehovot, Israel
- Instituto Tecnológico de Costa Rica, Cartago, Costa Rica.

As a result of restrictions on travel throughout almost the whole of 2020, the number of foreign students decreased to 3,710, from 3,825 in the previous year, representing a year-on-year drop of 3%. The share of foreign students, from 96 countries around the world, at CTU is 20.73%. In 2020, 440 self-payers studied at CTU, a significant decline from 621 recorded in late 2019. This is clearly due to the worsening conditions for travel in 2020, coupled with the lengthy visa process. For applicants from outside Europe in particular, this was a major setback, and many students interrupted their application procedures.

But the surprisingly moderate decline in the number of foreign students can be perceived from another angle. The decrease in incoming students within the Erasmus+ programme, the decrease in the number of exchange students from partner universities, as well as the decrease in the self-pay pool were compensated for by an increase in foreign students in Czech study programmes, mainly citizens of the large states of the former Soviet Union, Vietnam and Slovakia. These students mostly attended a variety of Czech language courses starting in 2019, graduated successfully in May and June 2020 and subsequently passed the CTU entrance exams. The number of students from the states of the former USSR and from Vietnam rose from 1,556 to 1,748, and from Slovakia from 1,051 to 1,066, representing an overall increase from 2,607 in 2019 to 2,814 in 2020. The percentage of these countries in the overall population of foreign students shows an even sharper increase, from 68.16% to 75.85%. The best foreign students of all types of study programmes can be supported by extra scholarships from so-called extra-budgetary sources. In 2020, 43 students, received these scholarships totalling CZK 958,000.

As an active member of T.I.M.E.'s association of prestigious universities, CTU signed the International Doctorate Charter as early as 2012, under which the preparation of joint doctoral courses is ongoing, primarily between the association's member institutions. Joint study programmes (mostly master's) are already completed with TU München (FCE), École Centrale de Nantes (FCE), KTH-Royal Institute of Technology (FCE), RWTH Aachen (FCE, FEE and FBME), Aalto University (FEE) and TPU Tomsk (FEE). CTU faculties have a total of 25 valid contracts for double degree study programmes.

Regular participation of CTU representatives in the three largest, annual, international education fairs – NAFSA in the US, APAIE in Asia and EAIE in Europe – contributes to expanding existing inter-university cooperation and establishing new contacts. However, in 2020 these fairs were cancelled. The staff of the Foreign Relations Department attended the EAIE 2020 conference and fair at least in the form of online presentations.

CTU's participation in a number of projects following up the already completed Erasmus Mundus projects aimed at promoting the mobility of students from so-called third countries to EU Member States, also has positive benefits for attracting foreign self-payers. CTU was active in projects involving Latin American, Indian and Brazilian universities. In this context, it should be noted that CTU has committed to continue working with partner universities in the consortium of the terminated HERITAGE project (EU and India) as well as in the consortium of another SmartCities-SmartGrids project (EU and Brazil). 2020 brought some stagnation and reduction to online forms of cooperation, but the most valuable characteristic, the uninterrupted existence of consortia, has remained.

Also in 2020, there were two Orientation Week events organised by members of the International Student Club with organisational and financial support from the Foreign Relations Department of the Rector's Office. Orientation Week is an important tool to help the school's newly arriving students and is already taken for granted at CTU. Due to the earlier beginning of the semesters (in contrast to other Czech universities), both events could be arranged in standard attendance form before the advent of tough restrictive rules in the Czech Republic in

spring and autumn 2020. This also had a positive effect on the total number of foreign students at CTU, with most of the admitted applicants (mainly from European and former USSR countries) being able to arrive safely in Prague and adapt in time to the new conditions.

In cooperation with the International Student Club, foreign students were offered two dozen language courses and several dozen extracurricular cultural, social and learning events. Foreign students have the opportunity to attend at least one student event a week each year, which greatly contributes to popularising the CTU campus as a pleasant place to study and pursue extracurricular activities. It also makes Prague a long-standing world leader in cities welcoming foreign students. Unfortunately, 2020 was also a bad year in this area. The number of events fell to about a third of the usual number, many of which took place online only. Volunteers from the International Student Club have enormous credit for being able to maintain a positive mood in the international campus community even in difficult circumstances.

In 2020, CTU prepared the first multidisciplinary summer school for foreign students, CTU Summer School Robotics and Future-Tech. Most CTU faculties were involved in its preparation, with an interactive programme of three weeks planned. Unfortunately, due to the ongoing pandemic, the event did not take place.

Study in Prague and Study at CTU projects – recruitment of foreign students

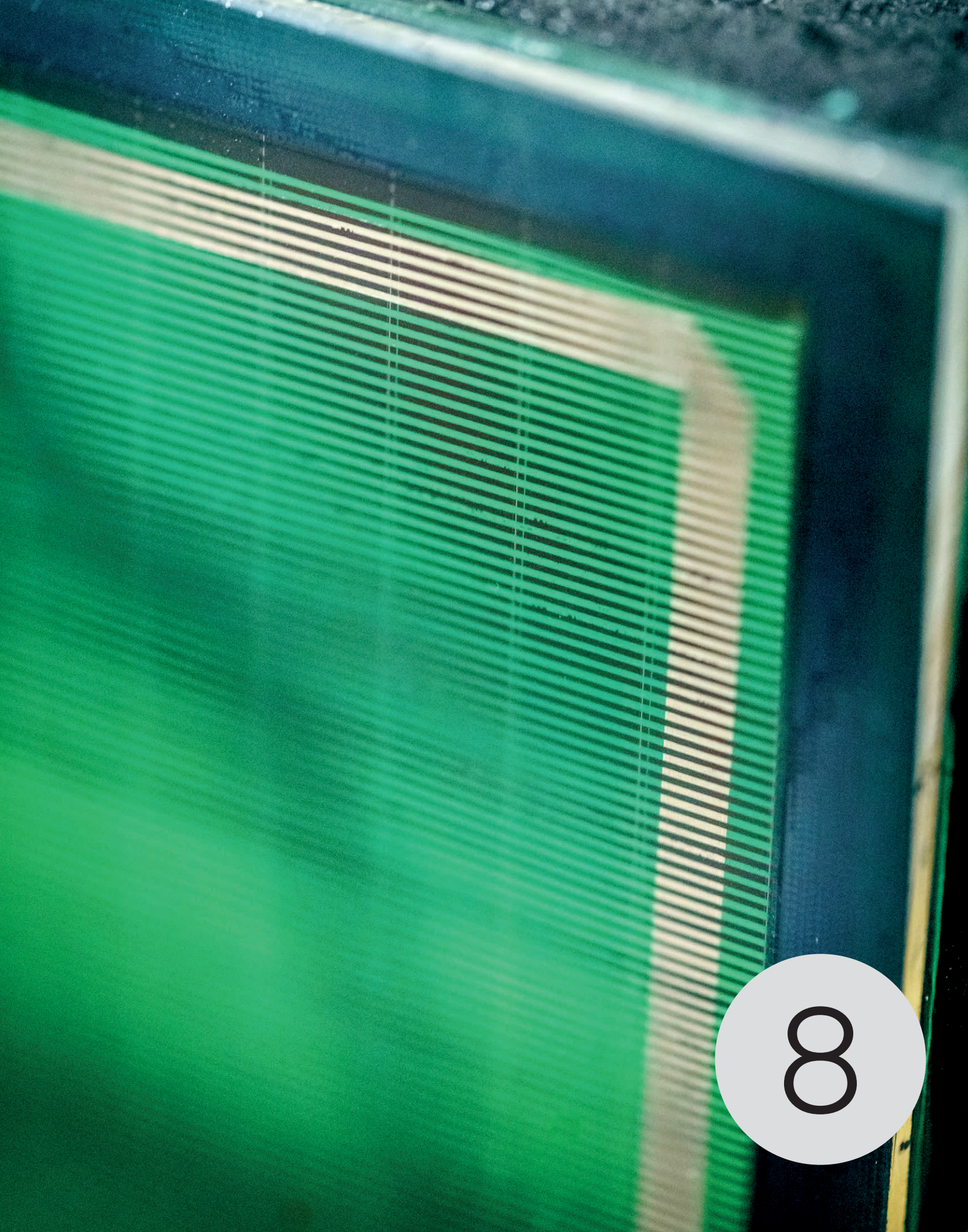
In 2014, a joint project of five Prague public universities (Charles University, CTU, University of Economics, UCHT and Czech University of Life Sciences, AMU and UMPRUM joined in 2019) was prepared at the initiative and under the leadership of CTU, "Study in Prague", aimed at promoting studies at these universities and attracting student-self-payers from prospective target areas of the world.

The joint promotion was primarily virtual in 2020. CTU was "live" only in Serbia and at the Study in Prague joint booth at a trade fair in Mexico. CTU participated virtually in online fairs and webinars in, for example, Italy, Ukraine, Russia, Turkey, Canada, Japan, China, South Korea, Latin America, the Baltics or Central Asia. The Study in Prague website added a new section to promote science and research, featuring examples of research projects. Easy-to-read information about creative activity is thus available in one place.

Interest in English-language doctoral programmes has been fuelled by a reduction in study fees for foreign students based on the CTU Statute. The establishment of a new scholarship under the name of CTU emeritus vice-rector, Prof. Miroslav Vlček, father of the idea and founder of the joint consortium, was also a major step for the entire consortium. This scholarship supports foreign students who have contributed with their activities to the dissemination of the reputation of participating universities and to the dissemination of the Czech education system. The first nominations, student selection and award itself are scheduled for 2021. The concept of promotion through counsellors in international secondary schools was also jointly devised. Presentation on social networks, YouTube platform or expats.cz has also become commonplace.

Another project, Study at CTU, is an equally important part of the strategy to recruit foreign students and is primarily dedicated to promoting curricula at CTU with different tools. An important element is the longstanding tradition of study ambassadors who share their experience with the candidates and actively engage in strengthening internationalisation, e.g. by participating in recruitment fairs in both attendance and virtual forms.

Faculties use projects led by the Rector's Office and projects under their leadership for internationalisation. The Faculty of Biomedical Engineering Dean's Incentive Directive targets strengthening the internationalisation of creative activities with establishing a system of remuneration for academic staff when submitting major international projects and facilitating individual membership in the editorial boards of respected international scientific journals and in major foreign professional and scientific associations. A good example of a project with considerable added value is the project to assist Cambodia in the field of neonatology under the cooperation of Czech Development Agency, General University Hospitaland FBME. The Klokner Institute is involved in international standardisation (CEN and ISO) and international research on materials engineering and structural reliability (RILEM, IABSE, FIB, WTA, JCSS). Experts from the Institute serve as members of the editorial boards of prestigious international magazines and on committees of international conferences. They participate in international projects and work with prestigious research institutions and important industry partners.



prof. Ing. Zbyněk Škvor / Vice-Rector for Science, Creative Activities and PhD Studies

"In the evaluation of universities by the International Evaluation Panel we succeeded excellently. This is both a significant step for us to strengthen our already good position, but also a great experience and a basis for setting up a system of evaluation of results in the field of science, research and creative activity. I am very happy that our excellent position among Czech universities has been confirmed and I believe that thanks to the international panel we will further continue to improve all processes towards international competition."

8 RESEARCH, DEVELOPMENT, ART AND OTHER CREATIVE ACTIVITIES

MEASURES TO STRENGTHEN THE INTEGRATION OF CREATIVE AND EDUCATIONAL ACTIVITIES

"CTU in Prague will strengthen its place at the forefront of technical universities in the Czech Republic and its position as an internationally recognised research university developing the talents and skills of students, academic and other staff." The first sentence of the CTU vision clearly declares that the field of research, development, artistic and other creative activities is the basis for all faculties and university institutes of CTU. Mutual cooperation and the results arising from it have an impact on educational activities. The link between scientific and educational activities begins already during undergraduate studies, and its importance is confirmed especially at the level of doctoral or master's studies. Students are regularly involved in research at CTU, and most study programmes include courses focusing on innovation activity. The development of scientific personalities is related to the improvement of the education of students and PhD students and to the professional growth of supervisors or the entire scientific and pedagogical staff. Doctoral studies involve participation in prestigious successful project teams and foreign stays in the framework of scientific activities. Part-time employment in scientific projects or receiving a special-purpose scholarship provide financial motivation. Analytical data on research, development, artistic and other creative activities can be found in the **Table Annex, Section 8**.

For the implementation of theoretical and experimental research, the Student Grant Competition, which takes place once a year in two areas, is an important support tool for PhD students' research. The first area is the support of grant projects in the fields of architecture and urban planning, architecture and civil engineering, civil engineering, geodesy and cartography, mechanical engineering, technology in transportation and telecommunications, logistics, computer science, electrical and computer engineering, engineering informatics, applications of natural sciences, biomedical and clinical technology, economics and management, quantitative methods in economics and history of technology. The second area is the support of projects aimed at organising student scientific conferences, which, however, were significantly complicated in 2020 in view of the coronavirus pandemic. Despite this, 73 conferences were held, 26 of which were international. In only 14 cases did the participants meet in person. Participation in conferences is one of the incentives that the faculties apply for students in PhD programmes.

ENGAGEMENT OF STUDENTS OF BACHELOR'S, MASTER'S AND FOLLOW-UP STUDY PROGRAMMES IN CREATIVE ACTIVITIES

Faculties and university institutes approach the creative activities of students of bachelor's, master's and follow-up master's study programmes individually, based on their specific needs. Feedback from students and external partners is also an important element. Students use the results of their creative activities in the preparation of their seminar, bachelors and master's theses and dissertations. The themes of the qualification theses are related to current issues in the field and reflect contemporary important social issues and needs. Students participate with faculty research teams in solving specific tasks in projects of the Student Grant Competition, Security Research, GA CR, TA CR and other international projects. An interesting feature of 2020 was the participation of MIAS students in data collection for the TA CR project Integration of children from children's homes into society and their adaptation to the labour market.

For the implementation of scientific research projects, students have well-equipped laboratories where they can use the latest technologies. The participation of PhD students, as well as master's and bachelor's students, is very beneficial for research. As part of the compulsory student projects, internships in the industrial sector are also encouraged, for example at the Faculty of Mechanical Engineering within the international Master of Automotive Engineering programme, where a whole semester is devoted to an industrial or research project, focused

on drafting a thesis. This two-year programme, whose students have the choice of splitting their studies between two technical universities in Europe, has been very popular with both students and, subsequently, future employers. Industry partners have also been actively involved in the block teaching of practically oriented courses, followed by practical projects.

Another project of the Faculty of Mechanical Engineering is the participation of the CTU CarTech team in student formulas, within the framework of which technical solutions are presented at international competitions. Similarly, a team of students from the Faculty of Electrical Engineering eForce FEE Prague Formula participated in the international Formula Student competition. At the same time, the best students from the Faculty of Engineering have been able to participate in projects announced and supported by individual institutes from the 2nd semester on, which aim to include interested students in the scientific research activities of individual institutes. For the topics of these projects, a separate portal has been set up on the faculty's website to facilitate orientation in this offer.

At the Faculty of Architecture, in addition to the ongoing method of "learning by doing", which primarily strengthens the connection between creative and educational activities, some of the bachelor's and master's theses are commissioned as variant designs of real public buildings, the design of which was originally created in the studios of the teachers. This approach is very welcome by the students, as a realistic result is evident, which increases overall motivation. The involvement of students also takes place in collaboration with the public and private sectors, offering them not only exposure to new knowledge, methods and technologies, but also the opportunity to realise their own designs. For example, the semestral and final theses of the students of the Design programme are based on assignments from renowned companies such as RWE, Sapeli, Technistone, Galavito, Tesla, Meva, Meopta, Viadrus and Lasvit. The faculty has also cooperated with the Krkonoše National Park Administration in the long run.

Other faculties, such as the Faculty of Electrical Engineering and the Faculty of Nuclear Sciences and Physical Engineering, provide first-class education in their programmes, which are closely linked to research activities. Semester projects and theses are usually part of a research or development project involving students and academic staff. Students are engaged in research within the framework of the Student Grant Competition projects, and they participate to a considerable extent in the projects of the Grant Agency of the Czech Republic or the Operational Programme Research, Development and Education, etc. The themes of theses at these and other faculties are formulated with regard to current problems in the given field and thus reflect the issues addressed in the research and development activities of academic staff. Students have participated in custom research projects, measurements, testing and expert consultations, especially for medical institutions and for companies producing and distributing medical technology.

Project-oriented teaching takes place at the Faculty of Transportation Sciences, which also involves external experts from the field of road, rail and air transport and information and telecommunication superstructure. Individual departments cooperate with partners from the application sphere in solving research and practical tasks. Doctoral students are also involved in specific research mainly through Student Grant Competition projects. Talented students engage in professional and scientific research activities, either as auxiliary researchers or through their direct participation in projects, grants and experiments. Through project-oriented teaching, cooperation in student projects includes a number of employers - e.g. PUDIS a.s. and the Railway Administration, or some state organisations, such as the coordinator of public transport in the Liberec Region KORID LK, spol. s r.o., ROPID, and the Institute of Planning and Development of the Capital City of Prague.

A team of bachelor's degree students regularly participates in the international student transport engineering project seminar Middle European Planning Seminar, which is held alternately in the Czech Republic, Austria and Hungary. Here, international teams solve selected transport engineering problems of the host city. In 2020, it took place in Uherské Hradiště.

Students are also involved in applied research through laboratories and specialised teams. They can meet, for example, in the Research Summer Programme, where they work with their mentors on joint projects that result in scientific papers. A very important tool is the faculty website Collaboration with Industry, which allows students to engage in problem-solving activities assigned by partners in practice, both extra-curricular activities and as part of the completion of certain courses, e.g. in the form of a term paper.

The university institutes of CTU, such as the Klokner Institute, engage researchers of the research projects directly in teaching and allow the participation of bachelor's, master's and doctoral students. These are not only students of CTU, but also students of other Czech universities, such as the Institute of Technical and Experimental Physics (IEAP). In 2020, its staff, including the students who carry out the professional part of their studies at IEAP, participated in particular in advanced projects in cooperation with CERN (ATLAS, MOEDAL, LUCID, Medipix), projects in neutrino physics (the SuperNEMO and TGV experiments at the LSM underground laboratory in France, the Baikal-GVD experiment in Russia, the LEGEND experiment) and in the detection of neutrinos - a possible carrier of dark matter in the universe (the PICO experiment at the SNOLAB underground laboratory in Canada), nuclear physics projects (monitoring of exotic nuclei in collaboration with ILL Grenoble and SÚJV Dubna) and space research (cooperation with ESA and NASA - pixel detectors on the PROBA-V satellite and on the International Space Station, cooperation with the Japanese space agency JAXA - pixel detectors on the RIS- ESAT satellite, GROND experiment).

DEDICATED FUNDING OF RESEARCH, DEVELOPMENT AND INNOVATION

In 2020, CTU had a total amount of special-purpose funds of CZK 1,687,602,820 allocated from the state budget for research, development and innovation. Of this amount, CTU spent CZK 1,462,092,478 directly on grants and projects. The remaining funds were transferred to co-researchers or contractors in

accordance with the terms and conditions of the projects and relevant contracts. The share of projects implemented directly at CTU was over 86 % and the remaining funds were received by other entities related to the projects. This share slightly increased compared to the previous year and shows that CTU is capable of implementing many projects independently and, at the same time, is an organisation open to cooperation with other expert teams.

SUPPORT FOR PHD STUDENTS AND POST-DOCTORAL FELLOWS

The first and fundamental method of supporting PhD students at CTU is to offer them quality dissertation topics provided by supervisors who are not only experts in the field, but also personalities willing and able to guide their PhD students along the path of science, including their first publications in quality journals.

The European Commission's HR Excellence in Research Award contributed to the improvement of the working environment. The Award facilitates adopting the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. As part of the implementation phase, the Code of Recommended Practice for the Recruitment of Academic and Scientific Staff was approved, which aims to translate best practice recommendations into transparent procedures for the recruitment of academic and scientific staff.

CTU also aims to support internationalisation in science, e.g. by obtaining specific grants, such as ERC or Marie Skłodowska-Curie Actions of the European Commission. The direction of cooperation, especially the selection of foreign partners and the method of its implementation, usually grows organically from the activities and professional needs of specific departments and staff and their professional interests. Taking into account the size and heterogeneity of CTU, support is planned for the future in particular by strengthening strategic areas corresponding to upcoming large projects from structural funds at the central or faculty level, such as the Industrial Technology Centre, the Innovative Centre for Transport Technologies, Aerospace Technologies in the Czech Republic, Light Technologies for 21st Century Energetics - LIGHTEN, UCEEB 20+, the Research Centre for Artificial Intelligence and Machine Learning - AIML. CTU's participation in the European Universities Initiative network is also key. To ensure foreign stays of PhD students, special-purpose support programmes from external sources are primarily utilised, such as the ERASMUS+ programme, EU operational programmes to support international cooperation and the Czech Republic's participation in international organisations, grant projects, including Student Grant Competition, which is widely used by all faculties and institutes. At the same time, CTU supports the establishment and development of joint doctoral study programmes with foreign universities in the form of double or joint degrees with professionally close international institutions.

The university information infrastructure, e.g. the Anlupa.cz application, was also supported in 2020 to ensure timely and sufficient information about funding opportunities for national and international projects. In line with its digital development plans, CTU supports the principle of Open Access publishing of preprints in, e.g. by using the university repository D-Space or the departmental repositories within arXiv.org.

It should also be noted that each faculty makes effort to create conditions for promising young teaching and research staff in post-doc positions. One of the most frequent forms is to engage them as researchers in scientific research projects in a number of national and international programmes, including the use of the already mentioned Student Grant Competition and mobility programmes. Other tools are also used to improve the conditions for post-doc positions, for example, the Faculty of Civil Engineering has established an Initiation Fund with the aim to support and stabilize promising young researchers up to ten years after obtaining their Ph.D. degree and to encourage their activity in pursuing international projects and establishing international cooperation. PhD students are members of research teams and participate in domestic and international basic, applied and contract research projects. Their scientific research work is also supported by grants under the Student Grant Competition funded from funds earmarked for specific research or by involvement in contract research in cooperation with industrial partners, as was the case last year at the Faculty of Mechanical Engineering in particular, where donation-based funding is also used, for example from the Zvoníček Foundation.

The Dean of the Faculty of Electrical Engineering awards a one-off special-purpose scholarship for exceptional results of innovation or pedagogical activities or to support the studies of foreigners in the Czech Republic. The Faculty of Information Technology has also introduced the possibility to receive direct financial support for full-time students of doctoral programmes. Among other things, the Faculty of Electrical Engineering cooperates very closely with institutes of the Academy of Sciences of the Czech Republic, which are accredited with the faculty for the instruction of doctoral students, and also with other organisations (e.g. medical schools and teaching hospitals) where the experimental activities of doctoral students take place. The Dean of the Faculty of Biomedical Engineering has chosen a similar model of support; outstanding students have the opportunity to receive financial support from funds earmarked for specific research. In all faculties, research and teaching staff have also been supported in an internal competition for development projects.

A unique platform for young talents is the eClub, which is led by Jan Šedivý at CTU's Czech Institute of Informatics, Robotics and Cybernetics. The principal objective of the platform is to support innovative ideas of students and to put their business plans into practice. Their work is supported by a scholarship from the CTU Media Lab Foundation, which associates partner industrial companies such as Certicon, Seznam.cz, Cybex, etc., as sponsors of this scientific incubator. CIIRC also supports PhD students and postdocs by organizing lectures by leading experts in various fields. Of great importance has been expansion of professional relations with the state administration and the industrial sector, which is manifested across all parts of CTU.

COLLABORATION WITH THE APPLICATION SPHERE ON THE CREATION AND TRANSFER OF INNOVATIONS, TECHNOLOGIES AND THEIR COMMERCIALISATION

Study programmes at CTU in Prague are strongly focused on preparing students for their future careers in the industries related to their field of interest. All faculties are closely linked in various ways according to their focus with experts from the application sphere who participate in the formulation of interesting tasks that are subsequently rewarded by industrial partners. Faculties for cooperation with the manufacturing sector use their transfer departments as contact points for addressing potential commercialisation for both students and faculty staff. For most faculties or higher education institutes, the focus is on exploiting innovation potential for industry. Partners are involved in innovation brainstorming sessions where ideas for new products, applications and subsequent collaborations are sought. While the Faculties of Civil Engineering, Mechanical Engineering, Electrical Engineering, Transportation Sciences and Information Technology directly collaborate with industry in their respective sectors, the Faculty of Nuclear Sciences and Physical Engineering and the Faculty of Architecture mostly cooperate with public administration or state-owned enterprises such as ČEZ, a.s.. Quite specific are partners to the Faculty of Biomedical Engineering, which primarily engages prominent practitioners in the Faculty's Scientific Board, while compulsory professional practice of students is an important part of the cooperation. All faculties, the Masaryk Institute of Advanced Studies and the Klokner Institute engage external experts from the application sphere in their accredited study programmes, and some of them take on the role of supervisors in doctoral studies. In addition, the faculties and institutes are continuously deepening their cooperation with industrial partners within the framework of contractual activities, testing and forensic expertise.

Intellectual property protection and technology transfer are considered instrumental at CTU, which is why CTU has its own patent centre, technology transfer department and InQBay incubator. The CTU Licensing Fund continued to provide support in 2020 for the reimbursement of the costs of intellectual property protection abroad.

Total income from the transfer of knowledge and research results into practice amounted to CZK 232,788,128.70 in 2020, generated predominantly from contract research, consulting and advisory serVICes. Compared to the previous year, when revenue totalled nearly CZK 400 million, it is a considerable decline, which we attribute to the economic slowdown. We believe that next year's results will be better again.

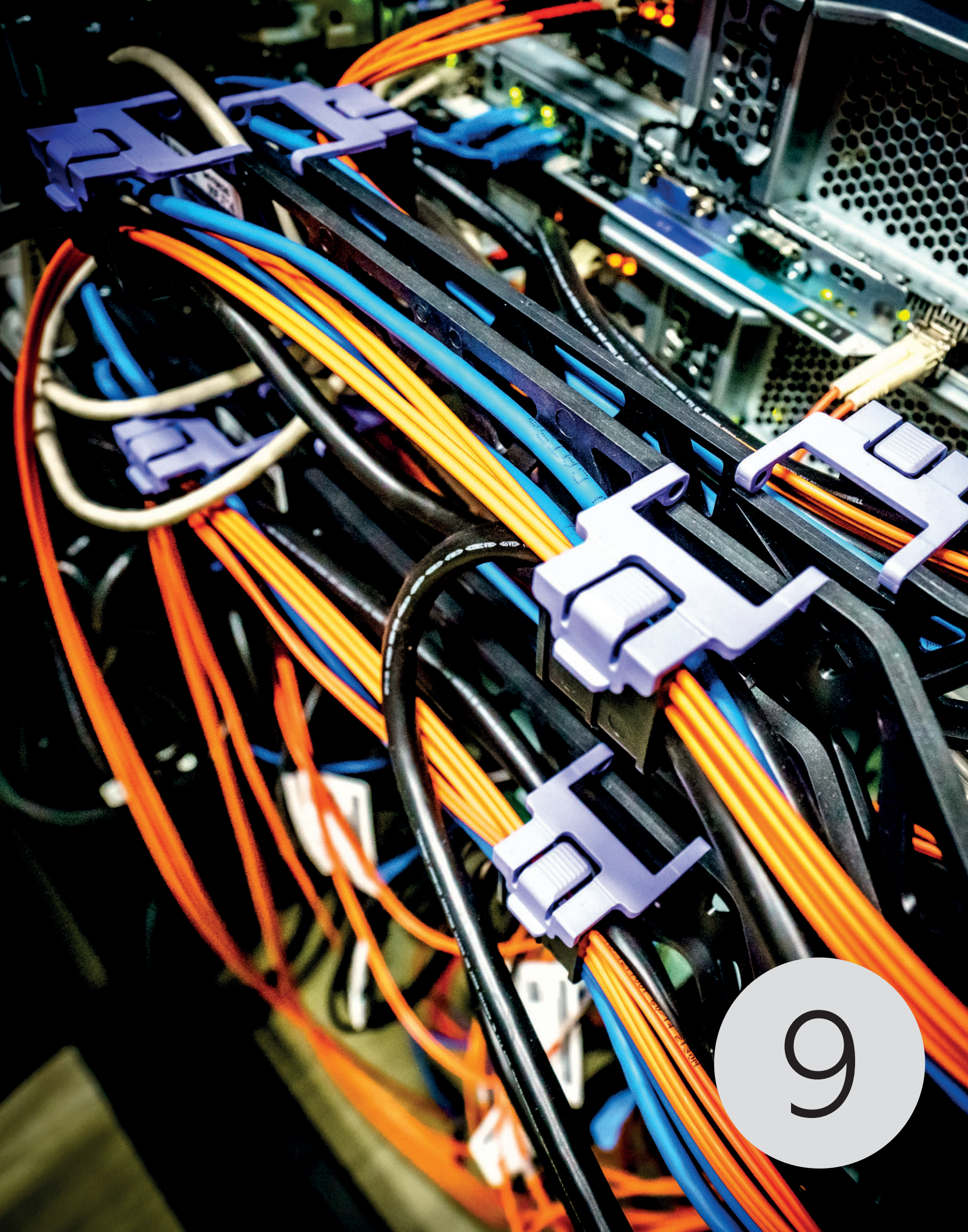
PRACTICAL EXAMPLES, PROMOTING HORIZONTAL MOBILITY

Collaboration with the application sphere on the creation and transfer of innovations and their commercialisation is one of the issues that still needs to be given great attention. Contractual arrangements for the transfer of copyright and a wide range of other professional services aimed at the administration of the commercialisation of science and research results and support for start-up companies are provided by the Technology Transfer Department of the CTU Rector's Office. The aim of this department is also to secure patent protection for successful projects not only in Europe but also in the countries of America, Asia and Africa.

In some faculties, various courses dealing with the promotion of innovative entrepreneurship have been created both in the undergraduate and graduate programmes. For example, the research group Centre for Business Informatics at the Faculty of Information Technology helps students with entrepreneurship-related issues just by creating business models and business cases. A number of faculties benefit from long-standing contacts with many foreign universities and research institutes, which often share the best examples for transferring the results of science and development into practice.

At the same time, it is necessary to mention that the Faculty of Architecture, for example, is by the very nature of the architectural profession a multidisciplinary environment where horizontal intersectoral mobility of students occurs both within the teaching sphere and within the participation of students and academic staff in research, both basic (GA CR) and applied (TA CR, NAKI, contract research). This approach can be documented by research in the field of national and cultural identity (NAKI), in which academic staff and students of the FA are also involved in CTU's sister components (e.g. Klokner Institute - Optimization of monitoring and evaluation of information on heritage buildings, Faculty of Civil Engineering - Development and research of materials, procedures and technologies for restoration, conservation and strengthening of historic masonry structures and surfaces and systems of preventive protection of historic and listed buildings threatened by anthropogenic and natural hazards, and Methods for ensuring sustainability of steel bridge structures of industrial cultural heritage).

The Klokner Institute is a good example of intersectoral mobility of students and staff in the fields of civil engineering, materials engineering, chemistry, transport, energy and the aforementioned conservation. The University Centre for Energy Efficient Buildings as an interdisciplinary department of CTU is also a place of professional meeting and cooperation of researchers and students from different faculties, disciplines and departments. The intensive deepening of cooperation across the university, external cooperation with both domestic research institutions and the industrial sector, and with foreign industrial and academic entities is one of the main strategic goals of this centre. It provides facilities and equipment for joint projects and student work, for which, as a component of CTU without its own accredited study programmes, it has greater potential and prerequisites than individual faculties. In 2020, the centre handled a total of over 70 grant awards and 140 contract research projects. A significant outcome was, for example, the commissioning of a prototype of the S.A.W.E.R deVICe designed to extract water from the air and is to be integrated into the Czech pavilion at EXPO 2020 in Dubai. EXPO 2020 was originally scheduled to take place in 2020, but was postponed by a year due to the pandemic.



9

Ing. Radek Holý, Ph.D. / Vice-rector for Quality Management

"In 2020, Czech Technical University in Prague had an in-depth discussion on the issues related to quality assurance of all activities with clear conclusions. CTUdefined its priorities, objectives, measures and tools across the areas of study, education and research and creative activities, while ensuring the quality of human resources and the environment, in the key document Strategic Plan 2021+. The Plan will guide the direction of all activities also with regard to their quality in the next decade. The discussion was conducted across the entire university, involving all entities - faculties, institutes and components of CTU, as well as academic staff, employees, and students. Thus, the foundation stone was laid in 2020 with the aim of continuously contributing to the strengthening of weak points. There was also consensus in the area of data policy. It is noted that further development must be based on available and relevant data from all university components to ensure the proper functionality of the quality assessment system for all activities. It is necessary for such a system to adequately set all indicators and properly define the evaluation methodology. The implementation of quality assurance and evaluation of educational, creative and other related activities is governed by the substantively defined internal regulation Rules of the system of quality assurance of educational, creative and related activities and internal evaluation of the quality of educational, creative and related activities of CTU, in effect since 2018. The system set up in line with the regulation ensures the University's fulfilment of its core mission, notably to build international excellence and competitiveness in education, science, technology, innovation and application for the betterment of life. I am sincerely pleased with the progress the university is making in this area, and I am equally pleased that the goal of quality assurance is being pursued in a project-based manner, e.g. within the framework of the projects of the Centralised Development Programme of the Ministry of Education, Youth and Sports."

9 QUALITY ASSURANCE AND EVALUATION OF ACTIVITIES PERFORMED

The traditional values of CTU, reaffirmed by its long history, include heterogeneity and a considerable degree of autonomy in the educational and creative activities of individual faculties and university institutes. The structure of the system for achieving and assurance of quality also corresponds to this trend.

The quality of educational, creative and related activities is understood by CTU as meeting and improving the standards of CTU's core activities in accordance with the European concept of the quality of university education and research and in accordance with its mission and objectives, which are described in the Statute of CTU, the Strategic Plan and other internal regulations of CTU. The system is based on the focus, medium-term strategy and intentions of CTU and is a follow-up to the CTU development concept formulated in the CTU Strategic Plan, the CTU Strategic Development Plan and its annual updates - CTU Strategic Plan Implementation Plans.

Evaluations at CTU are based on qualitative and quantitative data stored in the information system and validated by relevant CTU components. An example of an important resource for the area of creative activity is the application https://v3s.cvut.cz (hereinafter referred to as the "V3S application"), which liststhe results of publishing, applied research and other activities of creative members of the scientific community. The V3S Application is used to submit CTU results to the Register of Information about Results (RIV), to experts for statistical analyses and for internal evaluations. More detailed on evaluation of the quality of creative activities is provided in the Report on Internal Evaluation of the Quality of Educational, Creative and Related Activities of the University.

CORE ACTIVITIES IN THE CONTEXT OF THE LONG-TERM STRATEGY

The mission of CTU is to provide its students with valuable education according to the focus of individual faculties so that they can establish themselves in their fields of study both nationally and internationally. The system of quality assurance and evaluation of educational, creative and related activities at CTU (hereinafter referred to as the "System") is motivated by the long-term effort to maintain and continuously improve the position of the best technical university in the Czech Republic and to improve its position in international rankings.

Although many elements of the current System are not yet explicitly codified, CTU as a whole has achieved a good level of all activities. This can be documented by the position of CTU in the world university rankings, taking into account the low level of state contribution compared to comparable universities worldwide. In the international QS World University Rankings, CTU has consistently achieved the best ranking among Czech technical universities and second place behind Charles University among all Czech universities. In the QS 2020 World University Rankings, CTU is ranked 498th. In the rankings by subject, CTU is ranked 255th as the best in the Czech Republic in Engineering and Technology, 271st as the second best in the Czech Republic in Natural Sciences, 151st-200thin Civil & Structural Engineering, 201st-250th in Architecture, Physics & Astronomy and Mechanical, Aeronautical & Manufacturing Engineering, 251st-300th in Electrical & Electronic Engineering and Computer Science & Information Systems.

QUALITY OF EDUCATION IN BACHELOR'S AND MASTER'S STUDIES

The quality management system in the field of educational activities is based on the primary responsibility of the dean to the faculty's scientific council and academic senate, and secondary responsibility to the university authorities. The implementation of all study programmes is managed by their guarantors in cooperation with the heads of the relevant departments or faculty institutes. The interaction of the individual study programmes and doctoral study programmes is coordinated by the vice-deans for bachelor's and master's studies and the vice-deans for creative activities and doctoral studies.

The study programmes are accredited and then continuously updated during their implementation to meet the latest requirements for the professional profiles of technically educated university students at national and international level. The great demand for CTU graduates in Prague is evidenced by the fact that in the long term the labour market requirements exceed the number of CTU graduates. The overwhelming majority of graduates are employed in the fields they studied or in fields close to their specialisation. In the case of generally oriented programmes, graduates are expected to have a broader range of job opportunities, which testifies to the quality of the education provided in terms of its attributes ofgeneral scope and universality.

The university-wide electronic CTU Student Survey is used to evaluate the quality of educational activities at all faculties and plays a crucial role at most faculties. With this application, faculties can define their specific requirements for the collection and evaluation of survey ballots. Students can either remain anonymous or have the option to reveal their identity. They also have the option of adding a verbal comment to their grade.

A major step forward was the approval of the Merit-based Career System for academic staff. The digitisation of activities and operations, which means streamlining of administrative processes, has also played an important role, resulting in an increase in the quality of serVICes provided, as demonstrated by the smooth transition of studies from full-time to fully distance learning after the outbreak of the pandemic and the subsequent closure of the university.

The way the university holds up the mirror will fundamentally affect its perception as a whole, so it is necessary to focus not only on specific segments but on CTU as a whole when setting up quality assessment. It needs to be taken into consideration that in 2020 it was not always entirely easy to assess the trend, as it necessitated adaptation to change and focus on distance education.

DOCTORAL STUDIES

Educational and creative activities in doctoral studies are based on contemporary international knowledge. CTU prefers that all outputs of the creative activities of doctoral students (professional studies, publications, dissertations, etc.) be produced in English.

Doctoral students in technical disciplines must present the results of their creative activity in the form of publications in journals and conference proceedings, preferably included in the WoS or SCOPUS citation databases. PhD students are expected to publish conclusive results of their dissertations in the form of articles published in impacted journals. In the case of applied research, patents and their licensing in application and commercial practice are considered the most important, apart from publications.

The quality and content of the new scientific reality of the dissertation topic proposals are evaluated by the Doctoral Programme Boards, and the proposals are subject to the approval of these Boards. In assessing the topics, it is considered, among other things, whether the supervisor has had a high-quality publication record in recent years related to the given topic. The supervisor is responsible for the quality of the dissertation.

CREATIVE ACTIVITY

The key criteria for assessing the quality of creative activity are publications and results of applied research in utility models and inventions granted and listed in the V3S database, which presents the results of research and other creative activities, including contract research. The nature of the results varies according to the disciplinary focus of individual CTU components. For technically oriented faculties and higher learning institutes, one of the decisive criteria for the quality of creative results is publication in impacted journals, preferably the best in the given field, i.e. in Q1 (i.e. journals belonging to the top 25% of the most cited in their field). CTU uses the V3S application, which, in addition to searching publication results, enables analytical comparison of the results of staff, departments/institutes and faculties. These analyses are used by managers to assess the quality of creative activity, which is then translated into institutional support for excellence and support for young staff.

CTU uses the outputs of the RVVI expert panels in Pillar II of the Evaluation of the Results of Research Organisations. The new external assessment system will be rolled out at CTU along with the transition to the 2017+ Assessment.

In the area of creative activities, steps were taken to support the parameters with a focus on increasing the proportion of foreign dissertation opponents, ensuring support for the inclusion of talented foreign postdocs (with a minimum of H-2) in research teams. Incentives for academicians to spend at least six months at a major foreign institution have been increased. Another task was the development of a methodology for the distribution of institutional funds for the development of a research organization promoting excellence in creative activity.

RELATED ACTIVITIES

Professional institutes at individual CTU components provide forensic expert activities in the fields for which they are appointed. Their professional activities are documented in the expert journals maintained at the relevant departments.

CTU ascribes considerable importance to work with human resources, especially to the motivation of young promising employees. At some CTU components, a career system has been introduced for academic and other creative staff. Educational and creative activities are periodically evaluated by the respective supervisors.

ASSESSMENT OF THE QUALITY ASSURANCE AND INTERNAL EVALUATION SYSTEM AS A WHOLE

The structure of the quality assurance and control system at CTU is traditionally based on the principle of respecting the powers of individual faculties, university institutes and other components

with their diverse focus. Even with this autonomy of educational and creative activities, historically applied at individual faculties and components, CTU manages to maintain the quality at a good level, even in international comparison, where CTU has long been ranked highest among Czech technical universities in individual technical disciplines. However, the ambition of CTU should be to achieve even better rankings and gradually become one of the world's top research universities.

In order to achieve this goal, CTU must meet and gradually raise the level of standards of its core activities in accordance with the European concept of university education quality.

For example, a project from the Centralised Development Programme of the Ministry of Education, Youth and Sports, C19-2020 Development and Quality Assurance of Joint Degree Programmes in Cooperation with Foreign Universities, was implemented in 2020 to evaluate the quality assurance of study programmes. Its aim was to collect data for the evaluation of current joint and double degree agreements across CTU and to prepare a SWOT analysis of them. In discussions with partner universities, countries and regions suitable for potential agreements of this type were identified. The analysis of the transfer of experience from foreign cooperation to cooperation with Czech universities is important for the internationalisation and evaluation of the university according to international criteria. Foreign experience is a helpful indicator for the future direction of the university in the field of curriculum standards and quality. The development of standards for quality assurance of educational activities in various forms of study will also receive attention in the coming year within the centralised development programme of the Ministry of Education, Youth and Sports, this time with regard to the persistent pandemic situation with an emphasis on distance education.

INTERNAL EVALUATION BOARD

The quality management system is coordinated at the CTU level by the Internal Evaluation Board (RVH). This academic self-governing body manages the internal evaluation of the standard of CTU's educational, creative and related activities. It approves the draft rules of the quality assurance system for all activities, prepares a report on the internal evaluation of these activities and its amendments, and carries out other related activities leading to quality assurance of all processes at CTU. The Rector participates in the quality management process as the Chairman of the Internal Evaluation Board and also in the event of grievances or appeals from students or other serious issues.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10 THE UNIVERSITY'S NATIONAL AND INTERNATIONAL EXCELLENCE

NATIONAL AND INTERNATIONAL RESEARCH, DEVELOPMENT AND CREATIVE ACTIVITIES

Czech Technical University in Prague is undoubtedly one of the universities meeting the criteria of international excellence. With its results it continuously demonstrates its competitiveness in education, science, technology and innovation on a national and international scale. It focuses on directly promoting interdisciplinary internationalisation, openness, diversity of opinion, both at home and abroad. CTU continuously builds prestigious research laboratories, testing facilities and centres of excellence with the aim of achieving international credibility. CTU's research teams have succeeded in engaging in projects with global participation, and their achievements have been and will continue to be recognized in both national and international competitions. The strategic goal of CTU is to maintain the credit of an internationally recognised university with the attribute of an international centre of excellence in science, innovation and education in the long-term context and thus contribute in the application sphere to solving global societal challenges and improving the quality of life of society. CTU intends to continue, not only in 2020, to focus on cooperation with foreign partners, both scientific and industrial, expanding foreign-language study programmes, increasing the international focus of its academic staff and students, while striving for mobility and attracting internationally renowned experts to strengthen its ranks.

Excellence is one of the key concepts of the new CTU Strategic Plan 2021+, it permeates the entire document and has a major influence on the setting of measures and tools in all areas of the university's development in the future period. It must be emphasised that excellence is significantly influenced by involvement in international cooperation projects with foreign experts. Participation in the EuroTeQ project, a partnership with six European universities, is significant in this area. Its objective is to implement the vision of the European University Initiative and the European Education Area in an ecosystem of leading technical universities with the financial support of Erasmus+. The project is coordinated by the Technical University of Munich, and the partners are, in addition to CTU, the Technical University of Denmark, the Technical University of Eindihoven, Ecole Polytechnique, and Tallinn University of Technology. EuroTeQ focuses on creating educational programmes in response to the changing needs of society. Another important goal is to connect the university environment with industrial sectors across Europe, involving 45 industrial partners, including four Czech ones - prg.ai, GasNet, Pražská energetika and Workswell.

In 2020, despite the obstacles associated with the pandemic, collaboration with international universities and industrial partners continued. Participation in conferences was considerably limited, so links were maintained mainly in virtual form, but strengthening relations with internationally renowned educational and scientific institutions remained a priority for CTU. Global challenges, coupled with the need to find quick solutions, in many cases helped to make visible the excellence of the university's scientific teams and CTU's technical focus. The participation of students, PhD students and researchers in international conferences and research projects, albeit at a distance, was extremely important in maintaining the established cooperation. Contrary to expectations, a number of projects adapted very well to the pandemic situation, with teams using the latest technologies for their solutions, from digitisation to 3D printing, cybernetics, robotics, artificial intelligence, nanotechnology and the like.

In 2020, CTU reaffirmed its ability to adapt to the changed conditions and continue its projects, but at the same time significantly strengthened its Third Mission - in the fight against SARS-CoV-S coronavirus, on an international scale. The ability of continuity of international projects, despite the difficult situation, was confirmed by practically all faculties or institutes of CTU.

An example of excellent collaborative research with international engagement is the cooperation of the Faculty of Mechanical Engineering with GE Aviation, the world's largest manufacturer of aircraft engines. Despite the difficult conditions, in 2020 it was possible to conduct research in the flight test

facilities in both Letňany and Hradec Králové without interruption and to achieve another planned project milestone at the end of the year. Another successful project is the space start-up company Dronetag of FIT students, which won the top prize in the Galileo Masters competition focused on European satellite navigation.

The best thesis of the 22nd Werner von Siemens Prize was presented by Ing. Denys Rozumnyi from the Faculty of Electrical Engineering, which dealt with the search and tracking of objects moving at high speeds, such as balls in various sports disciplines. A significant achievement is the first place of Ing. Šimon Mandlík in the IT SPY 2020 competition for the best diploma thesis. The graduate of the OI programme scored success among 1400 competitors with his thesis on internet mapping. The Hackthecrisis.cz prize from CzechInvest went to the team of doc. Tomáš Krajník from the Department of Computer Science for his project FreMEn contra Covid with the application Nebojsa, which can advise how to avoid queues in shops and large concentrations of people in public places. The innovation also scored points in the Best anti-covid IT project category organised by the Asian Institute of Technology.

CTU has also received many awards in the industrial field. Seeveral CTU names appeared on the 30 under 30 list of Forbes magazine Czech Republic, including FIT student Martin Kučera and graduate Vojtěch Paukner for the project Dear Jesus, which fulfilled Christmas wishes to children from orphanages and socially disadvantaged families, FNSPE student Roberta Bimbová, who scored points with an optical detector of space debris, and graduate David Klečka, one of the founders and CEO of Yieldigo, according to many one of the most promising Czech start-ups of today. The university's Energy Efficient Buildings Centre scored in the business plan competition with its Levitee urban furniture, which consists of a cantilevered bench and accessories that should bring a wide variation in placement in public space. The bench offers a variety of functionalities, such as Wi-fi connectivity, mobile device charging and air quality measurement. Alquist, a conversational robot devised by CTU students led by Jan Šedivý from CTU's CIIRC, won bronze at Amazon's prestigious global competition - the Alexa Prize.

Some of the awards have their origins in the ongoing pandemic crisis, such as the second place in the EUvsVirus hackathon, the largest pan-European online event of its kind, initiated by the European Commission together with the European Innovation Council.

Antonie Galušková, a student of the Faculty of Transportation Sciences, collected sports trophies. In the canoe slalom she won 1st place in the team competition, 9th place in the individual race at the European Championships in Troja, 3rd place in the individual race and 3rd place in the team competition at the European Championships in Krakow in the category up to 23 years, and overall 3rd place in the nomination to the senior team for the Olympic Games in Tokyo, Japan. The Masaryk Institute of Advanced Studies can also boast successful athletes; its floorball team won the international tournament in Košice and the national finals of university floorball leagues.

INTERNATIONAL RANKINGS OF THE UNIVERSITY, FOREIGN ACCREDITATION

CTU in Prague has been participating in the QS World University Rankings for several years, where it was ranked 432nd in 2020, improving its ranking by 66 places compared to 2019 and 106 places compared to 2018. The QS World University Rankings is one of the most prestigious international comparisons of universities. They areassessed according to six criteria: academic reputation, reputation among employers, the ratio of academic staff to students, the number of published citations academicians, the proportion of international academicians and the proportion of international students. High-quality basic, applied and innovative research are at the heart of CTU's rise in international reputation, along with efforts to improve the quality of studies and expand international cooperation in teaching and research and exchange of students and academic staff. The above criteria are monitored within CTU and therefore the tabular section is extended to include this assessment.

Another respected ranking of universities, The Times Higher Education World University Rankings, placed CTU Prague in the 1000+ position in 2020, which is a drop into the group of other universities. Evaluation in these rankings is based on 13 indicators, where two of the indicators focusing on citations and publications together account for a full one-third of the overall evaluation and are based on the results of the annual evaluation. A more detailed analysis shows that there is a year-on-year decline in this ranking despite the increasing values of the indicators monitored. This is mainly due to the fact that growth is slower than that of other universities, while there is an overall increase in the number of schools evaluated. At any rate, the overall downward trend needs to be reversed, primarily by finding an effective tool for significant improvement, especially in the area of citations. These are one of the important indicators of both international rankings, in which CTU still has a very weak position, despite the fact that the absolute number of citations has been increasing over the last five years. CTU and its components continuously endeavour to reflect the impulses from international rankings and evaluations in their educational and creative activities in order to keep improving the conditions for study and research and, as a result, to improve their positions in these evaluations, and strengthen the competitiveness of the CTU brand both in the European and international context.

Although the absolute number of publications in 2020 declined compared to the previous year, the number of citations has been steadily increasing over the last five years. Compared to 2019, it has increased by 657 to 25,322. The moderate increase can be explained by the growing number of academic and scientific staff as well as students. The citation score over the last five years is 22,177, and the publication score is 4,154. These figures are also taken into account in the QS and THE international university rankings. An interesting indicator demonstrating the "performance and productivity" of individual faculties/components of CTU in the field of citation and publication is the overall average citation score for 2020, which reached 8.5 citations per academician/scholar. High above this average is the Faculty of Nuclear and Physical Engineering with

27.4 citations per academician/scientist, although it is the FNSPE that saw a decline in the absolute total of citations in 2020. The Institute of Experimental and Applied Physics (IEAP) reported a significant increase in foreign academic and scientific staff in 2020, and this can be linked to the above-average annual growth in citations, but also in publication activity. The average university-wide publication score reached 5.3 in 2020. This score is a pro rata indicator of the average number of citations per publication in a given year. The Faculty of Architecture performed best in this area, with a score of 10.6. In addition to the aforementioned IEAP, the Faculty of Transportation Sciences (9.3), the Faculty of Civil Engineering (7.4) and the Klokner Institute (6.6) also ranked above the average. The source for the calculation of these indicators is the database of the CTU Central Library. The challenge for the future period is to access and fully use the data of the Scopus information system, which is also the basis for the international rankings of QS and THE agencies, although their calculation method is not fully known. Furthermore, it should be noted that the international rankings for a given year are based on data from previous years, and therefore the processing of the outputs in the tabular part is in this chosen form.

EVALUATION OF CTU BY THE INTERNATIONAL EVALUATION PANEL

In 2020, for the first time ever, the scientific activities of CTU were evaluated according to the Methodology for the Evaluation of Research Organisations in the Higher Education Segment, which was approved by Government Resolution No. 563 of 30 July 2019.

The evaluation is carried out in five modules. Module 1 evaluates selected results, Module 2 uses bibliometric analysis. These modules are processed centrally. In contrast, modules 3 to 5 are evaluated by evaluation panels once every five years, the last time in 2020. The international panel evaluated each of the thirteen CTU components separately in Module 3 (Social Relevance) and the whole CTU in Modules 4 (Viability) and 5 (Strategy and Concepts).

János Bergou, The City University of New York, Hunter College, USA, became the chair of the International Evaluation Panel, active since mid-March. The secretaries of the panel were elected Jan Macek, CTU, and the representative of the Ministry of Education, Mgr. Lucie Nunez Tayupanta, PhD. The other academic members, all of whom carry the title of professor, come from different parts of the world - from TU Wien Herbert A. Mang and Ulrich Schmid, from Germany's RWTH Aachen Michael Vorlander, from TU Berlin Khosrow Mottaghy, from TU Dresden Ivan Reiman, from Greece's National Technical University of Athens Evangelos Hristoforou, from Canada's McGill Jozsef Kovecses and from the UK's University of Reading Kevin Warwick.

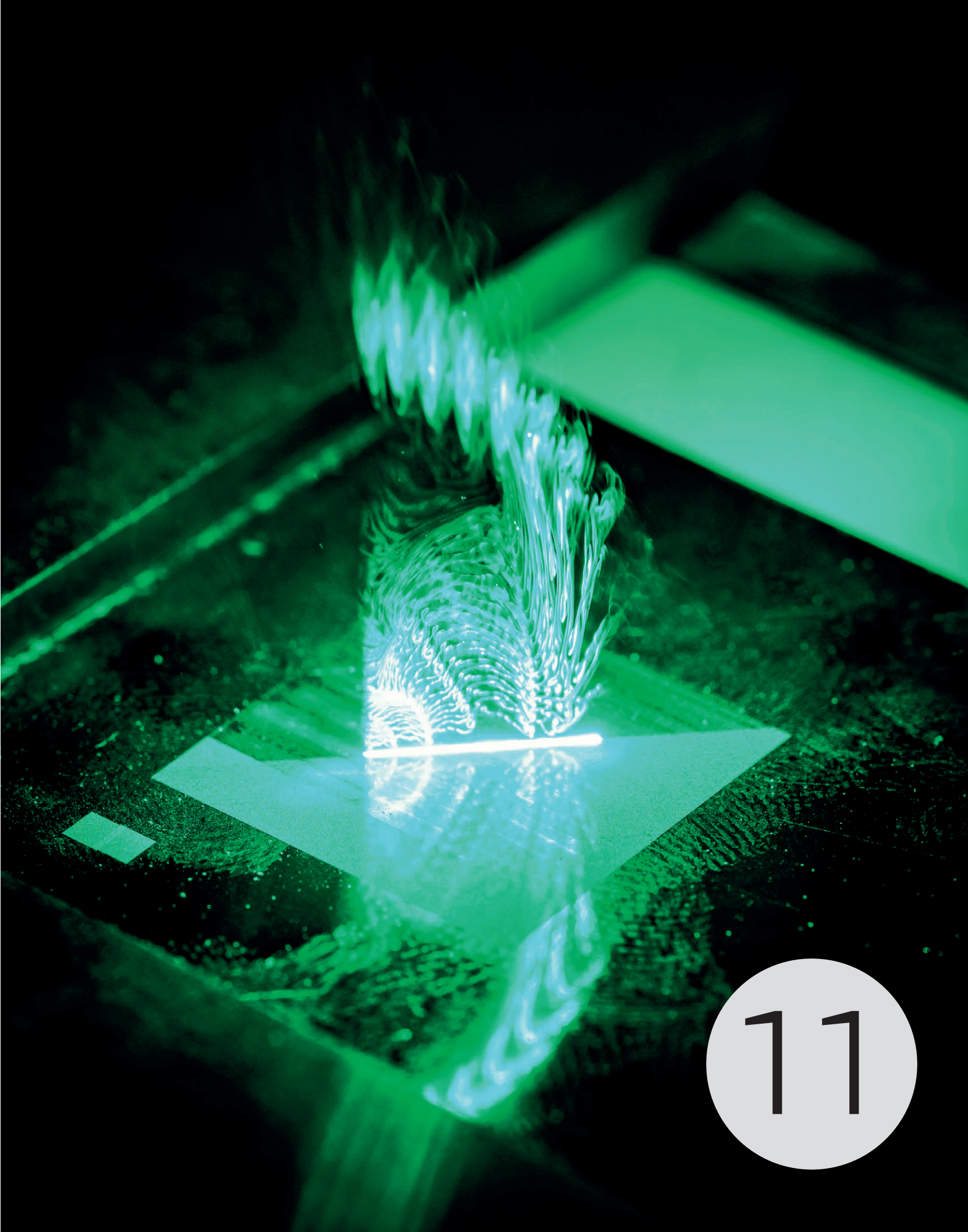
The actual evaluation took place between the end of April and the end of November 2020. Subsequently, the panel prepared a draft evaluation structured according to the guidelines of the Ministry of Education documentation, which was sent to the Rector of CTU for comments. The latter, in cooperation with the deans of the faculties, prepared an opinion on the evaluation report and returned it to the panel. The comments were discussed and the evaluation report was finalized by 31 December 2020 so that it could be sent to the Ministry for consideration on the last day of the year in due time. Again, the pandemic affected the process as the November Panel meetings could take place via Zoom only.

The results of the evaluation were discussed at all levels of CTU and the management highly appreciates them and started their implementation in December 2020. The key recommendations include shortening the duration of doctoral studies, simplifying administrative conditions for habilitation and focusing more on research leading to publications than on cooperation with the industrial sector.

Conducting an evaluation of this magnitude initiated a look back to 2014 and the opportunity to compare the performance of separate components. Some of the results are presented in the tabular section of the annual report in the science section, along with further analyses.

CTU succeeded in the evaluation and proved that it belongs to the top among domestic universities. The Faculty of Civil Engineering, the Faculty of Mechanical Engineering, the Faculty of Electrical Engineering, the Faculty of Nuclear Sciences and Physical Engineering and the Czech Institute of Informatics, Robotics and Cybernetics achieved the highest rating of "Excellent" in Module 3. The "Excellent" grade was also awarded to CTU in Modules 4 and 5.

The submitted self-evaluation report, the presentation from the on-site visit and additional information, as well as the final CTU evaluation and other related materials are available at https://evaluation-cvut.cz/AOCVUT/.


11

Ing. Lucie Orgoníková / Chancellor

"I am very appreciative of what the university was able to provide not only for Czech but also for European citizens during the pandemic. It managed to stand up to the crisis and continued its mission with social responsibility. It has not forgotten its commitment to science, students and the public. The life of the university has not stopped, quite the opposite. I am sincerely glad to see the results of CTU's work recognised. In the first wave of the pandemic in particular, the positive public reaction was a real driving force for further activities at the faculties, institutes and the Rector's Office. I appreciate that despite the critical situation CTU was able to divide its attention between generations and had a lot of strength left for the young technicians at the University primary school and the Lvíčata (Lion Cubs) kindergarten. CTU has proved that it is a university looking far into the future with a high degree of erudition, and for this it deserves a thank you."

11 THE THIRD MISSION OF THE UNIVERSITY

TRANSFER OF KNOWLEDGE INTO PRACTICE

The main mission of CTU faculties and institutes within the Third Mission is transfer of research results into practical life. Due to its technological focus closely intertwined with the application sphere, CTU is an important partner for society in this area. Such cooperation is mutually beneficial - the university's scientific teams are involved in industrial projects, and industry experts help students understand the practice. In the pandemic year 2020, CTU demonstrated its excellence and uniqueness in many examples. Not only did it focus on urgent assistance in times of crisis, but it did not forget its long-term goals in areas not directly related to the pandemic.

The CIIRC science teams proved great relevance to society. Their stories filled the front pages of the media, whether it was the CIIRC RP95-3D half-mask or the Pipette robot. Knowledge transfer between academia and industry has played an important role at CIIRC for a long time. It is implemented through the National Centre for Industry 4.0, the Centre of City of the Future, the RICAIP Centre, the key infrastructure Testbed for Industry 4.0 and the Academic-Industrial Collaboration Centres. The CIIRC is also home to joint labs, Škoda Auto, Eaton and Rockwell Automation, where successful student start-ups are incubated through its own e-club accelerator, such as AlquistAI, which has won numerous awards for its chatbot, including the prestigious international Amazon Alexa Prize. The CIIRC's mission also includes outreach to the general public. CIIRC has been instrumental in the fight against the coronavirus pandemic.

The Faculty of Information Technology (FIT) also excels in the area of technology transfer into practice, for example in the licensing of intellectual property represented by software applications. Links with companies mean long-term cooperation in applied research and development. Also very interesting is FIT's cooperation on the prg.ai initiative, which was established jointly with Charles University, the Academy of Sciences of the Czech Republic and the City of Prague to promote cutting-edge science and research in the field of artificial intelligence. In this area and on the pillars of the cooperation with Charles University and Masaryk University in Brno, it is necessary to mention the acquired project to provide the legal and organisational structure for the establishment of a European Centre of Excellence in Artificial Intelligence. This project should create a platform for international cooperation, setting up transfer policies and socio-economic impacts in the field of artificial intelligence, where CTU is among the top centres thanks to its experts. FIT has also been involved in helping to fight the pandemic; it offered an independent opinion on the eRouška app to the public, and created the website potrebujurousku.cz to gather the latest regulations issued to prevent the spread of Covid-19. In May, together with prg.ai, it participated in UniHack, an innovative online hackathon aimed at helping the Czech economy, in the Folding@home project, and also provided the GoDeliver platform for arranging food and parcel deliveries to senior citizens and people in quarantine. Citizens appreciated the services of www.koronavirus24.cz, a 24/7 communication channel for coronavirus queries. The Smart Triage app helped with triage of patients in hospitals. FIT fulfilled its Third Mission in relation to the public by organizing professional lifelong learning courses in the framework of the University of the Third Age. UCEEB was able to market approximately 15 new products without any loss or delay. The scientific outputs of the Klokner Institute were also transferred to social life and found application in the commercial sphere. In 2020, for example, a spatial numerical model of the overhead line on the Negrelli Viaduct was developed for the Railway Administration to evaluate deformations. MIAS participated in the organisation of the Week of Science and Technology of the Academy of Sciences of the Czech Republic, a very popular public awareness event, as well as in the Night of Scientists.

The Faculty of Architecture has long entered into mutually beneficial cooperation with the public and private sectors and is visible in the public space. For example, cooperation with KRNAP

is valuable. In 2020, six shelters were built to replace outdated shelters on the the Krkonoše Mountains crossroads and ridges.. The public space has acquired a water tower in Žižkov and the Radost project as a seating and misting area in Radost Park. In Prague, the faculty conducted a structural and historical survey of selected parts of the New Stage of the National Theatre building and provided expert opinion for the reconstruction of the Pod Marjánkou Polyclinic.

The Faculty of Biomedical Engineering (FBME) was also able to respond to crisis situations and thus make a significant contribution to the population of the whole country. An example was the development of the CoroVent emergency lung ventilator, whose story also filled the front pages of the media. The faculty did not omit the younger generation, donating twelve computers to the charity project Computers for Children. Thanks to its location, it is the only faculty of a public university in the Central Bohemian Region, so cooperation with the town of Kladno and the Central Bohemian Region is crucial in the region where it is perceived as a prestigious partner. Equally important is the activity for the Rehabilitation Centre Kladruby in the field of accredited physiotherapy teaching. The faculty also cooperates with hospitals in Slaný and Rakovník and the company LINET spol. s r. o. During the pandemic, it helped significantly with loans of high-tech equipment, such as vital signs monitors with defibrillation, infusion pumps, linear dosing and suction machines, which are primarily used to teach future paramedics, biomedical technicians or biomedical engineers, but helped doctors and paramedics during the pandemic. Several lectures and a charity photo exhibition were held for the public, with proceeds going towards the purchase of special teaching aids for children.

The Faculty of Nuclear Sciences and Physical Engineering (FNSPE) also held classes for the public during the pandemic as part of the University of the Third Age. A very interesting project was the stage performance of Physics and Ballet at the CAAS Gala event.

The faculties and institutes of CTU together managed to fulfil the Third Mission of the university as a whole. Their excellence is described in the presentation section of the Annual Report.

OPERATING IN THE REGION

CTU has an important position not only in the territory of the capital city of Prague, where a significant part of the university is located, but also in the Central Bohemia Region, where the Faculty of Biomedical Engineering is seated. In the Ústí nad Labem region there is a study centre of the Faculty of Nuclear Sciences and Physical Engineering and the Faculty of Transportation Sciences, UCEEB is seated in Buštěhrad near Kladno,, Roztoky u Prahy is an important location for the Faculty of Mechanical Engineering's engine and automotive test laboratories there, whereas the faculty's turboprop engine test laboratory is in Hradec Králové. And we could go on and on. The university's position in relation to society is also determined by other, sometimes lesser-known activities of CTU, which also has its own university primary school and kindergarten, orchestra, theatre ensemble or choir.

Youth education at the University Primary School and Kindergarten Lvíčata

CTU is the founder of the University Primary School and Kindergarten Lvíčata (Lion Cubs), which is part of the Dejvice campus. Both the school and the kindergarten cooperate closely with CTU's faculties and institutes; pupils can visit, for example, research laboratories or listen to a lecture by an invited expert. In this way, CTU also meets the need for support from parents of employees and parents of students.

In 2020, the Lion Cubs celebrated their 10th anniversary. The kindergarten was opened first in September 2010 and the primary school has been in operation since 2015. The latter started as a small classroom housed in the Faculty of Architecture building, after a year it moved to the new premises of the Student House. It now has four classrooms for a total of 56 children from the first to the fifth grade.. There are plans to expand the premises to include a computer room, a hall and other facilities.

Primary school pupils have enhanced classes in computer science, mathematics, science subjects, such as Man and the World and Science, where pupils conduct research, work on projects, experiment and discuss. They participate in competitions from the first grade and have achieved excellent results.

Similar to other schools, the Lion Cubs' operation was affected by the pandemic in the spring and the need to switch to online teaching, which was organised through MS Teams. Half an Hour for the Soul meetings were also held remotely to help the children through a difficult time, and an online after-school club took place twice a week. Despite the crisis, pupils took part in - and won - many competitions, such as the Mensa Logic Olympiad, the Christian Doppler Grammar School Maths Stream, the Maths Olympiad, the Pythagoriad, the Science Cup, Pangea and the Maths Kangaroo.

Very unique is the involvement of the Lion Cubs in projects led by the European Space Agency's Education Office, ESA - ESERO, whose mission is to use space themes with a wide range of European curricula shared by teachers and children across Europe. As a result, the competitions in which the pupils participate are internationally judged and promote internationalisation in children from an early age. In 2020, the Lion Cubs took part in the Mission X, Mission Zero and Moon Camp Challenge projects. Outcomes are presented on the school website and in updates on the CTU website.

The kindergarten also operated in an online environment, where the emphasis was mainly on preparing preschoolers for enrolment in the first grade online, and younger children talked and received tips for home activities. In the summer, the summer kindergarten From Fairy Tale to Fairy Tale was held and a Chronicle event was held to chronicle the lives of the children in the kindergarten for charity sales. The proceeds of nine thousand crowns were distributed to the Life for Children Foundation and the Single Mothers Club.

Cultural life with CTU

Despite the obstacles caused by the pandemic, culture did not disappear at CTU. Selected projects were available online, even exhibition activities were held virtually. Music continued to be heard, albeit via YouTube.

One such undertaking is the project Mass. Its website maps artworks in the interiors and exteriors of the Dejvice campus. Also available online was the exhibition One Hundred Years under the CTU Brand, which commemorated the 100th anniversary of the university's reorganidation and the use of the CTU name, prepared by the CTU Archives. A purely "pandemic" venture is the TV9P television station, which helped to stay in touch with students and communicate better during the second wave of restrictions. Since November 2020, the CTU Rector's Office on the 9th floor is transformed into a TV studio once a week, which has broadcast music programmes aand a number of interviews with interesting personalities.

The CTU Academic Orchestra is comprised of students not only from the CTU. It performs at the Bethlehem Chapel, and also on Czech and foreign stages with classical and multi-genre repertoire. Theatre does not come short either, the Comica Economica theatre ensemble is active at CTU.

UNIVERSITY OF SUPRA-REGIONAL IMPORTANCE

CTU declares its impact in the international arena through extensive cooperation with foreign partners, but also through international awards. In 2020, despite the pandemic, all faculties and institutes were still involved in the international research infrastructure, participating in scientific and research programmes and organising conferences, both virtual and sometimes "live".

For example, the Faculty of Biomedical Engineering managed to implement a project to help Cambodia in the field of neonatology or an international project. The Klokner Institute was involved in the testing of high-strength cementitious materials for Lafarge centre (France), skeleton joint elements for Peikko (Finland), insulator elements for PPC (USA), specialised aluminium joints for Milos (UK) and collaborated with many prestigious research institutions (JRC Ispra, Politecnico di Torino, Torroja Institute, Madrid, TNO Delft, TU Ghent, de Coimbra - Polo II, University of Stellenbosch, South Africa). The cooperation of the Faculty of Mechanical Engineering with GE Aviation, the largest American manufacturer of aircraft engines, is extraordinary.

The Czech Institute of Informatics, Robotics and Cybernetics also has a significant supra-regional reach and is a member of global and European initiatives and platforms, such as CLAIRE (Confederation of Laboratories for Artificial Intelligence in Europe) and ELLIS (The European Laboratory for Learning and Intelligent Systems). One of the most important is the participation in the RICAIP project, funded by the European Horizon 2020 programme.

Another potentially important step forward is the nomination of CTU for the Czech Republic in the European call for the creation of a network of European Digital Hubs funded by the Digital Europe programme. This is particularly significant as an agreement of centres of excellence that want to transfer their experience in the field of artificial intelligence to the industrial sector, thereby strengthening and improving the digital maturity of small and medium-sized businesses.


BEZ ROUŠKY
ANI KROK!

12 ACTIVITIES RELATED TO THE IMPACT OF THE SARS-COV-2 PANDEMIC

Czech Technical University in Prague dealt with the SARS-CoV-2 pandemic in a very responsible manner during 2020. Even though the first occurrence of the coronavirus infection and the beginning of its spread in the Czech Republic was identified in March 2020, as early as in January CTU management set up a crisis staff with regard to the development of the situation in China from where students came to CTU to study. In addition to the crisis headquarters, an assistance system and a coordination centre were prepared. The international orientation of the university and the monitoring of the data and the intensity of the spread of the disease in China helped to make an early and qualified estimation of the possible development in the Czech Republic. The university management reacted quickly and without delay at the beginning of the spreading pandemic and practically from day to day came up with an appropriate solution to the situation. On 9 March 2020, the Rector of CTU issued an order with a radical restriction of the University's activities, with the aim, first and foremost, to protectthe health and lives of all employees and students, especially those at risk. Quality communication and declared assistance in an unknown situation were crucial, especially in the first months of the pandemic. The digitisation of the teaching system and the transition from full-time to fully distance learning within a few weeks was admirably fast, in particular with regard to the operation of laboratories, test rooms and studios. Virtually all the scientific teams of CTU, as well as the students themselves, were involved in solving the problems related to the pandemic.

CTU established its role as a key player and strategic partner in the fight against the global pandemic, which eventually affected all areas of social and economic life of society. On the basis of its erudition, it gradually offered solutions that were applicable not only in the Czech Republic, but globally. Although the pandemic became an everyday issue, the university did not cease to live socially and fulfil its role; on the contrary, it showed its humanity, solidarity and the basic social need to help others in need.

The stories of the faculties, institutes, laboratories and testing rooms of CTU and their application of science into practice have caused the university to become the most quoted entity in the Czech media from one day to the next and to gain attention from the public and state representatives that it had never experienced before. The university's technical focus, the potential of scientific teams respecting diversity and freedom of opinion, its long experience, laboratories, testing rooms and studios using modern technologies, all served a good purpose for the benefit of society in many specific cases in a challenging year. All eight faculties and six institutes of higher education were able to respond quickly and adequately to the societal demand for solutions to the pandemic situation, taking into account their specific mission and profile, without ceasing to fulfil their primary roles. Thanks to technology, excellent science, innovative solutions and cooperation with industrial partners, CTU has made a major contribution to improving the quality of social life in times of pandemic, while creating entirely new opportunities for the university's own development in the right direction. Paradoxically, the crisis helped to significantly accelerate the necessary changes, revised the set procedures and further emphasised the importance of solidarity, cooperation, internationalisation, flexibility and action in decision-making. At the same time, it confirmed the need for further development of technical education in line with international trends and standards and the need to respond quickly to unexpected situations and to evaluate relevant available data with high quality. Overcoming obstacles in the present thus become advantages in the future.

SCIENCE, RESEARCH, CREATIVITY, INNOVATION AND TECHNOLOGY

As already mentioned, CTU was preparing for a possible crisis by monitoring world events. As early as on Friday, 13 March, Rector Vojtěch Petráček gained the attention of the public, the media,

and social networks when, in response to the lack of protective equipment, he presented his protective mask, made at home from commonly available packaging material, exaggeratedly labelled Apollo 13. This was followed by the production of Anti-COVID disinfectant, which, although critical to fighting the disease, was soon in acute short supply. It was produced at the expense of CTU by the laboratories of the Faculty of Nuclear Sciences and Physical Engineering (FNSPE) and supplied to the urban districts near the university, the Integrated Rescue System, Prague Public Transit Company, Motol University Hospital, the Liberec Air Rescue Service, the National Technical Library, the Mountain Service of the Czech Republic and many others. FNSPE also provided instructions for home production on its website.

Another important aid was a robot that provides accurate pipetting for testing samples from patients infected by by coronavirus. In April 2020, the Pipetting robot was already able to physically assist laboratory technicians at Na Bulovce University Hospital. Its development was led by the team of Professor Václav Hlaváč from the Czech Institute of Informatics, Robotics and Cybernetics, which collaborated with the Institute of Nuclear Physics of the Czech Academy of Sciences.

At the Faculty of Transportation Sciences, the idea was born to use 3D printing for the production of protective masks and shields, which were also subsequently (as early as 30 March!) distributed in large quantities to hospital facilities and GP surgeries across the country. The Faculty of Civil Engineering was also involved in the 3D printing and production of the disinfectant. The Faculty of Mechanical Engineering responded rapidly as well, designing and printing a prototype reduction for the Easybreath full-face mask, used especially for snorkelling. This helped in the first days of the spreading epidemic, for example, neurosurgeons at Na Homolce. There was also a high demand for nanofibre masks, to which the University Centre for Energy Efficient Buildings responded by producing nanofibre fabrics for use as filter membranes, which were then offered for further processing to manufacturers or buyers of masks.

The "star" of the anti-pandemic solutions is undoubtedly the CIIRC RP95-3D protective half-mask, developed by the Czech Institute of Informatics, Robotics and Cybernetics for 3D printing technology. The mask with an interchangeable filter has passed testing and has been certified for the highest level of protection, FFP3. The free license and bilingual instructions available on the web mean unlimited printing for non-commercial purposes anywhere in the world. Of course, the CIIRC also printed the masks, and their rapid distribution was handled in times of greatest need by, among others, the Pilots to the People initiative, consisting of nearly three hundred volunteers and pilots who distributed medical supplies across the country at their own expense.

However, a mask designed for an adult shape did not sufficiently seal the face of a small child. On the basis of a database of three-dimensional images of faces of children aged 4-10 years, provided by anthropologists from Masaryk University Brno, a mask for children was designed. The mask received an award from the Research, Development and Innovation Councilfor its scientific contribution to solving the problem of the Covid-19 epidemic in a global context.

However, technology alone is not enough; the public needs to use it properly. Therefore, CTU prepared an educational video Masks for All. It went around the world, was broadcasted by the American TV station CNN and its relevance was also appreciated by the World Health Organization (WHO). As a result, the Czech Republic became a positive example at the beginning of the pandemic and CTU contributed to it in a major way.

Development of the CoroVent lung ventilator began in April 2020 in response to the growing need for artificial lung ventilation under the leadership of Professor Karel Roubík's team from the Faculty of Biomedical Engineering in collaboration with the COVID19CZ initiative. The demand for CoroVent was enormous, the United Nations also showed interest, and it was unique because, among other things, it did not exist in Europe at the time, at least not in the production or certification phase. It is now manufactured by MICo under licence from Czech Technical University. It was soon awarded US Food and Drug Administration certification, which was the ticket to world markets. Although it is a final product, Czech hospitals have received several units as gifts. The ventilator placed second in the EUvsVirus hackathon, the largest pan-European online event initiated by the European Commission and the European Innovation Council.

Also in the autumn, the CIIRC came up with an idea that makes it easier to save lives - an integration system for online monitoring of bed capacity in hospitals. This works as a web-based service that receives and processes real-time data on the occupancy of individual beds not only in hospitals but also in other inpatient care providers who can offer their capacity in case of shortages. The system was developed by CTU together with the start-up TRIX Connections, tested at the Ostrava University Hospital in cooperation with VSB - Technical University of Ostrava and subsequently deployed in other hospitals.

Not all of the aid was material. For example, the Faculty of Information Technology participated in Folding@home, a project used by development teams around the world for calculations and simulations in researching therapeutic agents against coronavirus and other diseases. The faculty reserved part of the computing capacity of the ClusterFIT and CloudFIT platforms for this purpose and thus took the 1st place in the rankings of Czech academic institutions.

A number of application platforms and websites emerged. A collaboration between FIT and FEE resulted in the GoDeliver platform, which provided food or parcel delivery to senior citizens and people in quarantine. The Smart Triage app, aimed at helping to triage patients in hospitals, succeeded in the Hack Kosice Digital and Hack the Crisis Slovakia hackathons. FIT students also won an award for the chatbot on the website www.koronavirus24.cz, which answered questions about the coronavirus without a break in the early days of the pandemic.

Scientists and students from the Faculty of Electrical Engineering conceived the FreMEn contra COVID project, the output of which was the Nebojsa app, which based on data on the concentration of people helps to avoid queues or crowded parks and recommends places with a potentially lower risk of infection.

The Faculty of Information Technology issued an independent assessment for the mobile application eRouška, which confirms

that the application respects the privacy of users. In cooperation with FIT students, the project of the web application Wowee for helping the needy, which works on the principle of fundraising, and the Fitify application, which offered over 800 exercises, dozens of workouts and a virtual coach, found its users in 180 countries around the world during the pandemic.

Furthermore, CTU employees and students were also personally involved in helping, including future paramedics, physiotherapists, laboratory technicians, radiology assistants or biomedical technicians from the Faculty of Biomedical Engineering actively assisted in medical and social facilities, at sampling points and emergency services. The Faculty of Electrical Engineering, in turn, helped children by donating 60 monitors and other computer equipment to families in need through the charity project Computers for Children, which is run under the auspices of the IT People Foundation, thus facilitating their access to distance learning. It also provided online tutoring in math and other subjects and consultations to families and school administrators.

IMPACT ON STUDIES

It is obvious that the students themselves experienced the most the impact of changes caused by the pandemic on their studies. The full-time form of study was only possible for a small part of the first quarter in 2020, followed by the closure of universities, which eventually affected the rest of the school year and the beginning of the next one. The order of the CTU Rector came into force on March 10 and meant the interruption of classes, lectures, seminars and exams, including the state final exams. This was immediately followed by the closure of all CTU facilities to both students and staff, and even to the public, as some of the facilities are open to the public during normal operation. As the restrictions tightened, the National Technical Library, the University Bookstore, the Central Library, and eventually the sports and accommodation and catering facilities also closed. All of this, of course, posed major obstacles to the continuation of studies. So, the long-planned digitisation of activities come to the fore and within two weeks most of the faculties and institutes switched to distance learning. Even the bookstore and library continued to operate remotely. In particular, MS Teams became a daily partner for everyone, and the transition to this platform was also seamless thanks to the technological possibilities and modern equipment of the university. The readiness of faculties and institutes was later evaluated by students in an extraordinary electronic contactless survey across CTU. It was conducted in May and provided feedback from students to both the school management and lecturers. Of the 18,217 students contacted, 1,737 participated, which corresponds to the usual participation of respondents in surveys conducted. The data were evaluated by FIT with a final grade of 2.18 for self-adaptation. It can be concluded that, given the anonymity of the voting, the evaluation turned out in favour of CTU's readiness for the change of teaching format. A thank you also goes to the teachers, who in many cases showed humanity, a high degree of erudition and the ability to lecture even under very difficult conditions, and CTU passed the test with flying colours. According to the results, CTU did well not only in the scientific field but also in the case of adaptation of study affairs. Let us recall, for example, the positive attitude of Prof. Petr Kulhánek, CSc., from the Faculty of Electrical Engineering, who charmed social networks with his lectures from unheated premises of the faculty, when he persistently, with a positive attitude and wit, lectured to the cuddly monkey Máňa. In the end, everyone adapted, although the aftertaste of the lack of social contacts lingered.

However, student life is not just about education as CTU also provides students with space for cultural and sporting activities. The form of physical education and sport varied significantly in 2020 due to the closure of both the school and the sports facilities, with only the very beginning of the year and the summer seeing sports without significant restrictions. The Institute of Physical Education and Sport (IPES) provided videos on social media during the pandemic, which allowed students to enjoy table tennis, running, outdoor exercise and health physical education, at least in an online form, and there were also streaming lessons in professional physical education. Online CTU exercise programmes practiced at home were available, for example, via FB, along with interviews with top athletes studying at CTU, which were also broadcast by the new school TV station TV9P. Thanks to the summer relaxation of restrictions, 34 summer courses could be organised, but winter courses were cancelled in full. The Engineers Prague versus UK Hockey Prague match took place in front of the Czech TV cameras, albeit without spectators, at the Eden Ice Stadium. The trophy for the winner of the University Ice Hockey League went to the team composed of students from Czech Technical University, University of Economics and Czech University of Life Sciences, Engineers Prague. It was not the only success of the CTU athletes. The first place in the canoe slalom was won by MIAS student Martina Satková, hockey players won gold, other medal places were taken by swimmers, athletes, and rowers of CTU. However, the closure of the sports grounds brought an opportunity for their maintenance - the multi-purpose field in Chuchle was reconstructed and the flooring in the table tennis room and the lights in the gym in the Pod Juliskou facility were replaced.

IMPACT ON THE QUALITY OF ACTIVITIES AND SERVICES

The measures affected the whole spectrum of services offered by CTU. All providers approached the problems responsibly and some of them even managed to continue their activities without any significant impact. This applies to the library services provided by the CTU Central Library. Remote access via the library website allowed students to access all subscribed information resources portals (EIZ), Open Access resources in trial mode as well. Paid resources were also available for remote access via CTU IP addresses. Thanks to authorisation, students were able to access remotely even resources outside the CTU network. The library also transferred its other services to the virtual environment. It launched online pre-registration, extended reservations and borrowing and suspended reminders. The Distance Learning with the CTU Central Library brochure was

published where students could get information about the availability of literature, access to EIZ, online library services, useful contacts to CTU staff, etc. in one place. The library also launched a Consultation Counter with the possibility of contactless consultations, for example by phone, e-mail, MS Teams, etc. Seminars organised annually by the library were also held online.

Conversely, the restrictions stemming from the pandemic had a quite severe impact on the accommodation services sector and the aforementioned sports sector. A similar situation occurred in the catering sector. The dormitories, cafeterias and sports facilities are organised under the Service Facilities Administration (SFA). Due to distance learning, the number of boarders in the dormitories decreased, resulting in a sharp drop in revenue, immediately after the first wave of the pandemic. Tough measures imposed in both the spring and autumn months meant an impact on the SFA's main revenue season. Accommodation capacities could not be filled in the summer, and the pandemic also affected the tourist season. The same applied for catering facilities. As a result, the SFA saw a decline in revenue of CZK 138 million compared to 2019, while a proportional reduction in expenditure was not possible.

Despite the restrictions, CTU looked for ways to offer services that would entertain its students, employees, and the public, so cultural events were moved to the online environment as well. Most of the events were of a thankful and supportive nature, intended to contribute to solidarity and support for communication in difficult times. An example is a virtual music festival was held at the Lucerna Music Bar in May under the banner Musicians to Scientists: People, Science, Art and Tolerance. A virtual concert streamed from the Bethlehem Chapel took place in a similar vein. Meetings broadcast by the new TV9P television station, whose television studio was at the Rector's Office, were also very friendly. The programme was aired in the positive spirit of chamber music meetings, with all faculties and institutes actively participating in the broadcasts.

INTERNATIONALISATION, CONFERENCE ACTIVITIES

It is evident that a number of planned events did not take place. However, a few of them could be organised live, while others, when possible, were transferred to the virtual environment. As a result some traditional events such as the Festival of Science, the Night of Scientists, the Week of Science and Technology of the CAS and others took place.

The eighth year of the Festival of Science was held as a virtual laboratory and was open for participants from September until the end of November 2020. This joint project of CTU, UCHT and the Prague Children and Youth House focused on Innovation for the Future. Interested visitors could attend more than 70 educational, guided video exhibitions, including the accompanying Smart Head programme, and compete for many interesting prizes such as a 3D printer or an iPhone. The festival was visited by 14,000 virtual guests, 38,000 quiz questions were answered and Vimeo recorded 35,000 views.

Despite the difficult conditions, 19 universities took part in the organisation of the Night of Scientists. In this case, the programme on Man and Robot was held online.

A few national conferences on a smaller scale were held, but participation in or organisation of international events was not easy, resulting in cancellations and refunds of unspent funds allocated for this purpose. However, despite all the hurdles posed by the pandemic, there was a number of positive effects as organisers learned to adapt to the new conditions andmedia and social networks were used more. Never before werethere so many videos, podcasts and streams created in the virtual environment as in 2020, still available today through Youtube, Vimeo and other channels which is a small bonus, a positive legacy of the pandemic.

13

Ing. Veronika Kramaříková, MBA / Vice-rector for Development and Strategy

"The greatest achievement in 2020 was the creation of the CTU Strategic Plan 2021+, which determines the direction of the university in the coming years. The weight of the document itself, however, rests primarily on the communication and strong cooperation of all the faculties and university components that participated in its development, and that will definitely drive CTU forward in a major way."

13 FURTHER DEVELOPMENT AND STRATEGIC DIRECTION

2020 was a year of many changes, not only with regard to the ongoing pandemic. A new Strategic Plan 2021+ was created, which should fundamentally influence the development of CTU. It is based primarily on the intersection of the needs and potential of CTU and on a completely new concept of the Ministry of Education's Strategic Plan for the Development of Higher Education, which was approved by the government in the first half of the year.

The Strategic Plan 2021+ was prepared by a working group consisting of representatives of all faculties and university institutes together with representatives of students, both Czech and foreign. Thanks to their input, it was possible to define specific areas of development and support needs in studies, science and internationalisation, as well as in the area of process management, quality and environmental development. The environment here is not only the physical space or the use of buildings and land, but also the virtual environment in which both students and academic and non-academic staff spend theirleisure time.

The guided discussion resulted in strategic objectives for each segment, which were further developed into sub-objectives, which were followed by concrete measures and tools. The whole process was discussed several times by the academic community to produce a truly living document, leading to a significant shift of CTU not only in international rankings, but especially in its scientific mission, excellence and provision of quality teaching.

The new formulation of the mission and vision set out in the Strategic Plan 2021+ significantly reinforces the importance of excellence in science and high-quality teaching. It also places great emphasis on close links with the application sphere and a strong orientation towards 21st century technologies.

In addition to the essential document mentioned above, development projects were being implemented, but their completion was extended until the end of June 2021 in view of the ongoing crisis. The impossibility of travel and meeting in person had a significant impact on the possibilities and methods of implementing these projects, but according to the interim reports of the relevant researchers, they have been adapting to the situation and everyone believes that the conditions will eventually allow for gaining experience abroad or from international partners in the Czech Republic.

In 2020, CTU received institutional support in the amount of CZK 77,376 thousand. CZK 23,522 thousand was provided for capital investments and CZK 53,854 thousand for non-investment projects. Of the latter funding, CZK 19,000 thousand was allocated for internal tenders. In total, 37 projects were supported. There has been a significant change in the management of institutional projects for 2021, where individual projects have their own guarantors who have to communicate with each other in order to maximise the synergy of specific projects and their activities, while a new model has been set up for the allocation of funds solely on the basis of specific outputs. Since the provider of these financial resources, the Ministry of Education, Youth and Sports, has also changed the funding criteria, it is possible to better distribute development activities in accordance with the Strategic Plan 2021+ for the future period.

CONTINUITY IN QUALITY ASSURANCE

In 2020, more than 30 per cent of the funding for institutional projects was earmarked for meeting the priority target of "Quality Assurance". Thirteen projects aimed at improving network systems in the field of quality were implemented, including the development of the instrument base and the presentation of the results of activities through presentation videos, which are widely used for the presentation of CTU. For example, the Faculty of Biomedical Engineering acquired teaching workstations and sensors for physiological variables. In implementing the projects, great emphasis was placed on improving the quality of studies and the learning environment as well as on links to cooperation with the industrial sector.

DIVERSITY AND ACCESSIBILITY

Care for gifted students and support for students in their first years are two distinct yet closely interrelated areas, both of

which represent potential for the further development of the university. One of the IP projects supported in 2020 is focused on students who have exceptional skills and talents and, in the form of special-purpose scholarships, motivates them to improve their skills. All CTU components were involved in this project, which covered only bachelor's and master's studies. The second project aimed at improving the administration of Lifelong Learning, taking into account the new course management methodology and the newly developed approach to LLL.

INTERNATIONALISATION

Engagement in international structures and the opportunity to gain foreign experience is one of the most important areas of development not only for individuals but also for the whole institution. In 2020, with the aim of increasing internationalisation, two student and staff mobility projects were supported, accounting for almost 17% of the total expenditure of the Institutional Plan 2020.

The projects utilised the long-established model of sending students to foreign partner universities on the basis of bilateral student exchange agreements. Expansion of the internationalisation of university life and the improvement of the quality of the educational process is also significantly influenced by the presence of foreign staff at individual faculties. Trips of CTU teachers abroad and arrivals of foreign visitors were also supported.

Another successful project is the "Study in Prague" project, funded under the umbrella of the Centralized Development Projects (CRP), in conjunction with the project "Development and Quality Assurance of Joint Degree Programmes in Cooperation with Foreign Universities".

In this area, the possibility of extending the deadline to meet its objectives was most appreciated but it is still unclear whether the funds will be spent in accordance with the set target.

RELEVANCE

The project, which was dedicated to this priority objective, focused on the improvement and development of counselling at CTU, provided by CTU's Centre for Information and Counselling Services (CIPS). The target group was students, PhD students involved in teaching and staff of study departments. The project aimed at preventing dropouts and promoting success in studies and professional career. It was subsidised with the amount of CZK 600 thousand.

QUALITY AND RELEVANT RESEARCH, DEVELOPMENT AND INNOVATION

Participation in the C.E.L.S.A. Programme is a regularly supported activity that aims to help the internationalisation of science at CTU by supporting the preparation of international scientific projects. In particular, it takes advantage of CTU's membership in the international CELSA (Central Europe Leuven Strategic Alliance) led by the Catholic University of Leuven, Belgium.

DATA-DRIVEN DECISION MAKING

A complete and user-friendly data infrastructure is key to quality assurance and evaluation of proposed actions in strategic management. Its construction must meet all data protection requirements, together with securing the entire system against external interference. The whole system, built on the interconnection and communication of all the parts involved, requires a high investment of time, expertise and money. For this reason, almost 23% of the funds earmarked for the Institutional Plan 2020 were dedicated to this priority, which included a total of 16 sub-projects, aimed at implementing legislative changes in cybersecurity or addressing the support of electronic signature using a qualified certificate. Another major area of implementation is the development of functionalities in individual applications such as Mobility or the KOS student information system.

At the same time, it is also necessary to mention in this area the involvement in the CRP projects "Sustainable development of EIS in the network of universities" and "Mutual cooperation of universities in the computerisation of processes and technical development of administrative and study agendas", which significantly contribute to faster and more effective digitisation of management of all participating universities.

EFFICIENT FINANCING

The area of efficient financing is becoming increasingly important in view of the declining financial resources and the need to prepare for EU operational and Community programmes in the new financial period. At the same time, project preparation and detailed knowledge of the underlying situation is essential. This is why the project Support for the technical condition inventory of GTF buildings was implemented in 2020, which serves to capture the current condition of the buildings and is a tool for asset management, thus supporting the drafting of a master plan. It must therefore allow for processing of data inputs into various software applications.

In 2020, CTU again joined the CRP project entitled "Development and effective use of subsidy tools in accordance with legislation and subsidy conditions".

The coming year will see the specification of the Strategic Plan 2021+ and the drafting of a Strategic Plan Implementation Plan. The next task will be the completion of the master plan, work on which was already started during 2020, when data on CTU's assets was collected, reviewed, and options and opportunities for future development were analysed. Many other issues and areas of focus have been outlined during the process, in view of new funding opportunities from operational programmes and national development programmes. It is therefore necessary to have a detailed overview and development plan to enable CTU to take advantage of potential financial opportunities.


14

prof. Ing. Alena Kohoutková, CSc. / Vice-rector for Construction

"CTU presents itself as a competitive, internationally recognized, open, socially beneficial university with a technical focus, which has to date built strong and modern infrastructure, state-of-the-art laboratories, test laboratories, centres of excellence and research facilities working closely with industrial partners not only nationally but also internationally. It is a technical university that demonstrates in a transparent manner that it is capable of addressing global challenges in all areas with socio-economic impact, such as the use of artificial intelligence, robotics and other cutting-edge technologies in defence, aerospace, automotive and energy sectors. It is therefore imperative that we continue to create a quality environment for education, research and innovation that is comparable to international standards. In this context, one of the fundamental strategic objectives is to ensure continuity in creating the conditions for an appropriately stimulating quality and pleasant environment for the university as a whole. This includes a high standard of services provided, efficiency and digitisation of activities and operations and reduction of the administrative burden of management processes. The strategic goal of CTU is to modernise the premises and buildings forming an attractive environment that will provide requisite facilities for students, academic staff and employees, both domestic and foreign, that promotes cooperation, inspires, creates a good feeling in everyday life at the university, including leisure activities. CTU will continue to focus on developing the university's facilities and invest in improving them. It will develop common areas, libraries, study rooms, leisure, accommodation and catering facilities and contribute to the public realm in line with the CTU Development Master Plan and the CTU Investment Plan."

14 UNIVERSITY FACILITIES

ACCOMMODATION AND CATERING SERVICES

Quality accommodation and catering are indispensable in the provision of university services, however, 2020 was a challenging year in this area. The introduction of government restrictions on accommodation and catering caused a sharp drop in sales almost immediately. Despite the relaxation of measures in the summer months, tourism did not return to normal, and even then accommodation capacity was only partially utilised. The situation kept improving and worsening during the year, but restrictions on the provision of accommodation in university dormitories had a major impact in 2020. As a result, the measures ensuing from the coronavirus pandemic led to a significant decrease in revenue in 2020 compared to 2019, amounting to CZK 138 million. The Accommodation and Catering Services department was one of the severely affected departments at CTU, yet we look to the future with hope for a return to normal.

LIBRARY SERVICES

The pandemic and the related measures related to it inevitably affected the operation of the CTU Central Library.

What they did not affect, however, was the acquisition of new information resources. The Central Library's additions in 2020 included to 4,281 library items, and the library continued to focus on profiling and building its electronic collection. The American Society for Testing and Materials resource offerings were expanded, subscription to Science magazine was obtained, and access to Statista, a major fact-based database of statistical information, reports, analyses, and forecasts, was added. Thanks to the new Bookport subscription, the e-book collection was expanded to include Czech productions in the field of engineering, which have been used extensively by undergraduate students. Thanks to the Summon discovery system, it is possible to search from one place all information resources available to CTU - subscription-based information resources portals (EIZ), Open Access resources and resources in trial mode. Paid resources are also available for CTU students via CTU IP addresses. Thanks to authorisation, students are able to access remotely even resources outside the CTU network. The library primarily provides remote access to the EIZ in 24/7 mode.

The database of the CTU Digital Library (institutional repository) continued to grow in 2020 with a number of theses, dissertations, new publications by CTU authors and teaching materials. The library's serVICe offer was expanded to include electronic publishing of books, university textbooks and study materials in Open Access mode. Altmetrics were implemented to further improve the functionality.

In connection with an increase in activities and services in the field of information support for science, research and publishing, the library also provided in 2020 bibliometrics, corrections of data in citation databases, including the management of the institutional profile of CTU. In cooperation with the V3S and taking into account the evaluation of the RVVI, the evaluation of CTU and individual authors, the Central Library in cooperation with the producers of citation databases carried out both simple and more complex data corrections in records or assigned citations. It monitored the issues of Open Access and Open Science, methodically participated in storing full texts of publications in the CTU Digital Library via the IS V3S component. It managed publication standards and publication platforms for the entire CTU.

The library also publishes the university-wide peer-reviewed scientific journal Acta Polytechnica. The journal is published in Open Access mode six times a year and is indexed in the Web of Science (ESCI edition), Scopus, CAS, Inspec and DOAJ databases. In 2020, the cover of the journal received a new graphic design and its website was updated. A new version of the Open Journal System editorial platform was also set up last year, and by the end of the year the editors of ten journals were using it, while two others were being managed in a test mode.

INVESTING IN FURTHER DEVELOPMENT

CTU's extensive infrastructure is located not only in Prague, but also in many other locations in new and older buildings, which often require high investments for repairs and maintenance. Efforts to transform immovable assets into modern spaces are significantly constrained by financial resources.

In 2020, the priority was to accelerate the preparation of major investment projects so that they could be implemented immediately after the pandemic has subsided. These include the reconstruction of Bubeneč Dormitory and Building B of the Faculty of Civil Engineering, the renovation of historical buildings on Charles Square and the conversion of the Strahov building into the new headquarters of the CTU Archives. Among the major projects, general reconstruction of two large lecture halls of the Faculty of Civil Engineering was carried out. They received a new lightweight envelope, which in its colouring and materials used is a continuation of the previous construction work on a section of the faculty. The rooms are fully equipped with new wiring and technologies for modern teaching and will provide students with all the comfort during lectures. The renovation also increased the capacity of the classrooms from the original 480 to 540 seats. Construction work has also begun on a part of the Student House building that will house the University Primary School Lvíčata, scheduled for completion at the beginning of the 2021/2022 school year. The long-term and technically demanding project of reconstruction of the historical listed building in Kruh near Jilemnice, which is mainly used for teaching and outdoor sports, also continued. The total volume of work performed for 2020 was CZK 65 million.

As part of the investment development of CTU, in 2020 the university purchased the Fragner Gallery in Husova Street in Prague's Old Town and a building in Kladno, which will be used to expand the laboratory space of the Faculty of Biomedical Engineering.

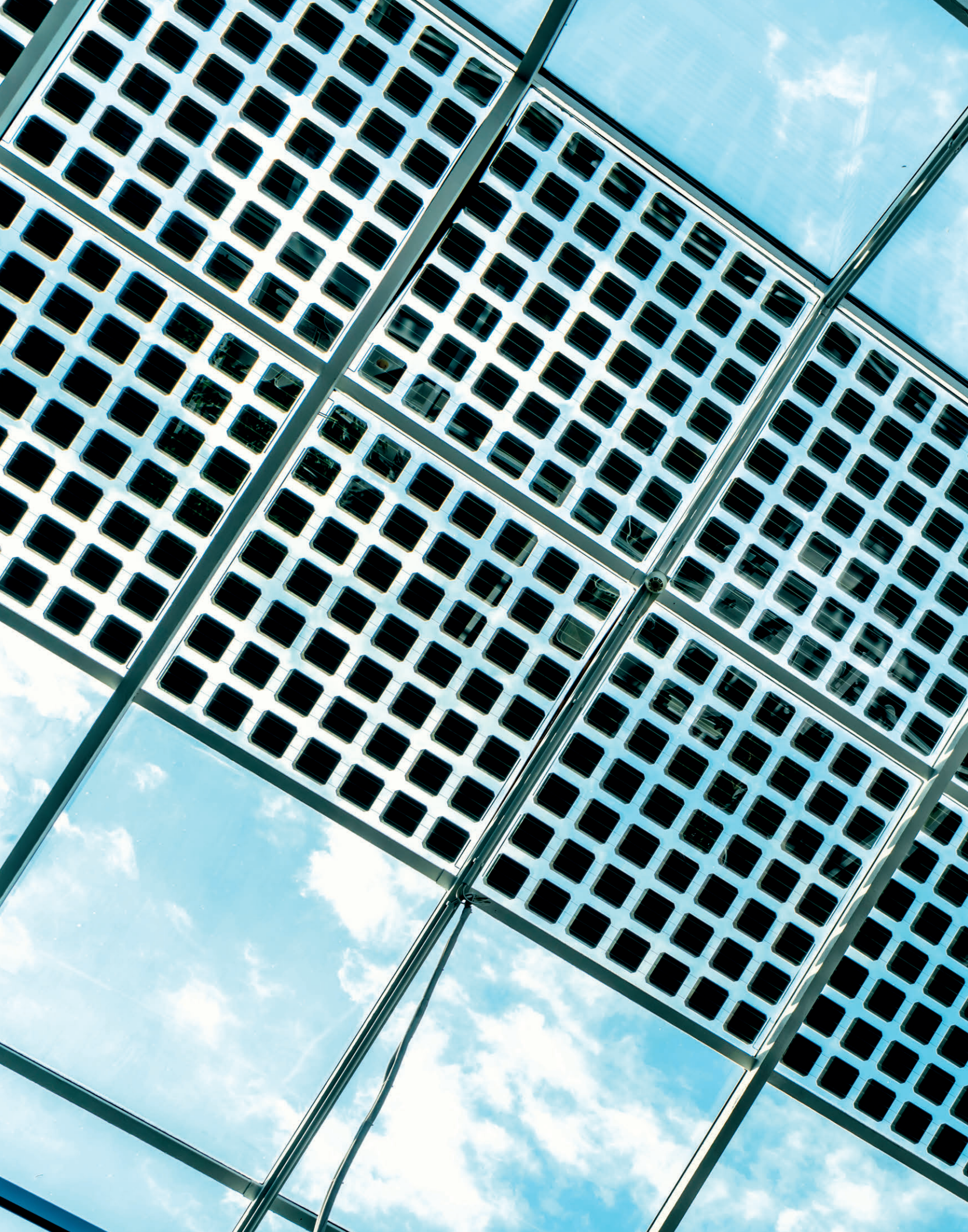


Table Annex

1.1 Basic facts

FACULTIES

Faculty of Civil Engineering (FCE) – Thákurova 7, Prague 6 – Dejvice, 166 29

Faculty of Mechanical Engineering (FME) – Technická 4, Prague 6 – Dejvice, 166 07

Faculty of Electrical Engineering (FEE) – Technická 2, Prague 6 – Dejvice, 166 27

Faculty of Nuclear Sciences and Physical Engineering (FNSPE) – Břehová 7, Prague 1 – Staré Město, 115 19

Faculty of Architecture (FA) – Thákurova 9, Prague 6 – Dejvice, 166 34

Faculty of Transportation Sciences (FTS) – Konviktská 20, Prague 1 – Staré Město, 110 00

Faculty of Biomedical Engineering (FBME) – Sítná 3105, Kladno, 272 01

Faculty of Information Technolog (FIT) – Thákurova 9, Prague 6 – Dejvice, 160 00

UNIVERSITY INSTITUTES

Klokner Institute (KI) – Šolínova 7, Prague 6 – Dejvice, 166 08

Masaryk Institute of Advanced Studies (MIAS) – Kolejní 2637/2a, Prague 6 – Dejvice, 160 00

Institute of Physical Education and Sport (IFES) – Pod Juliskou 4, Prague 6 – Dejvice, 160 00

University Centre for Energy Efficient Buildings (UCEEB) – Třinecká 1024, Buštěhrad, 273 43

Czech Institute of Informatics, Robotics and Cybernetics (CIIRC) – Jugoslávských partyzánů 1580/3, Prague 6 – Dejvice, 160 00

Institute of Experimental and Applied Physics (IEAP) – Husova 240/5, Prague 1 – Staré Město, 110 00

OTHER PARTS OF CTU

Computing and Information Centre (CIC) – Jugoslávských partyzánů 1580/3, Prague 6 – Dejvice, 160 00

Central Library (CL) – Technická 6, Prague 6 – Dejvice 160 80

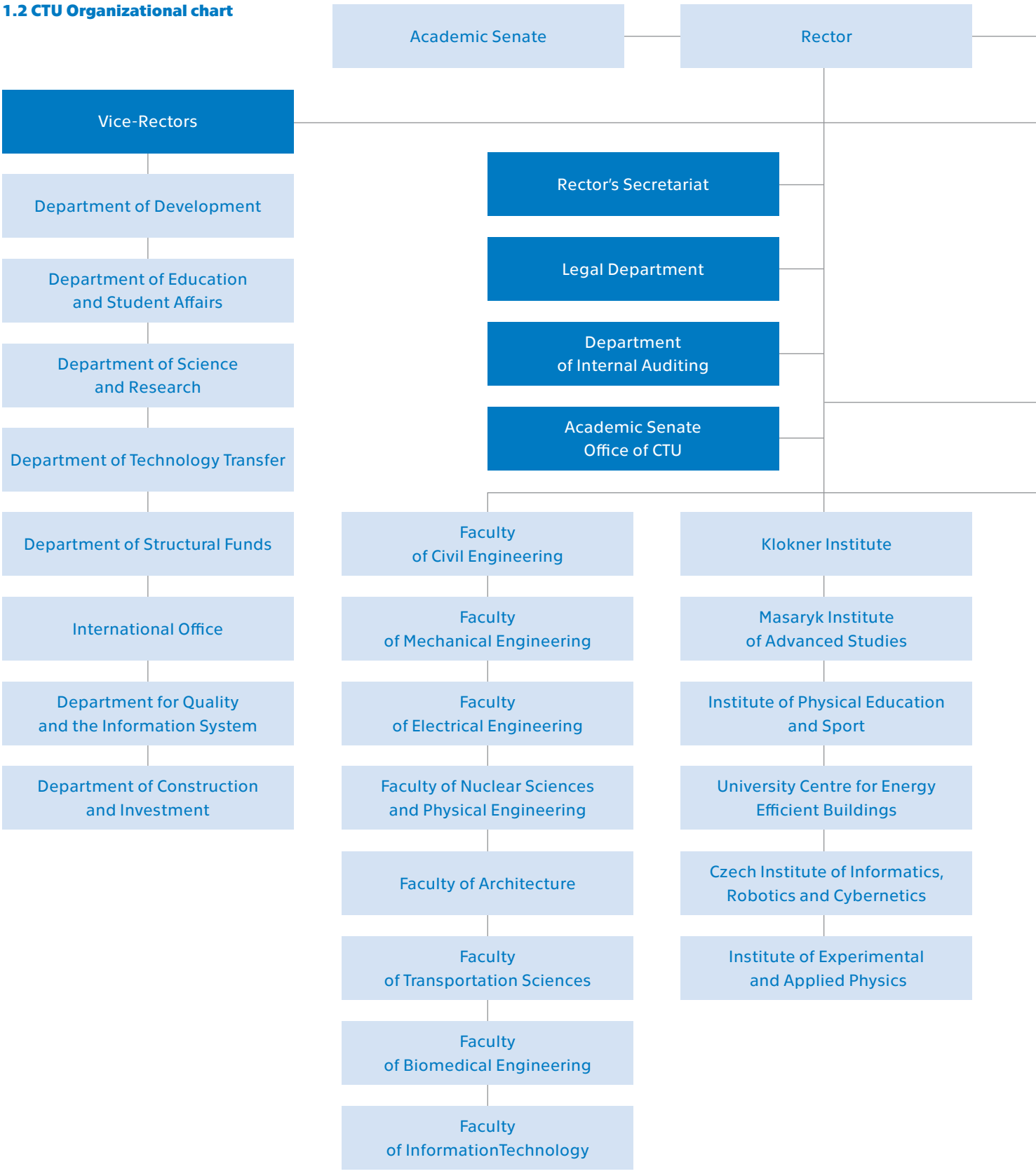
Rector's Office (R CTU) – Jugoslávských partyzánů 1580/3, Prague 6 – Dejvice, 160 00

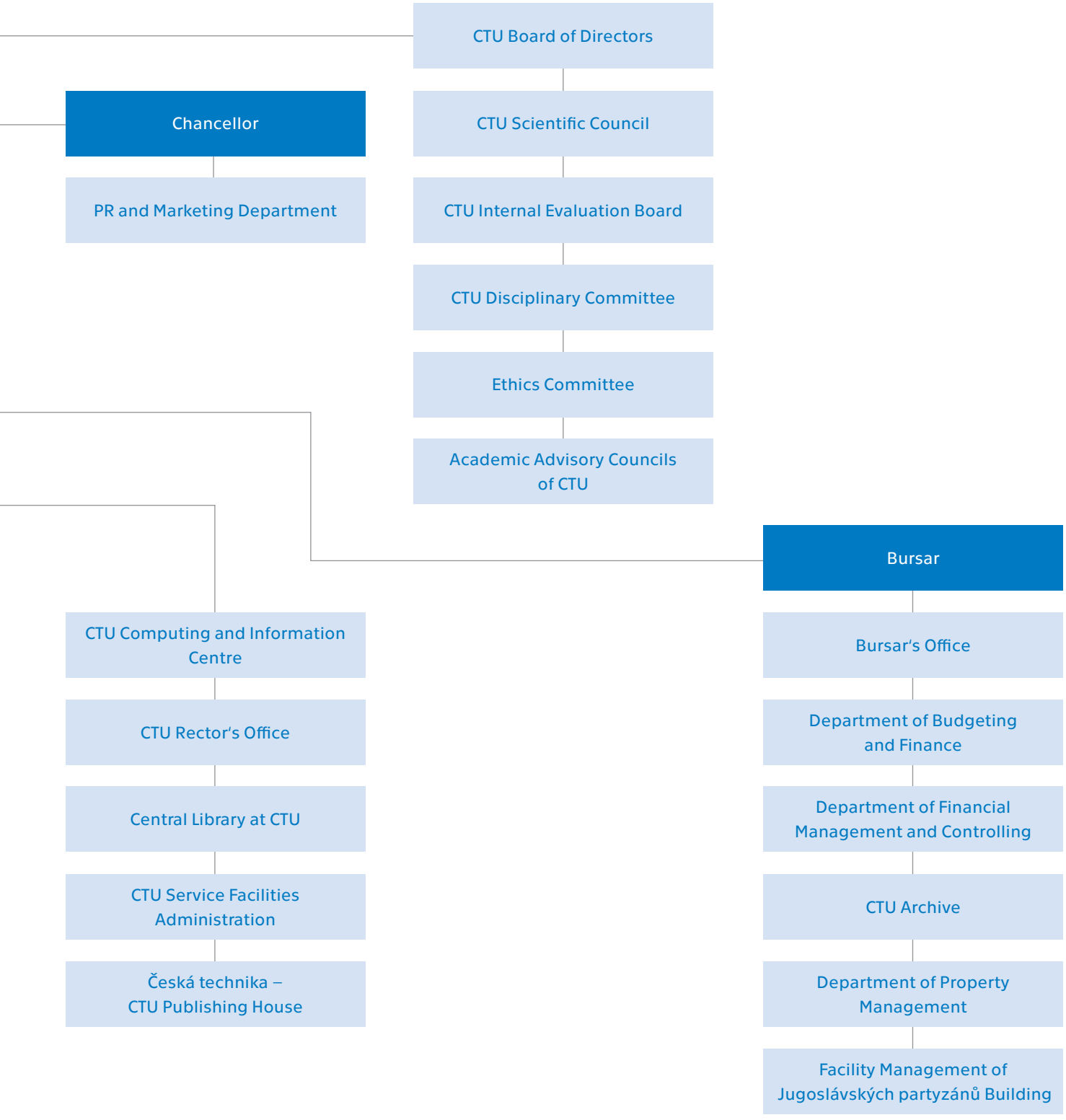
Service Facilities Administration (SFA) – Vaníčkova 315/7, Prague 6 – Dejvice, 160 17

CTU Archives – Zikova 2, Prague 6 – Dejvice, 160 00

CTU Publishing House (CTN) – Thákurova 1, Prague 6 – Dejvice, 160 41

1.2 CTU Organizational chart




CTU Board of Directors
Chancellor
CTU Scientific Council
PR and Marketing Department
CTU Internal Evaluation Board
CTU Disciplinary Committee
Ethics Committee
Academic Advisory Councils of CTU
Bursar
CTU Computing and Information Centre
Bursar's Office
CTU Rector's Office
Department of Budgeting and Finance
Central Library at CTU
Department of Financial Management and Controlling
CTU Service Facilities Administration
CTU Archive
Česká technika – CTU Publishing House
Department of Property Management
Facility Management of Jugoslávských partyzánů Building

1.3 Bodies of CTU

Table 1.3.1: CTU Management

Rector	doc. RNDr. Vojtěch PETRÁČEK, CSc.
Vice-Rectors	
For Bachelor and Master Studies	doc. Dr. Ing. Gabriela ACHTENOVÁ
For Information System and Quality Management	Ing. Radek HOLÝ, Ph.D.
For Development and Strategy	Ing. Veronika KRAMAŘÍKOVÁ, MBA (change from 1 February 2020)
For Science, Creative Activity and PhD Studies	prof. Ing. Zbyněk ŠKVOR, CSc.
For Construction	prof. Ing. Alena KOHOUTKOVÁ, CSc., FEng.
For International Relations	prof. Ing. Oldřich STARÝ, CSc. (change from 1 March 2020)
Registrar	Ing. Jiří BOHÁČEK
Chancellor	Ing. Lucie ORGONÍKOVÁ
Permanent Guest CTU Management	
Chair of the CTU Academic Senate	doc. Ing. Jan JANOUŠEK, Ph.D.

Table 1.3.2: Board of Directors		
Chair	prof. Ing. Petr SÁHA, CSc.	Vice-Rector for Creative Activities of Tomas Bata University in Zlín
Vice-Chairman	Ing. Dana DRÁBOVÁ, Ph.D.	Chairman of the State Office for Nuclear Safety
	Mgr. František BUREŠ, MBA, LL.M	Member of the Board of Directors and Technical Director of Ukrainian Railways
Members	Ing. Vladimír DLOUHÝ, CSc.	President of the Chamber of Commerce of the Czech Republic
	Ing. Petr DVOŘÁK, MBA	Director General of Czech Television
	Ing. arch. Jan FIBIGER, CSc.	Chairman of the Board of Directors of the Foundation for the Development of Architecture and Construction
	Ing. arch. Jan KASL, JK Architekti spol. s r. o.	Chairman of the Czech Chamber of Architects
	Mgr. Ondřej KOLÁŘ	Mayor of Prague 6
	Mgr. Karel KOMÁREK, st.	Manager and Managing Director of Smart Brain, spol. s r. o.
	Ing. Jaroslav MÍL, MBA	Government Commissioner for Nuclear Energy, Chairman of the Supervisory Board of Elektrárna Temelín II, a. s. and Elektrárna Dukovany II, a. s.
	Ing. Vlastimil PICEK	Mayor of Brandýs nad Labem, Stará Boleslav
	Ing. Jiří RUSNOK	Governor of the Czech National Bank
	RNDr. Jiří SLOVÁK	independent nuclear fuel cycle expert
	Ing. Michaela ŠOJDROVÁ	Member of the European Parliament
	Mgr. Radek VONDRÁČEK	President of the Chamber of Deputies of the Czech Republic
Secretary	Ing. Lucie ORGONÍKOVÁ	CTU Chancellor

Table 1.3.3: CTU Scientific Council		
Chair	doc. RNDr. Vojtěch PETRÁČEK, CSc.	Rector of CTU
Vice-Rector for Scientific and Research Activities	prof. Ing. Zbyněk ŠKVOR, CSc.	FEE
Members	prof. MUDr. Ivan DYLEVSKÝ, DrSc.	Dean of FBME
	prof. Ing. Petr HÁJEK, CSc.	FCE
	doc. Ing. Pavel HRUBEŠ, Ph.D.	Dean of FTS
	prof. Ing. Helena JELÍNKOVÁ, DrSc.	FNSPE
	prof. Ing. Igor JEX, DrSc.	Dean of FNSPE
	prof. Ing. Ondřej JIROUŠEK, Ph.D.	FTS
	prof. Ing. Tomáš JIROUT, Ph.D.	FME
	doc. RNDr. Ing. Marcel JIŘINA, Ph.D.	Dean of FIT
	doc. Ing. Hana KUBÁTOVÁ, CSc.	FIT
	prof. Ing. arch. Ladislav LÁBUS, Hon. FAIA	Dean of FA
	prof. Ing. Jiří MÁCA, CSc.	Dean of FCE
	prof. Ing. Jan MACEK, DrSc.	FME
	doc. Ing. Jaroslav MACHAN, CSc.	FTS
	prof. Ing. Jiří MATAS, Ph.D.	FEE
	prof. MUDr. Leoš NAVRÁTIL, CSc., MBA	FBME
	prof. Mgr. Petr PÁTA	Dean of FEE (change from 1 October 2020)
	prof. Ing. Pavel RIPKA, CSc.	FEE
	prof. MUDr. Jozef ROSINA, Ph.D., MBA	Dean of FBME (change from 1 October 2020)
	prof. Ing. Zbyněk ŠKVOR, CSc.	FEE, Vice-Rector for Scientific and Research Activities
	prof. Ing. Pavel TVRDÍK, CSc.	FIT
	prof. Ing. Michael VALÁŠEK, DrSc.	Dean of FME
	prof. Ing. František WALD, CSc.	FCE
	prof. Ing. arch. Zdeněk ZAVŘEL, dr. h. c.	FA
	prof. Dr. Ing. Zdeněk HANZÁLEK	CIIRC
	doc. Dr. Ing. Martin POSPÍŠIL, Ph.D.	FA

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Table 1.3.3: CTU Scientific Council		
External members	prof. RNDr. Miroslav DOUPOVEC, CSc., dr. h. c.	TU Brno
	Ing. Dana DRÁBOVÁ, Ph.D., dr.h.c.	SONS, Chair
	prof. Ing. Rostislav DROCHYTKA, CSc., MBA	Brno University of Technology
	prof. Ing. Jiří HOMOLA, CSc., DSc.	IFE CAS
	Ing. Arch. Jan KASL	Czech Chamber of Architects
	prof. RNDr. Jan KRATOCHVÍL, CSc.	MFF UK, Dean
	Dr. František KRAUS, Dr. Sc.	Wiss Adjunct ETH Zurich
	prof. Ing. Alois MATERNA, CSc.	MBA, TU Ostrava
	prof. Ing. Petr NOSKIEVIČ, CSc.	TU Ostrava
	prof. Ing. Ivo PROVAZNÍK, Ph.D.	TU Brno
	prof. Ing. arch. Jaroslav SAFER	Czech Chamber of Architects
	doc. Ing. Libor ŠVADLENKA, Ph.D.	DF UPCE, Dean
	prof. Dr. Ing. Pavel ZEMČÍK	Brno University of Technology
Extraordinary members	prof. PhDr. Vladimíra DVOŘÁKOVÁ, CSc.	MIAS Director (change from 1 October 2020)
	prof. Dr. ir. Dr. Henri Hubertus ACHTEN	FA
	prof. Ing. Zdeněk BITTNAR, DrSc.	FCE
	prof. Dr. Ing. Vladimír BLAŽEK	RWTH Aachen
	doc. PaedDr. Jiří DRNEK, CSc.	IPES Director
	doc. Ing. Lukáš FERKL, Ph.D.	Director of UCEEB
	prof. Ing. František HRDLIČKA, CSc.	FME
	prof. Ing. Stanislava HRONOVÁ, CSc.	University of Economics in Prague
	doc. Ing. Jiří KOLÍSKO, Ph.D.	Director of KI
	prof. RNDr. Bohumil KRATOCHVÍL, DSc.	UCHT
	prof. Ing. Karel MELZOCH, CSc.	UCHT
	RNDr. Michael PROUZA, Ph.D.	AS CZ
	prof. RNDr. Karel ŠAFAŘÍK, CSc.	FNSPE
	doc. Ing. Ivan ŠTEKL, CSc.	ITEF, Director
Rectors Emeritus of CTU	prof. Ing. Petr KONVALINKA, CSc., FEng.	FCE, Rector Emeritus
	prof. Ing. Václav HAVLÍČEK, CSc.	FEE, Rector Emeritus
	prof. Ing. Jiří WITZANY, DrSc.	FCE, Rector Emeritus
	prof. Ing. Petr ZUNA, CSc., D.Eng. h. c., FEng.	FME, Rector Emeritus

Table 1.3.4: CTU Academic Senate		
Chairman	doc. Ing. Jan JANOUŠEK, Ph.D.	FIT
Vice-Chairman – staff	Ing. arch. Dana MATĚJOVSKÁ, Ph.D.	FA
Vice-Chairman – student	Ing. Michal FARNÍK	FNSPE
Chairman of the Legislative Committee	Mgr. Veronika VYMĚTALOVÁ, Ph.D.	FBME (change from 8 January 2020)
Chairman of the Economic Commission	prof. Ing. Pavel RIPKA, CSc.	FEE (change from 8 January 2020)
Chairman of the Development and Quality Committee	prof. Ing. Václav HLAVÁČ, CSc.	CIIRC
Chairman of the Commission for Pedagogical Affairs	RNDr. Jiří ŠRUBAŘ, Ph.D.	FA
Chairman of the Commission for SUS	Bc. Lukáš KULIČKA	FNSPE (change from 8 January 2020)
Chairman of the Student Committee	Bc. Adolf VALÁŠEK	FME (change from 8 January 2020)
Chairman of the Information Strategy Committee	prof. Dr. Ing. Jan KYBIC	FEE
Chairman of the Commission for Science, Creative Activity and Doctoral Studies, Assoc.	Dr. Ing. Ivan RICHTER	FNSPE
Members of the Academic Senate, Assoc.	Ing. Josef JETTMAR, CSc.	FCE (change since 8 January 2020)
	prof. Ing. Jan TYWONIAK, CSc.	FCE (change since 8 January 2020)
	prof. Ing. František WALD, CSc.	FCE (change since 8 January 2020)
	Ing. Michal MÁRA	FCE
	Ing. Jakub HOLAN	FCE (change since 8 January 2020)
	doc. Ing. Václav BAUMA, CSc.	FME
	prof. Ing. František HRDLIČKA, CSc.	FME, Chairman of the AS Economic Commission
	Ing. Karel VÍTEK, CSc.	FME (change from 8 January 2020)
	Bc. Jiří SVOBODA	FME (change since 8 January 2020)
	Bc. Adolf VALÁŠEK	FME (change since 8 January 2020)
	RNDr. Ilona Ali BLÁHOVÁ, Ph.D.	FEE
	prof. Ing. Pavel RIPKA, CSc.	FEE (change since 8 January 2020)
	Bc. Petra FRIDRICHOVÁ	FEE (change since 8 January 2020)
	Bc. Jakub SLÁMA	FEE (change from 8 January 2020)
	Ing. Petr AMBROŽ, Ph.D.	FNSPE (change since 8 January 2020)
	doc. Mgr. Jaroslav BIELČÍK, Ph.D.	FNSPE (change since 8 January 2020)

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Table 1.3.4: CTU Academic Senate

Members of the Academic Senate, Assoc.	doc. Dr. Ing. Ivan RICHTER	FNSPE (change since 8 January 2020)
	Ing. Michal FARNÍK	FNSPE (change since 8 January 2020)
	Bc. Lukáš KULIČKA	FNSPE (change since 8 January 2020)
	doc. Ing. arch. Dalibor HLAVÁČEK, Ph.D.	FA
	Ing. arch. Dana MATĚJOVSKÁ, Ph.D.	FA, Vice-Chair of the AS
	RNDr. Jiří ŠRUBAŘ, Ph.D.	FA, Chair of the AS Committee for Educational Affairs
	Bc. Marek WAGNER	FA
	Ing. Arch. Kristýna SCHULZOVÁ	FA (change from 8 January 2020)
	Mgr. Jitka HEŘMANOVÁ	FTS (change since 8 January 2020)
	Ing. Tomáš DOKTOR	FTS
	Ing. Luboš NOUZOVSKÝ, Ph.D.	FTS (change since 8 January 2020)
	Ing. Michaela NEUHÄSEROVÁ	FTS (change since 8 January 2020)
	Ing. Petr RICHTER	FTS (change since 8 January 2020)
	Ing. Yulia ČUPROVÁ, Ph.D.	FBME
	Ing. Jan KAŠPAR	FBME
	Mgr. Veronika VYMĚTALOVÁ, Ph.D.	FBME
	Ing. Tomáš POKORNÝ	FBME
	Hana PROTIVOVÁ	FBME
	PhDr. Ing. Tomáš EVAN, Ph.D.	FIT
	Ing. Lukáš BAŘINKA	FIT (change from 8 January 2020)
	doc. Ing. Jan JANOUŠEK, Ph.D.	FIT, AS President
	Ing. Stanislav JEŘÁBEK	FIT
	Ing. Jan ŘEZNÍČEK	FIT (change from 8 January 2020)
	prof. Ing. Václav HLAVÁČ, CSc.	CIIRC, Chairman of the AS Commission for Development and Quality
	Mgr. Libor VYKYDAL	IPES (change from 8 January 2020)
	Ing. Bc. Pavel ANDRES, Ph.D., ING. PAED. IGIP	MIAS
	Bc. Jozef ŠEBÁK	MIAS, member of the AS student committee
	Jan MIKEŠ	member of the AS Student Committee, FEE (change from 8 January 2020)

Table 1.3.5: Disciplinary Commission	
Chair Members – academic	Ing. Petr TEJ, Ph.D. (KI)
	Ing. Dagmar ČÁMSKÁ, Ph.D. (MIAS)
Chair Members – students	Ing. Petr KNĚŽ (KI)
	Daniel LAPOSA (MIAS)
Alternates – academic	doc. Ing. Petr BOUŠKA, CSc. (KI)
	doc. Ing. Vít POŠTA, Ph.D. (MIAS)
Substitutes – students	Ing. Tomáš BITTNER (KI)
	Bc. Kryštof ŠULC (MIAS)

Table 1.3.6: Ethics Committee	
Chair	prof. Ing. František WALD, CSc. (FCE)
Members	prof. Ing. Jan HOLUB, Ph.D. (FIT, FEE)
	prof. Ing. Václav JIRKOVSKÝ, CSc. (FEE, CIIRC)
	prof. RNDr. Bohumil KRATOCHVÍL, DrSc. (UCHT)
	prof. RNDr. Ivo KRAUS, CSc. (FNSPE)
	doc. RNDr. Pavla POUČKOVÁ, CSc. (FBME)
	prof. Ing. Olga ŠTĚPÁNKOVÁ, CSc. (FEE, CIIRC)

Table 1.3.7: Internal Evaluation Board	
Chair	doc. RNDr. Vojtěch PETRÁČEK, CSc. (Rector of CTU)
Vice-Chair	prof. Ing. Petr HÁJEK, CSc. (FCE)
Members	prof. RNDr. Bohumil KRATOCHVÍL, DrSc. (UCHT)
	doc. Ing. Daniel MÜNICH, Ph.D. (FEE)
	Ing. Tomáš SMEJKAL (FNSPE)
	prof. Ing. Vladimír KUČERA, DrSc., dr. h. c. (CIIRC)
	doc. Ing. Antonín POKORNÝ, CSc. (FA)
	doc. Ing. Jiří JAKOVENKO, Ph.D. (FEE)
	prof. MUDr. Jozef ROSINA, Ph.D., MBA (FBME)
	prof. Ing. František HRDLIČKA, CSc. (FME)
	prof. Ing. Josef JÍRA, CSc. (FTS)
	doc. Ing. Miroslav ČECH, CSc. (FNSPE)
	prof. Ing. Pavel TVRDÍK, CSc. (FIT)
	doc. Ing. Jan JANOUŠEK, Ph.D. (FIT)
	prof. Ing. Jan MACEK, DrSc. (FCE)
Secretary	Ing. Bc. Josef SVOBODA, Ph.D. (R CTU)

1.4 CTU Presence in the Czech Universities Representation

Czech Rectors' Conference
doc. RNDr. Vojtěch PETRÁČEK, CSc. (Rector of CTU)

CTU Delegates in the Council of Universities Board
Ing. Michal FARNÍK (FNSPE)
RNDr. Petr OLŠÁK (FIT, FEE)

Members of the Assembly
RNDr. Petr OLŠÁK (FIT, FEE)
doc. Ing. Jiří CAJTHAML, Ph.D. (FCE)
prof. Ing. arch. Michal KOHOUT (FA)
prof. MUDr. Leoš NAVRÁTIL, CSc. (FBME)
Ing. Jakub HOSPODKA, Ph.D. (FTS)
doc. Ing. Hana KUBÁTOVÁ, CSc. (FIT)
doc. Mgr. Milan KRBÁLEK, Ph.D. (FNSPE)
prof. Ing. Michal POLÁK, CSc. (FME)
prof. Ing. Zbyněk ŠIKA, Ph.D. (FME)

Legislative Working Committee
Bc. Barbora KULTOVÁ (CIC)
RNDr. Petr OLŠÁK (FIT, FEE)

Working Committee on Economics
doc. Ing. Jiří CAJTHAML, Ph.D. (FCE)

Working Commission for Educational Activities
doc. Ing. Jiří CAJTHAML, Ph.D. (FCE)

Working Committee for Scientific Activities
prof. Ing. arch. Michal KOHOUT (FA)
doc. Mgr. Milan KRBÁLEK, Ph.D. (FNSPE)
prof. MUDr. Leoš NAVRÁTIL, CSc. (FBME)
prof. Ing. Michal POLÁK, CSc. (FCE)
prof. Ing. Zbyněk ŠIKA, Ph.D. (FTS)

Working Committee on Strategy and Development in Higher Education
Bc. Barbora KULTOVÁ (CIC)

Working Commission on Quality of Higher Education Institutions and its Evaluation
prof. Ing. arch. Michal KOHOUT (FA)
doc. Ing. Hana KUBÁTOVÁ, CSc. (FIT)
prof. MUDr. Leoš NAVRÁTIL, CSc., MBA (FBME)

Working Committee for External and Foreign Relations
doc. Jakub HOSPODKA, Ph.D. (FTS)

Student Chamber of the Council of Universities
Ing. Michal FARNÍK, Delegate (FNSPE)
Bc. Barbora KULTOVÁ, Alternate (CIC)

Table 2.1: Accredited study programmes (numbers)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Civil Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	10				10		17	12	49
Faculty total	X	10				10		17	12	49
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04					1	1			2
Technology, manufacturing and construction	07	3	3			15	9	6	6	42
Faculty total	X	3	3			16	10	6	6	44
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04							1	2	3
Natural Sciences, Mathematics and Statistics	05							2	1	3
Information and communication technologies	06	3	1			3		4		11
Technology, manufacturing and construction	07	9	1			13	1	6	4	34
Faculty total	X	12	2			16	1	13	7	51
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	1	1			2		2	2	8
Faculty total	X	1	1			2		2	2	8
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07							2	1	3
Services	10	1	2			6	2	4	5	20
Faculty total	X	1	2			6	2	6	6	23
Faculty of Nuclear and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	9				15		2	2	28
Information and communication technologies	06	1				1				2
Technology, manufacturing and construction	07					1		3	2	6
Health and social care, care for favourable living conditions	09	1								1
Faculty total	X	11				17		5	4	37
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Humanities	02	2				2		1		5
Technology, manufacturing and construction	07	3				2		2	2	9
Faculty total	X	5				4		3	2	14

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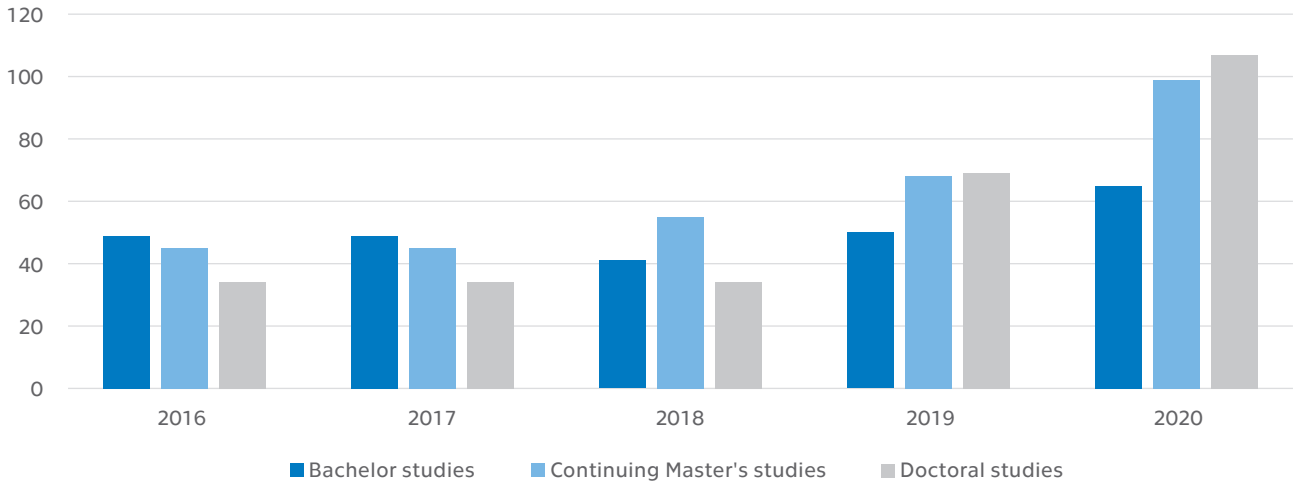
Table 2.1: Accredited study programmes (numbers)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	1				1		1	1	4
Technology, manufacturing and construction	07	1	1			1	1	1	1	6
Health and social care, care for favourable living conditions	09	6				4	1	1	1	13
Services	10	1	1			2	2	2	2	10
Faculty total	X	9	2			8	4	5	5	33
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		1							1
Arts and Humanities	02							1	1	2
Business, Administration and Law	04	2				2	1	1	1	7
Technology, manufacturing and construction	07							1	1	2
Total	X	2	1			2	1	3	3	12
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		1							1
Arts and Humanities	02	2				2		2	1	7
Business, Administration and Law	04	2				3	2	2	3	12
Natural Sciences, Mathematics and Statistics	05	9				15		4	3	31
Information and communication technologies	06	6	2			7		7	3	25
Technology, manufacturing and construction	07	26	5			42	11	38	29	151
Health and social care, care for favourable living conditions	09	7				4	1	1	1	14
Services	10	2	3			8	4	6	7	30
UNIVERSITY TOTAL	X	54	11			81	18	60	47	271

Note: * Faculty or other part of the university implementing the accredited study programme

FT = full-time
PT/DL = part-time / distance learning

ACCREDITED STUDY PROGRAMMES – Bc., NMgr., Ph.D. STUDIES (NUMBERS)



STUDY PROGRAMMES IN A FOREIGN LANGUAGE (NUMBERS)

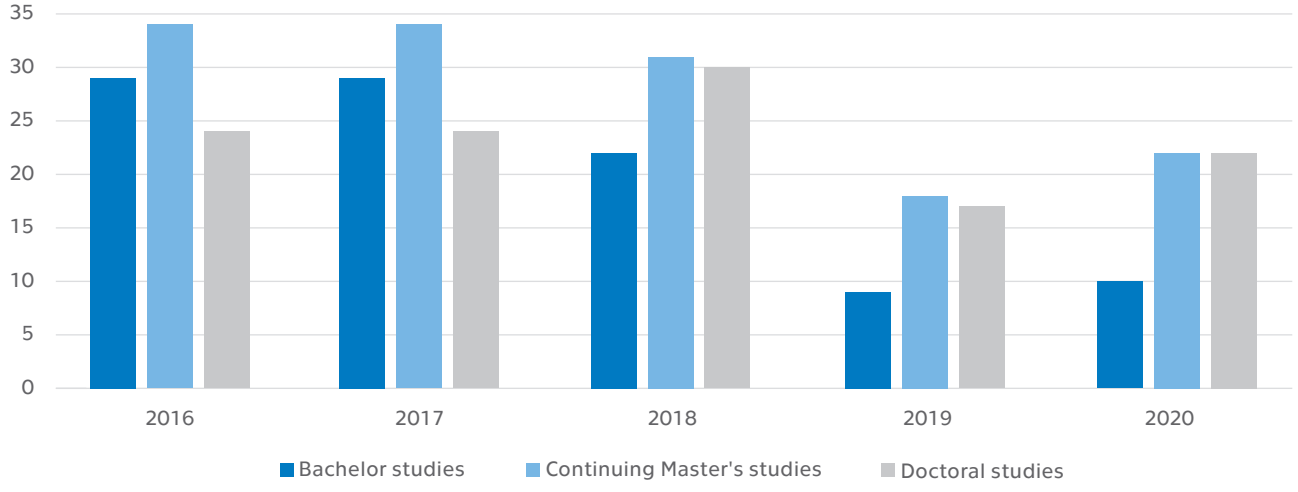


Table 2.2: Study programmes in a foreign language (numbers)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Civil Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	2				1		5	2	10
Faculty total	X	2				1		5	2	10
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	2				5		1		8
Faculty total	X	2				5		1		8
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04								1	1
Natural Sciences, Mathematics and Statistics	05							1		1
Information and communication technologies	06					1		2		3
Technology, manufacturing and construction	07	2				5		2	2	11
Faculty total	X	2				6		5	3	16
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	1				1				2
Faculty total	X	1				1				2
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Services	10	1				3				4
Faculty total	X	1				3				4
Faculty of Nuclear and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05					2			1	3
Technology, manufacturing and construction	07							2	1	3
Faculty total	X					2		2	2	6

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Table 2.2: Study programmes in a foreign language (numbers)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07					1		1	1	3
Faculty total	X					1		1	1	3
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	1				1				2
Health and social care, care for favourable living conditions	09	1				2				3
Faculty total	X	2				3				5
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04								1	1
Natural Sciences, Mathematics and Statistics	05					2		1	1	4
Information and communication technologies	06	1				2		2		5
Technology, manufacturing and construction	07	7				13		11	6	37
Health and social care, care for favourable living conditions	09	1				2				3
Services	10	1				3				4
UNIVERSITY TOTAL	X	10				22		14	8	54

Note: * Faculty or other part of the university implementing the accredited study programme

FT = full-time
PT/DL = part-time / distance learning

Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Faculty of Civil Engineering	
Programme name 1	Study program Civil Engineering, Advanced Master's in Structural Analysis of Monuments and Historical Constructions
Partner organisations	University of Minho, Portugal Technical University of Catalonia, Spain University of Padova, Italy
Associated organisations	Institute of Theoretical and Applied Mechanics of the CAS
Start of programme implementation	2008
Type of programme (Joint/Double/Multiple Degree)	Multiple Degree
Length of study (semesters)	2
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Credit system of study – 30 credits/semester, admissions are administratively handled by the consortium secretariat at the University of Minho. The final admission decision is made by the Consortium Executive Board, which includes representatives from all participating institutions. Completion by state final examination at the CTU and the foreign university. See www.msc-sahc.org for details.
How are the diploma and diploma supplement issued?	The diploma and the supplement to the diploma are always issued by 2 institutions (the university where the student has completed the coursework and the university where the student has prepared and defended the DP).
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	4
Programme name 2	Study program Civil Engineering, Double Degree Master Program in Civil Engineering
Partner organisations	École Nationale Des Ponts et Chaussées (ENPC), France
Associated organisations	not
Start of programme implementation	2006
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Credit system of study – 30 credits/semester, admission procedure – joint selection procedure at CTU and ENPC, ending with the defence of diploma thesis at ENPC + SSE at CTU.
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	1

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Programme name 3	Study program Civil Engineering, Double Degree Master Program in Civil Engineering
Partner organisations	Technische Universität München, Germany Fakultät für Bauingenieur- und Vermessungswesen, Germany
Associated organisations	not
Start of programme implementation	2009
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Credit system of study – 30 credits/semester, selection of students by both universities, individual study plan, completion by state final exam at both universities.
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	0
Programme name 4	Study program Civil Engineering, Double degree Master Program in Civil Engineering
Partner organisations	École Centrale de Nantes, France
Associated organisations	not
Start of programme implementation	2010
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Selection of students by both universities, individual study plan, graduation by thesis defence and SSE.
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	0

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Programme name 5	Study program Civil Engineering, Sustainable Constructions under Natural Hazard and Catastrophic Events
Partner organisations	University of Coimbra (UC), Portugal Luleå University of Technology (LTU), Sweden Politehnica University of Timisoara (PUT), Romania University of Liège (Ulg), Belgium University of Naples Federico II, Italy
Associated organisations	Universidade do Estado do Rio de Janeiro, Brazil Moscow State University of Civil Engineering, Russian Federation ArcelorMittal Global R&D, Luxembourg European Convention for Constructional Steelwork, Belgium Donbas National Academy of Civil Engineering and Architecture, Ukraine Tongji University, China Kyrgyz State University of Construction, Transport and Architecture, Kyrgyzstan Univerza v Ljubljani, Slovenia Associação Portuguesa de Construção Metálica e Mista, Portugal University of Mosul, Iraq
Start of programme implementation	9. 1. 2012
Type of programme (Joint/Double/Multiple Degree)	Multiple Degree
Length of study (semesters)	3
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Credit system of study: 30 credits/semester. Applications accepted until 15 January, selection of consortium committees until 28 February. Teaching one semester at the partner university, second semester at another partner university, theses equally at all partner universities. Universities alternate teaching first and second semesters. Thesis defences in January of the last semester at the university where the students studied. Final training camp and state exams at the Czech Technical University in Prague in February of the last semester.
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	0
Programme name 6	Stavební inženýrství, Double Degree Master Program in Civil Engineering
Partner organisations	KTH Royal Institute of Technology, Stockholm, Sweden
Associated organisations	not
Start of programme implementation	2010
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Selection of students by both universities, individual study plan, graduation by thesis defence and SSE.

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	2
Programme name 7	Study program Civil Engineering, Double degree Master Program in Civil Engineering
Partner organisations	RWTH Aachen, Aaachen, Germany, Faculty of Civil Engeneering
Associated organisations	not
Start of programme implementation	2016
Type of programme (Joint/Double/Multiple Degree)	double degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Selection of students by both universities, individual study plan, graduation by thesis defence and SSE.
How are the diploma and diploma supplement issued?	Diploma and Diploma Supplement issued by individual universities.
How are student exchanges implemented?	Exchanges are not organised. Students are admitted on the basis of a common selection procedure.
Number of active studies as of 31. 12.	3
Faculty of Mechanical Engineering	
Programme name 1	Master of Automotive Engineering
Partner organisations	Ensta Bretagne, France, TU Chemnitz, Germany, IT Bandung, Indonesia, HAN, Netherlands
Associated organisations	IFP, France
Start of programme implementation	2010
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The standard admission procedure for the 1st year of study is carried out at the CTU's Faculty of Science and Technology, and students go to partner schools for the 2nd year. At partner schools it is the other way around – students at CTU arrive only for the 2nd year. Qualification thesis defenses take place at the partner schools, but the SSE take place according to our standards at the CTU in Prague.
How are the diploma and diploma supplement issued?	The Diploma Supplement is issued in accordance with the Czech legislation, indicating all courses taken at FS CTU in Prague and with a summary reference to the completion of part of the DD programme at the partner school.
How are student exchanges implemented?	The exchange of students is handled by the Programme Board, made up of representatives of all participating schools, which also sets the conditions under which the exchange can take place. Within the EU, exchange is also supported by the Erasmus+ programme.
Number of active studies as of 31. 12.	60

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Faculty of Mechanical Engineering	
Programme name 1	Master of Automotive Engineering
Partner organisations	Ensta Bretagne, France, TU Chemnitz, Germany, IT Bandung, Indonesia, HAN, Netherlands
Associated organisations	IFP, France
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Number of active studies as of 31. 12.	60
Faculty of Electrical Engineering	
Programme name 1	Erasmus Mundus Master Course – Joint European Master in Space Science and Technology (SpaceMaster)
Partner organisations	Luleå University of Technology (LTU), Sweden Julius-Maximilian's University of Würzburg (JMUW), Germany Cranfield University (CU), United Kingdom Aalto University (Aalto), Finland Université Paul Sabatier Toulouse III (UPS), France University of Tokyo (Todai), Japan Utah State University (USU), USA
Associated organisations	Swedish Institute of Space Physics (IRF), Sweden Swedish Space Corporation (SSC), Sweden European Incoherent Scatter Scientific Association (EISCAT), Norway Honeywell s.r.o. (Honeywell), Czech Republic European Aeronautics Defence and Space Company, Innovation Works Division (EADS), France
Start of programme implementation	SpaceMaster I – 2005–2009 SpaceMaster II – 2010–2014
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Description of the organisation of studies, including admission and termination	Admission procedure: Based on set criteria, students are evaluated and a ranking is made. Depending on the amount of funding, some students are awarded scholarships. The evaluation criteria for students are as follows: results of the Bachelor's degree programme, professional experience, study abroad experience. In addition, where the student obtained his/her bachelor's degree is taken into account. Universities that are on the list compiled from „The Academic Ranking of World Universities (ARWU – 2009)", „THES-QS World University Rankings 2007" and „Third European Report on S&T Indicators 2003" are considered excellent and are rated with a factor of 1.2 compared to other universities that have a factor of 1. Study organisation. Students study in the first semester at JMUW in Germany and in the second semester at LTU in Sweden. In the second year of study, each student can choose where to continue his/her studies from all partner universities. In the fourth semester, students mainly work on their theses, usually at the university they have chosen for their second year of study. However, some students may work in the fourth semester on a thesis commissioned by an affiliated member. Another option is to work on a thesis at USU or Todai in the fourth semester. Students always have at least two supervisors for their thesis, one from the university they have chosen for their second year of study, the other from LTU, which is the main coordinator of the program. Completion of the study: the study is concluded with the defense of the thesis. At the CTU, successful completion of studies is also conditional on passing the state examination. This is carried out at the same time as the defence of the diploma thesis, and a representative of LTU is always present in the committee as the opponent of the diploma thesis.
How are the diploma and diploma supplement issued?	Each student who has fulfilled the requirements for the award of the diploma will receive a diploma from the university of the main coordinator of the programme – LTU. A second diploma will be awarded from the partner university where he/she studied in the second year of his/her studies. The diplomas are awarded at a ceremony organised by one of the partner universities in the autumn. At CTU, the diploma is issued in both Czech and English and also a supplement in both languages.
How are student exchanges implemented?	Each year, around 200 students from all over the world apply for the SpaceMaster programme. Approximately 80 students are accepted through the admissions process, of which about 15 are awarded a scholarship. The rest pay their own study costs, including tuition fees, or are supported by various educational programmes in their countries. The exchange of students is described in the previous point.
Number of active studies as of 31. 12.	13
Programme name 2	Power Generation and Transportation
Partner organisations	Tomsk Polytechnic University (TPU), Russian Federation
Associated organisations	not
Start of programme implementation	2011
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	6
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Description of the organisation of studies, including admission and termination	Admissions are organised by the sending university. The first year of study for Russian students and Czech students is at TPU. The second year of study for Russian students is in the Czech Republic and the third year again at TPU. Czech students continue their studies for two years at CTU. Russian students work on the economic part of the thesis in the Czech Republic, Czech students work on the technical part of the thesis in Russia. The assignment of the thesis is consulted by both parties. The defence of the diploma thesis takes place before a joint committee.
How are the diploma and diploma supplement issued?	Every student who has fulfilled the requirements for the award of the diploma will receive a diploma from their home university. A second diploma will be awarded from the partner university where he/she completed a year of study. At CTU, the diploma is issued in both Czech and English and also a supplement in both languages..
How are student exchanges implemented?	There is a selection process at the universities. In the first year of the run, the capacity was limited to 10 students per side. The expected target is 20 students from each side. The number of students is expected to be mutually balanced.
Number of active studies as of 31. 12.	21
Programme name 3	Double degree program s National Taiwan University of Science and Technology
Partner organisations	National Taiwan University of Science and Technology), DECE (Department of Electronic and Computer Engineering
Associated organisations	not
Start of programme implementation	2015
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	5
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The study is divided into five semesters, three of which are spent at the student's home university (CTU) and two at the partner university (NTUST). At the partner university, the student will take pre-selected courses that will be recognised at the home university. The entire study at the partner university, including the thesis defence, is conducted in English. The joint master's thesis is prepared at both universities in English.
How are the diploma and diploma supplement issued?	Every student who has fulfilled the requirements for the award of the diploma will receive a diploma from their home university. A second diploma will be awarded from the partner university where he/she completed a year of study. Upon graduation, the student will receive an Engineer (Ing.) degree from the Czech Technical University in Prague and a Master of Science (M.Sc.) degree from NTUST.
How are student exchanges implemented?	There is a selection process at the universities. Capacity is limited to 5 students per side. The expected target is 10 students from each side. The number of students is expected to be mutually balanced.
Number of active studies as of 31. 12.	6
Programme name 4	Double degree s RWTH Aachen
Partner organisations	RWTH Aachen

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Associated organisations	not
Start of programme implementation	2015
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	5
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The admission of students is done by both CTU FEL and RWTH Aachen. The studies are divided into five semesters, three of which are spent at the student's home university (CTU) and two at the partner university (RWTH). The student will spend three semesters at the partner university and take pre-selected courses that will be recognized at the home university. The entire study at the partner university, including the thesis defence, is conducted in English. The joint master's thesis is produced at both universities in English.
How are the diploma and diploma supplement issued?	Every student who has fulfilled the requirements for the award of the diploma will receive a diploma from their home university. A second diploma will be awarded from the partner university where he/she completed a year of study. At CTU, the diploma is issued in both Czech and English and also a supplement in both languages.
How are student exchanges implemented?	There is a selection process at the universities. Capacity is limited to 5 students per side. The number of students is assumed to be mutually balanced.
Number of active studies as of 31. 12.	5
Programme name 5	Double degree s Kazan Federal University
Partner organisations	Kazan Federal University
Associated organisations	not
Start of programme implementation	2018
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	5
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The admission of students is done by CTU FEL and KFU. The study is divided into five semesters, three of which the student spends at his/her home university (CTU) and two at the partner university (KFU). The student will spend two semesters at the partner university and will take pre-selected courses that will be recognised at the home university. The entire study at the partner university, including the thesis defence, is conducted in English. The joint master's thesis is prepared at both universities in English.
How are the diploma and diploma supplement issued?	Every student who has fulfilled the requirements for the award of the diploma will receive a diploma from their home university. A second diploma will be awarded from the partner university where he/she completed a year of study. At CTU, the diploma is issued in both Czech and English and also a supplement in both languages..
How are student exchanges implemented?	There is a selection process at the universities. Capacity is limited to 8 students per side. The number of students is assumed to be mutually balanced.
Number of active studies as of 31. 12.	12

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Programme name 6	Double degree program EURECOM, France
Partner organisations	Graduate School and Research Center in Digital Sciences, BIOT, Sophia Antipolis, France
Associated organisations	Mobile Computing Systems
Start of programme implementation	2019
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	5
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The study is divided into five semesters, the first two of which are spent at the CTU, the next two at EURECOM University in France and the last semester is spent on a thesis in the company or at one of the two universities. If the student works on the thesis in the company and chooses a topic from the range of topics provided by companies cooperating with EURECOM, he/she is paid a remuneration by the company for the duration of the thesis (in the order of thousands of EUR for the whole thesis). If the student does not have a certificate of English language proficiency of at least B2 level, he/she must obtain it at the latest during his/her studies in France in order to be awarded the French diploma. Accepted certificates and scores are: TOEFL: 550 (PBT), 213 (CBT), 79-80 (IBT), IELTS 5.5, TOEIC 750, and Cambridge CAE. The thesis is written in English and defended at both universities. Students must earn at least 150 ECTS credits (including the thesis) during their studies. The recommended course of study is given in the Passing Table. All study in France, including the thesis defence, is conducted in English.
How are the diploma and diploma supplement issued?	Upon graduation, the student will receive the degree of Engineer (Ing.) from the Czech Technical University in Prague and the degree of Master of Science (M.Sc.) from EURECOM. The diploma is issued in both Czech and English and also a supplement in both languages.
How are student exchanges implemented?	There is a selection process at the universities. Capacity is limited to 8 students per side. The number of students is assumed to be mutually balanced.
Number of active studies as of 31. 12.	1
Faculty of Transportation Sciences	
Programme name 1	Intelligent Transport Systems
Partner organisations	Linköpings universitet, Sweden
Associated organisations	not
Type of programme (Joint/Double/Multiple Degree)	Joint Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Description of the organisation of studies, including admission and termination	Admitted students can apply for the Joint-Degree programme „IS – Intelligent Transport Systems". Applicants must complete all 60 credits for all 1st year courses according to the recommended timetable for the study of „IS – Intelligent Transport Systems". Graduates of a study programme carried out in cooperation with a foreign university are awarded the academic title of ‚Engineer' (abbreviated as ‚Ing.' before their name) in accordance with Section 46(4) of the Act, as well as the academic title of the foreign university in accordance with the legislation in force in the country concerned. The cooperating foreign higher education institution is indicated in the Czech and English language diploma of the CTU.
How are the diploma and diploma supplement issued?	Graduation
How are student exchanges implemented?	Based on the contract of the CTU in Prague Faculty of Transportation Sciences with the student.
Number of active studies as of 31. 12.	7
Programme name 2	Smart Cities
Partner organisations	The University of Texas at El Paso
Associated organisations	not
Start of programme implementation	academic year 2020/2021
Type of programme (Joint/Double/Multiple Degree)	Dual-Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The Smart Cities study programme is a two-year (4 semesters) programme. Study in this programme is in full-time form. The composition of compulsory or optional courses is determined by the recommended curriculum for each semester of study. In order to complete the studies, it is necessary to successfully pass the state final examination, which includes the defence of the diploma thesis. Applicants for the Master's programme „SC – Smart Cities" must fulfil the following conditions: – have an arithmetic average of their previous bachelor's degree results of 1.5 or better – demonstrate English language proficiency of at least B2 level, or TOEFL score of at least 500 (paper-based test), at least 73 (computer-based test) or at least 61 (internet-based test), – successfully pass a motivational entrance interview in English before a committee appointed by CTU FD.
How are the diploma and diploma supplement issued?	Graduation
How are student exchanges implemented?	On the basis of the concluded Memorandum of Understanding (MOU) between CTU and UTEP.
Number of active studies as of 31. 12.	5

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Faculty of Biomedical Engineering	
Programme name 1	CEMACUBE – Common European MAster's CoUrse in Biomedical Engineering (Erasmus Mundus)
Partner organisations	RWTH Aachen, Germany Ghent University, Belgium Free University of Brussels (VUB), Belgium Trinity College Dublin, Ireland University Groningen, Netherlands (coordinator)
Associated organisations	ETH Zürich, Switzerland University of Calabria, Italy Aalborg University, Denmark Université de Technologie Compiègne, France University of Strathclyde, United Kingdom University of Patras, Greece Technical University of Warsaw, Poland
Start of programme implementation	September 2010
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	Graduates of bachelor's degree programmes in engineering are admitted to study. The student spends the first year at one university and the second year at another university. In addition, the final semester may be spent at a third university for the preparation of the thesis. The first year (2 semesters) focuses on general education in biomedical engineering and the study is the same at all partner universities. In the 3rd semester, each university offers several specialisations from which each student can choose. The fourth semester is entirely dedicated to the preparation of the thesis. Students are admitted in two groups: non-EU students and EU students. Applications are sent to the programme secretariat in Groningen. There, the applications are formally checked and evaluated on the basis of the written applications (quality of undergraduate studies, language skills). The best applicants are then ranked according to their undergraduate results, taking into account the GDP of the country concerned. The best applicants are interviewed in person – always by two members of the steering committee together (via Skype). The final examinations (final exams) and the thesis defence take place at the university where the student studied in the 3rd semester. Representatives from the university where the student studied in Year 1, or other interested parties, may attend. The result is valid for all consortium members (the consortium has established harmonisation tables) and serves as the basis for the issue of both Double Degree diplomas. Both diplomas are awarded together. They are valid only together.
How are the diploma and diploma supplement issued?	The CTU diploma and the diploma supplement are issued to those students who have studied at CTU for one full year (first or second) and have successfully passed the final examinations and defended their diploma thesis. Grades from the second school are recognized and transferred to the CTU system.

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
How are student exchanges implemented?	Students spend each year at a different university. Exchanges are organised by the University of Groningen (taking into account the student's choice), the actual move is a matter for the student concerned. In the future, trips to another school are foreseen in order to work on the thesis. FBMI has a number of bilateral agreements to this end.
Number of active studies as of 31. 12.	5
Masaryk Institute of Advanced Studies	
Programme name 1	Innovation Project Management
Partner organisations	Wuhan University of Technology (WUT)
Associated organisations	not
Start of programme implementation	2019
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Length of study (semesters)	6
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The selection of students takes place during the last two years of the Bachelor's degree and the first year of the Master's degree at WUT and MUVS; nominated students must complete all prescribed courses during the first year of the Master's degree at WUT and MUVS, then pass the MUVS entrance examinations in English (B2 level) and mathematics, statistics and economics and pass an interview. At MÚVS, there are three further semesters of study, the selection of the thesis topic, its defence and the final exam (in January).
How are the diploma and diploma supplement issued?	Upon graduation, the student will receive an MSc. degree in Innovation Project Management from the Czech Technical University in Prague and a Master of Science (M.Sc.) degree in Management Science and Engineering from Wuhan University of Technology. The diploma is issued in both Czech and English and also a supplement in both languages.
How are student exchanges implemented?	The first two semesters of study are at Wuhan University of Technology, the following three semesters at MIT and the final semester at WUT. The selection process is conducted in cooperation between the two universities.
Number of active studies as of 31. 12.	0

Summary information on Table 2.3

CTU in Prague	Bachelor's Degree	Master's studies	Continuing Master's studies	Doctoral studies	Total
Number of study programmes	0	0	18	0	18
Number of active studies in the following programmes	0	0	145	0	145

Table 2.4: Accredited study programmes implemented jointly with another university or public research institution* based in the Czech Republic	
CTU in Prague	
Faculty of Mechanical Engineering	
Name of study programme 1	Mechatronics
The broadly defined field of ISCED-F	0714
Partner university/institution*	University of South Bohemia in České Budějovice
Start of programme implementation	2015
Length of study (semesters)	8
Type of programme (bachelor's, postgraduate, master's, doctoral)	Bachelor's
Description of the organisation of studies, including admission and termination	Admission of students and all the student agenda is the responsibility of University of South Bohemia in České Budějovice. At the Faculty of Arts of University of South Bohemia, the entire teaching is also carried out
Number of active studies as of 31. 12.	0
Faculty of Electrical Engineering CTU	
Name of study programme 1	Biomedical Engineering and Informatics
The broadly defined field of ISCED-F	0688
Partner university/institution*	Charles University – 1st Faculty of Medicine
Start of programme implementation	2011
Length of study (semesters)	4
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Description of the organisation of studies, including admission and termination	The study of biomedical engineering and informatics educates specialists for top medical workplaces with sophisticated medical and diagnostic technology. Graduates are qualified to work directly with patients. Admission is by entrance examination. Graduates receive the degree of Ing.
Number of active studies as of 31. 12.	2
Faculty of Architecture	
Name of study programme 1	Landscape Architecture
The broadly defined field of ISCED-F	731
Partner university/institution*	Czech University of Life Sciences
Start of programme implementation	2015
Length of study (semesters)	6 semesters
Type of programme (bachelor's, postgraduate, master's, doctoral)	Bachelor's

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Table 2.4: Accredited study programmes implemented jointly with another university or public research institution* based in the Czech Republic	
CTU in Prague	
Description of the organisation of studies, including admission and termination	The study programme provides students with the basic knowledge, natural, technical, social and cultural, which are prerequisites for the profession of landscape architect. Emphasis is placed on interconnectivity with related disciplines, particularly urban planning, land use planning, architecture and fine arts and ethics. At the same time, the student is informed about the natural processes that significantly influence the creative activities of the landscape architect. Admission is by entrance examination. Graduates receive a B.Sc. The curriculum provides students with the basic knowledge, natural, technical, social and cultural, which are prerequisites for the practice of the profession of landscape architecture. Emphasis is placed on interconnectivity with related disciplines, particularly urban planning, land use planning, architecture and fine arts and ethics. At the same time, the student is informed about the natural processes that significantly influence the creative activities of the landscape architect. Admission is by entrance examination. Graduates receive a B.Sc.
Number of active studies as of 31. 12.	1

Note: * These are, for example, accredited study programmes carried out jointly with the CAS or other public research institutions based in the Czech Republic.

Summary information on Table 2.4					
CTU in Prague	**Bachelor's Degree**	**Master's studies**	**Continuing Master's studies**	**Doctoral studies**	**Total**
Number of study programmes	2	0	1	0	3
Number of active studies in the following programmes	1	0	2	0	3

Table 2.6: Lifelong learning (LLL) courses at the university (number of courses)

CTU in Prague		Career-oriented courses			Courses of interest			U3V	TOTAL
		up to 15 hrs	from 16 to 100 hrs	over 100 hrs	up to 15 hrs	from 16 to 100 hrs	over 100 hrs		
Broadly defined fields of ISCED-F	code								
Programmes and qualifications – general education	00	4	1					2	7
Education and upbringing	01		2						2
Arts and Humanities	02	14	28	19		3		15	79
Social Sciences, Journalism and Information Sciences	03								0
Business, Administration and Law	04		2	2					4
Natural Sciences, Mathematics and Statistics	05	6	52	1				5	64
Information and communication technologies	06	7	31					26	64
Technology, manufacturing and construction	07		7				1	14	22
Agriculture, forestry, fishing and veterinary medicine	08							1	1
Health and social care, care for favourable living conditions	09	1	1	2					4
Services	10							5	5
TOTAL	X	32	124	24	0	3	1	68	252

Table 2.7: Lifelong learning (LLL) courses at the university (number of participants)

CTU in Prague		Career-oriented courses			
		up to 15 hrs	from 16 to 100 hrs	over 100 hrs	up to 15 hod
Broadly defined fields of ISCED-F	code				
Programmes and qualifications – general education	00		49		
Education and upbringing	01				
Arts and Humanities	02	194	290	319	
Social Sciences, Journalism and Information Sciences	03				
Business, Administration and Law	04		19	2	
Natural Sciences, Mathematics and Statistics	05	83	66	207	
Information and communication technologies	06	10	189		
Technology, manufacturing and construction	07			150	
Agriculture, forestry, fishing and veterinary medicine	08				
Health and social care, care for favourable living conditions	09	10		6	
Services	10				
TOTAL*	X	297	613	684	0

Note: * As individuals who may attend more than one course are reported, the total is not the sum of the previous rows or columns, but reflects the actual total number of course participants.

Courses of interest		U3V	TOTAL*	Of which the number of participants who were admitted to accredited study programmes pursuant to Section 60 of the Higher Education Act
from 16 to 100 hrs	over 100 hrs			
		20	69	
			0	
29		420	1,252	
			0	
			21	
		112	468	140
		322	521	
	20	288	458	60
		70	70	
			16	
		15	15	
29	20	1,247	2,890	200

Table 3.1: Students in accredited study programmes (number of studies)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Civil Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	2,105				853		228	175	3,361
Faculty total	**X**	**2,105**				**853**		**228**	**175**	**3,361**
Of which the number of women	X	830				349		81	53	1,313
Of which the number of foreigners	X	314				126		23	11	474
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04					20	4			24
Technology, manufacturing and construction	07	1,293	78			666	41	183	119	2,380
Faculty total	**X**	**1,293**	**78**			**686**	**45**	**183**	**119**	**2,404**
Of which the number of women	X	90	11			73	3	32	18	227
Of which the number of foreigners	X	186	5			114	7	27	15	354
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04							5	3	8
Natural Sciences, Mathematics and Statistics	05							9	1	10
Information and communication technologies	06	747	3			338		52		1,140
Technology, manufacturing and construction	07	1,048	40			389	21	149	110	1,757
Faculty total	**X**	**1,795**	**43**			**727**	**21**	**215**	**114**	**2,915**
Of which the number of women	X	255	8			120	1	21	21	426
Of which the number of foreigners	X	426	3			162	3	65	23	682
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	1,651	149			418		39	24	2,281
Faculty total	**X**	**1,651**	**149**			**418**		**39**	**24**	**2,281**
Of which the number of women	X	221	34			46		2	4	307
Of which the number of foreigners	X	516	17			92		1	4	630
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07							8	16	24
Services	10	750	46			226	71	62	38	1,193
Faculty total	**X**	**750**	**46**			**226**	**71**	**70**	**54**	**1,217**
Of which the number of women	X	147	15			68	14	22	16	282
Of which the number of foreigners	X	209	8			35	10	11	8	281

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Table 3.1: Students in accredited study programmes (number of studies)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Nuclear and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	592				90		16	3	701
Information and communication technologies	06	83				117				200
Technology, manufacturing and construction	07					1		181	87	269
Health and social care, care for favourable living conditions	09	31								31
Faculty total	X	**706**				**208**		**197**	**90**	**1,201**
Of which the number of women	X	251				68		51	21	391
Of which the number of foreigners	X	176				28		37	14	255
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Humanities	02	104				44		8		156
Technology, manufacturing and construction	07	874				436		78	49	1,437
Faculty total	X	**978**				**480**		**86**	**49**	**1,593**
Of which the number of women	X	612				299		39	22	972
Of which the number of foreigners	X	236				128		13	4	381
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	18				12		14	5	49
Technology, manufacturing and construction	07	194	19			40	7	22	27	309
Health and social care, care for favourable living conditions	09	652				67	50	20	11	800
Services	10	96	83			77	141	9	43	449
Faculty total	X	**960**	**102**			**196**	**198**	**65**	**86**	**1,607**
Of which the number of women	X	658	30			114	88	35	30	955
Of which the number of foreigners	X	83	1			20	9	6	6	125
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		163							163
Arts and Humanities	02							1	6	7
Business, Administration and Law	04	407				154	98	1	1	661
Technology, manufacturing and construction	07							13	19	32
Total	X	**407**	**163**			**154**	**98**	**15**	**26**	**863**
Of which the number of women	X	229	75			96	45	2	7	454
Of which the number of foreigners	X	33	3			19	16	2		73

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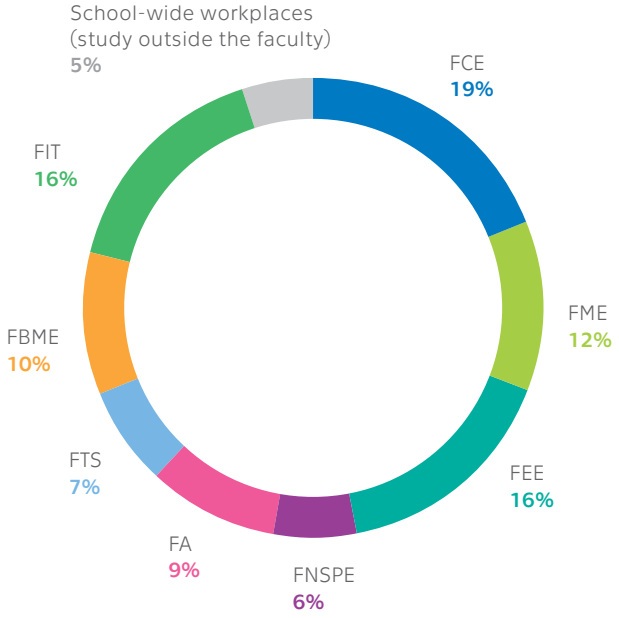
Table 3.1: Students in accredited study programmes (number of studies)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		163							163
Arts and Humanities	02	104				44		9	6	163
Business, Administration and Law	04	407				174	102	6	4	693
Natural Sciences, Mathematics and Statistics	05	592				90		25	4	711
Information and communication technologies	06	2,499	152			885		105	29	3,670
Technology, manufacturing and construction	07	5,514	137			2,385	69	862	602	9,569
Health and social care, care for favourable living conditions	09	683				67	50	20	11	831
Services	10	846	129			303	212	71	81	1,642
UNIVERSITY TOTAL	X	10,645	581			3,948	433	1,098	737	17,442
Of which the number of women	X	3,293	173			1,233	151	285	192	5,327
Of which the number of foreigners	X	2,179	37			724	45	185	85	3,255

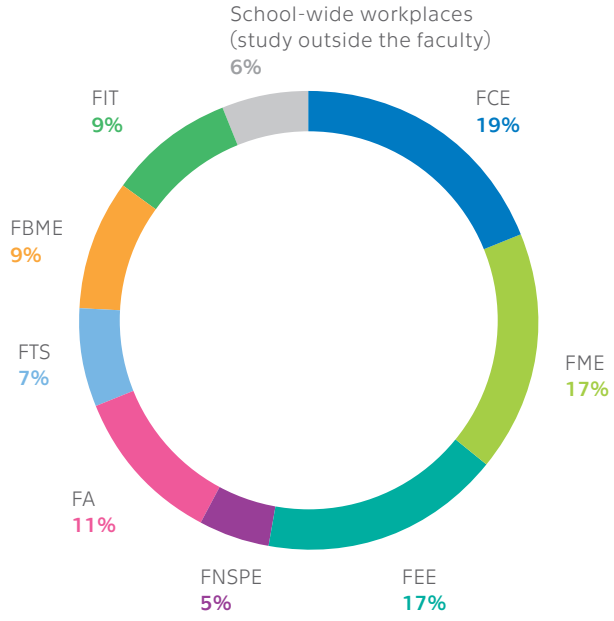
Note: * Faculty or other part of the university implementing the accredited study programme

FT = full-time
PT/DL = part-time / distance learning

STUDENTS IN BACHELOR'S DEGREE PROGRAMMES IN 2020



STUDENTS IN CONTINUING MASTER'S DEGREE PROGRAMMES IN 2020



STUDENTS IN DOCTORAL DEGREE PROGRAMMES IN 2020

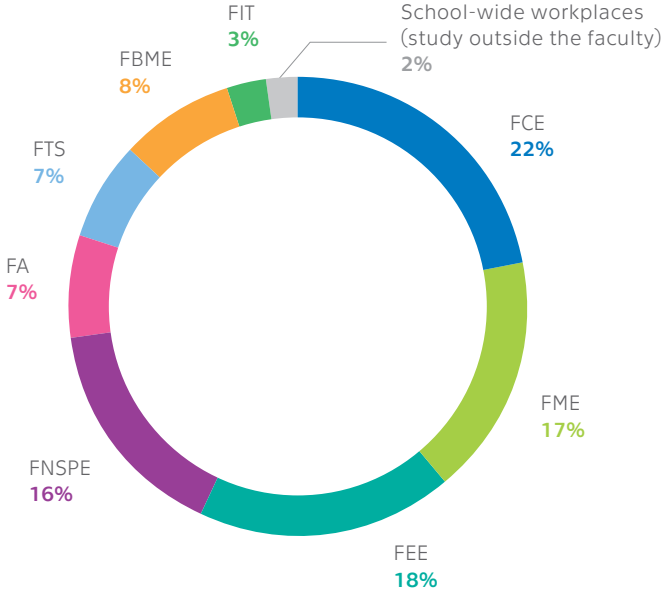


Table 3.2: Self-paying students** (number of studies)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Civil Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	12				8				20
Faculty total	X	12				8				20
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	79				81		1		161
Faculty total	X	79				81		1		161
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06					3				3
Technology, manufacturing and construction	07	57				20			1	78
Faculty total	X	57				23			1	81
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	87				8				95
Faculty total	X	87				8				95
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Services	10	41				1				42
Faculty total	X	41				1				42
Faculty of Nuclear and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05					3				3
Faculty total	X					3				3
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07					8			1	9
Faculty total	X					8			1	9
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	12				2				14
Health and social care, care for favourable living conditions	09	1				2				3
Faculty total	X	13				4				17

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Table 3.2: Self-paying students** (number of studies)

CTU in Prague		Bachelor's studies		Master's studies		Continuing Master's studies		Doctoral studies		TOTAL
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05					3				3
Information and communication technologies	06	87				11				98
Technology, manufacturing and construction	07	160				119		1	2	282
Health and social care, care for favourable living conditions	09	1				2				3
Services	10	41				1				42
UNIVERSITY TOTAL	X	289				136		1	2	428

Note: * Faculty or other part of the university implementing the accredited study programme

Note: ** A self-paying student is a person (student) who pays for his/her studies in a foreign language in full on his/her own and the university does not include him/her in the number of students determining the amount of the state contribution to educational activities.

FT = full-time
PT/DL = part-time / distance learning

Table 3.3: Academic failure* in the first year** of study (%)

CTU in Prague	Bachelor's studies			Mast
	FT	PT/DL	TOTAL	FT
Faculty of Civil Engineering***	32.3	0.0	32.3	
Faculty of Engineering***	31.8	72.4	35.3	
Faculty of Electrical Engineering***	26.0	64.3	27.2	
Faculty of Information Technology***	37.4	69.9	40.7	
Faculty of Transportation Sciences***	44.0	79.3	46.6	
Faculty of Nuclear and Physical Engineering***	45.3	0.0	45.3	
Faculty of Architecture***	25.6	0.0	25.6	
Faculty of Biomedical Engineering***	42.4	13.9	40.3	
School-wide workplaces (study outside the faculty)***	38.8	17.4	34.4	
UNIVERSITY TOTAL	34.6	50.3	35.6	

Note: * Study failure rate is the ratio of the number of studies started in calendar year n to the sum of

Note: ** This refers to all students who enrolled to study at the university in the calendar year n, ať jde o poprvé zapsané na vysokou školu či nikoliv.

Note: *** Faculty or other part of the university implementing the accredited study programme

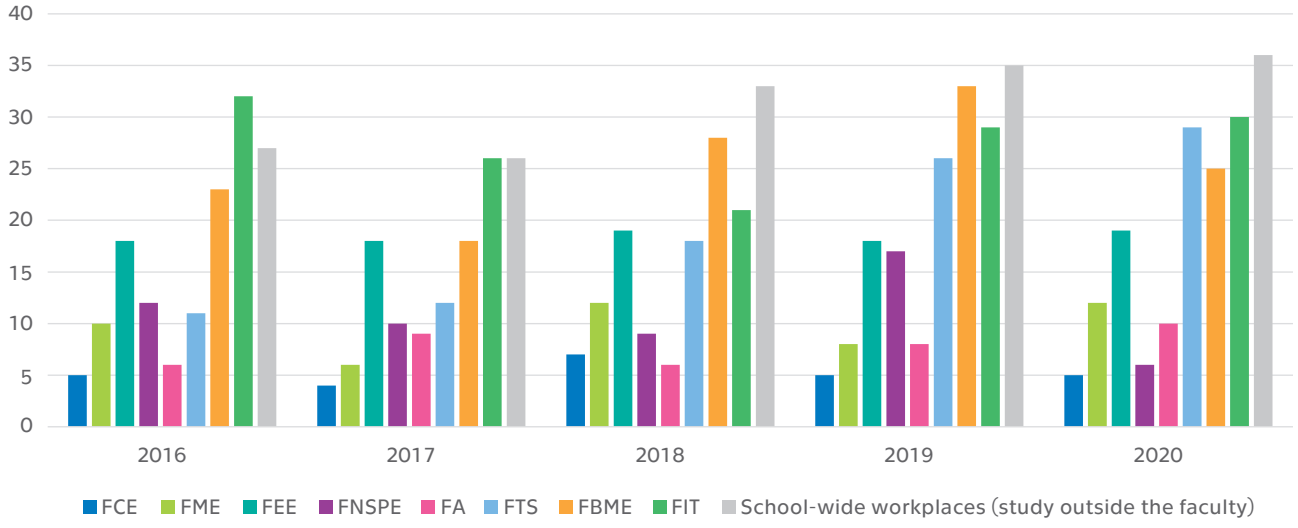
FT = full-time
PT/DL = part-time / distance learning

The TOTAL value is neither the sum nor the average of the previous values (e.g. for FT and PT/DL in a certain type of study). A separate calculation must be made for each field in the table.

Example:

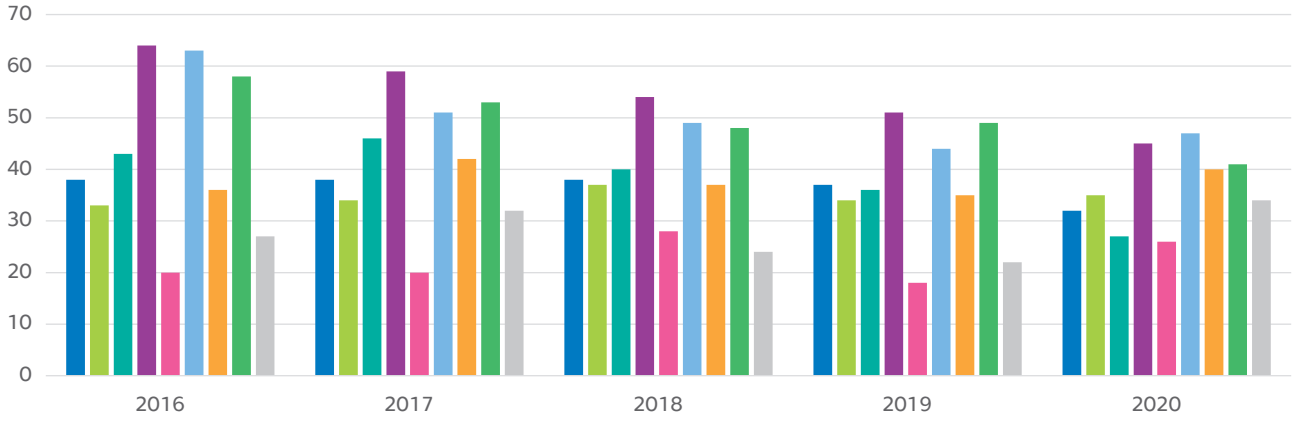
In 2019 (between 1 January and 31 December), 500 full-time undergraduate students were enrolled at the Faculty. In the same and the following year, 180 of this cohort were unsuccessfully completed. The first year failure rate for this cohort is 180/500 = 0.36, or 36%.

ACADEMIC FAILURE RATE OF THE 1ST YEAR OF THE FOLLOW-UP MASTER'S DEGREE (%)



ter's studies		Continuing Master's studies			Doktorské studium			TOTAL
PT/DL	TOTAL	FT	PT/DL	TOTAL	FT	PT/DL	TOTAL	
		4.7	0.0	4.7	15.6	17.4	16.1	21.7
		6.6	62.5	11.5	1.6	0.0	1.3	25.2
		19.2	16.7	19.1	20.8	85.7	26.2	24.8
		29.7	0.0	29.7	22.2	0.0	20.0	38.5
		19.6	50.0	28.5	10.0	0.0	9.1	40.5
		5.7	0.0	5.7	13.5	20.0	14.3	35.0
		10.3	0.0	10.3	23.8	28.6	25.0	21.3
		31.8	18.2	25.2	9.1	25.0	16.7	34.7
		21.5	61.2	35.6	0.0	0.0	0.0	34.6
		14.6	42.8	18.1	13.7	21.7	15.3	29.6

ACADEMIC FAILURE RATE IN THE 1ST YEAR OF BACHELOR STUDIES (%)



ACADEMIC FAILURE RATE IN THE FIRST YEAR OF DOCTORAL STUDIES (%)

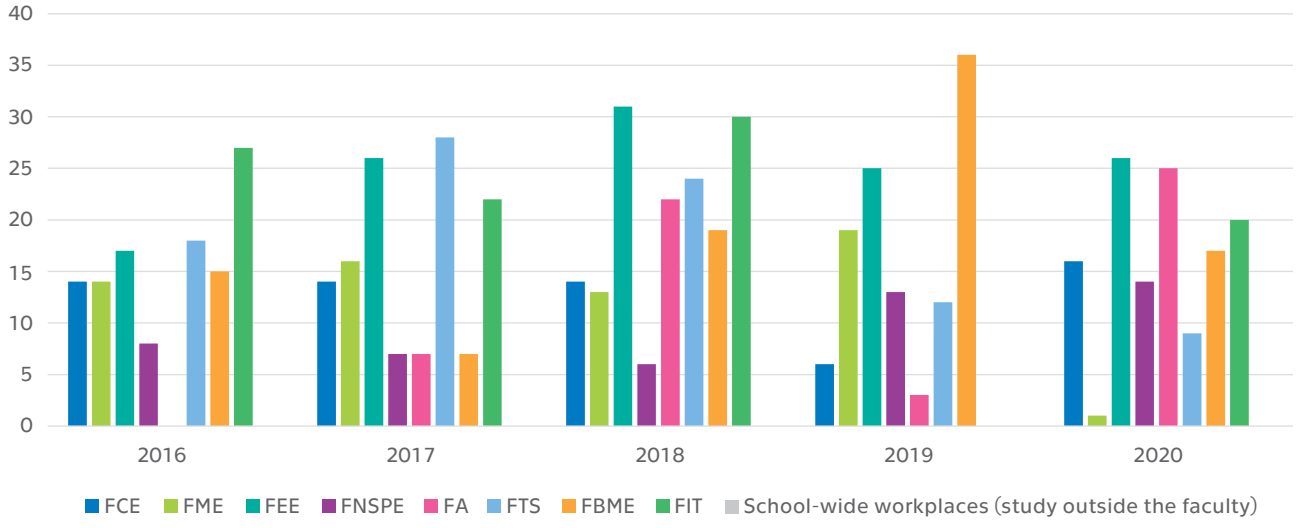


Table 3.4: Scholarships* to students by purpose of the scholarship (number of individuals)

CTU in Prague

Purpose of the scholarship	Number of students	Average scholarship amount**
for outstanding academic performance according to § 91 (2) (a)	2,567	10,681
for outstanding scientific, research, development, artistic or other creative achievements pursuant to Section 91 (2) (b)	759	16,127
for research, development and innovation activities according to a special legal regulation, § 91 (2) (c)	598	28,391
in the case of a student in a difficult social situation according to § 91 (2) (d)	4	25,619
in the case of a student in a difficult social situation according to § 91 (3)	26	24,683
in cases of special consideration pursuant to Section 91 (2) (e)	13,329	8,705
of which accommodation scholarship	13,309	3,854
to support study abroad according to § 91 (4) (a)	524	16,854
to support studies in the Czech Republic according to § 91 (4) (b)	202	31,985
students of doctoral study programmes according to § 91 (4) (c)	472	76,684
other scholarships	279	8,417
TOTAL***	18,760	22,909

Note: * Irrespective of the source of funds, it does not refer only to funds from the Ministry of Education.

Note: ** Proportion of the total amount paid out for a given type of scholarship per year and the total number of individuals to whom the scholarship was paid at least once per year. If a scholarship has been paid to one person more than once, the person is counted only once, but the sum of the amounts paid to that person enters the calculation.

Note: *** As individuals who may be recipients of multiple scholarships are reported, the total number of students is not the sum of the previous columns, but reflects the actual number of students.

Example: the university paid a total of CZK 15,000 to students for outstanding academic performance under Section 91 (2) (a) for the year. A total of 3 students received this scholarship, two of whom received it once and the third student received it three times. The average amount of this scholarship was CZK 5,000 (= CZK 15,000/3).

Table 4.1: Graduates of accredited study programmes (number of graduates)

CTU in Prague		Bachelor studies		Master's studies		Continuing Master's studies		Doctoral studies		Total
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Civil Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	394				446		1	32	873
Total faculty	**X**	**394**				**446**		**1**	**32**	**873**
Of which the number of women	X	161				178		1	12	352
Of which number of foreigners	X	54				37			2	93
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	282	13			310	14	7	12	638
Total faculty	**X**	**282**	**13**			**310**	**14**	**7**	**12**	**638**
Of which the number of women	X	29	4			32	2			67
Of which number of foreigners	X	26	2			49	3	1		81
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	141	3			99				243
Technology, manufacturing and construction	07	175	1			224	10	2	32	444
Total faculty	**X**	**316**	**4**			**323**	**10**	**2**	**32**	**687**
Of which the number of women	X	40				45	1		2	88
Of which number of foreigners	X	50	1			77		1	6	135
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	217	10			134			2	363
Total faculty	**X**	**217**	**10**			**134**			**2**	**363**
Of which the number of women	X	26	1			11				38
Of which number of foreigners	X	61	1			27				89
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07								5	5
Services	10	116	9			72	19		8	224
Total faculty	**X**	**116**	**9**			**72**	**19**		**13**	**229**
Of which the number of women	X	29	3			28	6		1	67
Of which number of foreigners	X	15	2			8	4		2	31
Faculty of Nuclear and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	99								99
Information and communication technologies	06					76				76
Technology, manufacturing and construction	07							4	20	24
Total faculty	**X**	**99**				**76**		**4**	**20**	**199**
Of which the number of women	X	30				30		2	2	64
Of which number of foreigners	X	12				15		1	3	31

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Table 4.1: Graduates of accredited study programmes (number of graduates)

CTU in Prague		Bachelor studies		Master's studies		Continuing Master's studies		Doctoral studies		Total
		FT	PT/DL	FT	PT/DL	FT	PT/DL	FT	PT/DL	
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Humanities	02	29				19				48
Technology, manufacturing and construction	07	150				185		2	5	342
Total faculty	**X**	**179**				**204**		**2**	**5**	**390**
Of which the number of women	X	117				124		2	4	247
Of which number of foreigners	X	38				45		1		84
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	64				55	10	2	6	137
Health and social care, welfare	09	130								130
Services	10	18	19			30	50		1	118
Total faculty	**X**	**212**	**19**			**85**	**60**	**2**	**7**	**385**
Of which the number of women	X	154	2			68	24		4	252
Of which number of foreigners	X	12				10			1	23
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		43							43
Arts and Humanities	02								2	2
Business, Administration and Law	04	99				111	11			221
Technology, manufacturing and construction	07								2	2
Total	**X**	**99**	**43**			**111**	**11**		**4**	**268**
Of which the number of women	X	68	11			79	9		1	168
Of which number of foreigners	X	9				5				14
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		43							43
Arts and Humanities	02	29				19			2	50
Business, Administration and Law	04	99				111	11			221
Natural sciences, mathematics and statistics	05	99								99
Information and communication technologies	06	358	13			309			2	682
Technology, manufacturing and construction	07	1,065	14			1,220	34	18	114	2,465
Health and social care, welfare	09	130								130
Services	10	134	28			102	69		9	342
UNIVERSITY TOTAL	**X**	**1,914**	**98**			**1,761**	**114**	**18**	**127**	**4,032**
Of which the number of women	X	654	21			595	42	5	26	1,343
Of which number of foreigners	X	277	6			273	7	4	14	581

Note: * Faculty or other part of the university implementing the accredited study programme.

FT = full-time
PT/DL = part-time / distance learning; the number of successful graduates (not individuals) between 1 January and 31 December is reported.

GRADUATES OF ACCREDITED STUDY PROGRAMMES (NUMBER OF GRADUATES)

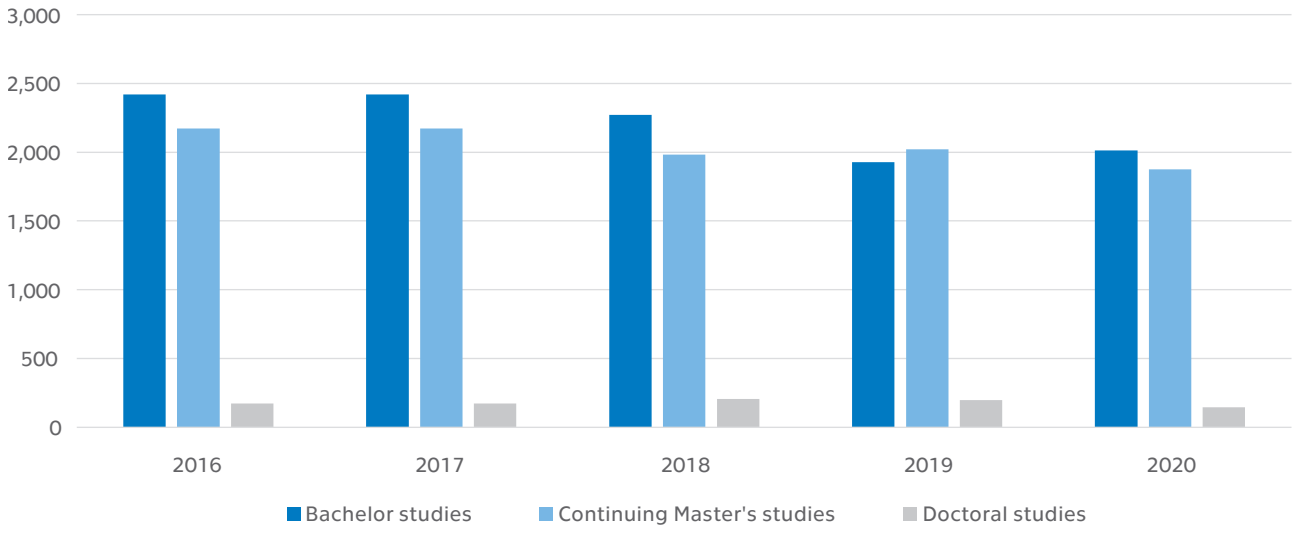

Table 5.1: Interest in studying at university

CTU in Prague		Bachelor studies				Master's	
		Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications
Faculty of Civil Engineering*							
Broadly defined ISCED-F disciplines	code						
Technology, manufacturing and construction	07	1,601	1,673	1,145	903		
Total faculty	X	**1,601**	**1,673**	**1,145**	**903**		
Faculty of Mechanical Engineering*							
ISCED-F broadly defined disciplines	code						
Business, Administration and Law	04						
Technology, manufacturing and construction	07	1,174	1,071	589	589		
Total Faculty	X	**1,174**	**1,071**	**589**	**589**		
Faculty of Electrical Engineering*							
ISCED-F broadly defined fields	code						
Business, Administration and Law	04						
Natural sciences, mathematics and statistics	05						
Information and Communication Technologies	06	981	1,035	354	297		
Technology, manufacturing and construction	07	1,014	1,079	542	460		
Total faculty	X	**1,838**	**2,114**	**896**	**757**		
Faculty of Nuclear and Physical Engineering*							
ISCED-F broadly defined disciplines	code						
Natural sciences, mathematics and statistics	05	527	443	316	260		
Information and communication technologies	06	239	170	106	86		
Technology, manufacturing and construction	07						
Health and social care, welfare	09	35	30	22	20		
Total faculty	X	**793**	**643**	**444**	**366**		
Faculty of Architecture*							
ISCED-F broadly defined disciplines	code						
Arts and Humanities	02	167	164	46	37		
Technology, manufacturing and construction	07	794	766	462	363		
Total Faculty	X	**901**	**930**	**508**	**400**		
Faculty of Transportation Sciences*							
ISCED-F broadly defined disciplines	code						
Services	10	749	692	458	363		
Total Faculty	X	**749**	**692**	**458**	**363**		
Faculty of Biomedical Engineering*							
ISCED-F broadly defined disciplines	code						
Information and Communication Technologies	06	44	41	20	18		
Technology, manufacturing and construction	07	123	117	66	62		
Health and social care, welfare	09	793	834	384	350		
Services	10	159	157	111	105		
Total faculty	X	**1,057**	**1,149**	**581**	**535**		

s studies		Continuing Master's studies				Doctoral studies			
Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study
		583	587	478	413	75	75	75	75
		583	**587**	**478**	**413**	**75**	**75**	**75**	**75**
		49	46	25	23				
		465	464	299	295	63	62	55	48
		499	**510**	**324**	**318**	**63**	**62**	**55**	**48**
						7	7	7	7
						5	5	5	5
		362	315	244	188	33	33	28	28
		394	373	290	216	36	37	35	34
		728	**688**	**534**	**404**	**81**	**82**	**75**	**74**
		115	104	85	84	8	8	8	8
		22	16	12	8				
		3	2	2	1	19	19	19	18
		138	**122**	**99**	**93**	**27**	**27**	**27**	**26**
		48	45	19	19	2	2	2	2
		291	235	203	180	46	46	37	35
		337	**280**	**222**	**199**	**48**	**48**	**39**	**37**
		272	258	185	171	14	15	13	13
		272	**258**	**185**	**171**	**14**	**15**	**13**	**13**
		20	18	10	8	11	11	11	11
		163	146	110	80	20	20	17	15
		255	256	133	128	16	16	16	15
		426	**420**	**253**	**216**	**47**	**47**	**44**	**41**

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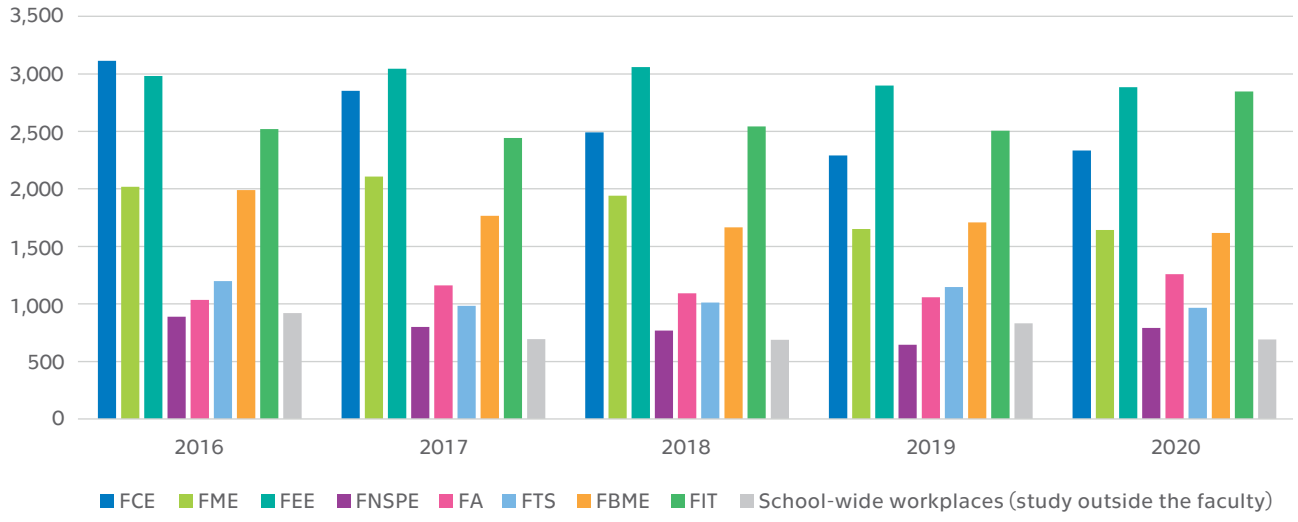
Table 5.1: Interest in studying at university

CTU in Prague		Bachelor studies				Master's	
		Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications
Faculty of Information Technology*							
ISCED-F broadly defined disciplines	code						
Information and Communication Technology	06	2,576	2,460	934	858		
Total Faculty	X	2,576	2,460	934	858		
Masaryk Institute of Advanced Studies*							
ISCED-F broadly defined fields of study	code						
Education and upbringing	01	3	1	1	1		
Business, Administration and Law	04	458	442	264	158		
Total Faculty	X	460	443	265	159		
CTU in Prague							
ISCED-F broadly defined disciplines	code						
Education and upbringing	01	3	1	1	1		
Arts and Humanities	02	167	164	46	37		
Business, Administration and Law	04	458	442	264	158		
Natural sciences, mathematics and statistics	05	527	443	316	260		
Information and communication technologies	06	3,840	3,706	1,414	1,259		
Technology, manufacturing and construction	07	4,706	4,706	2,804	2,377		
Health and social care, welfare	09	828	864	406	370		
Services	10	908	849	569	468		
UNIVERSITY TOTAL	X	9,407	11,175	5,820	4,930		

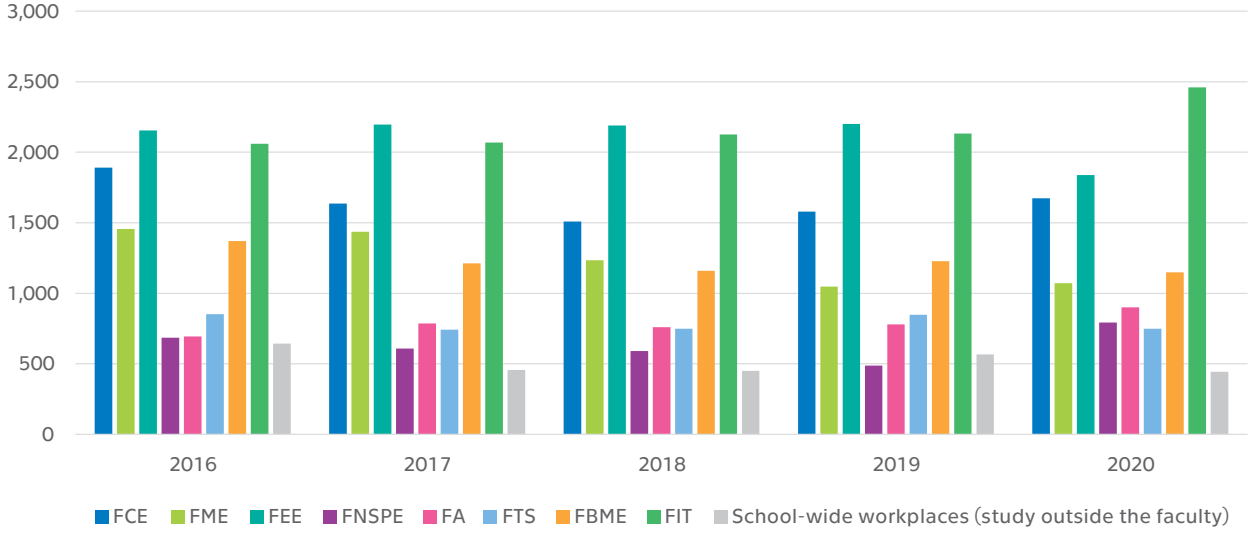
Note: * Faculty or other part of the university implementing the accredited study programme

NUMBER OF APPLICATIONS (Bc., NMgr., Ph.D. STUDIES TOTAL)

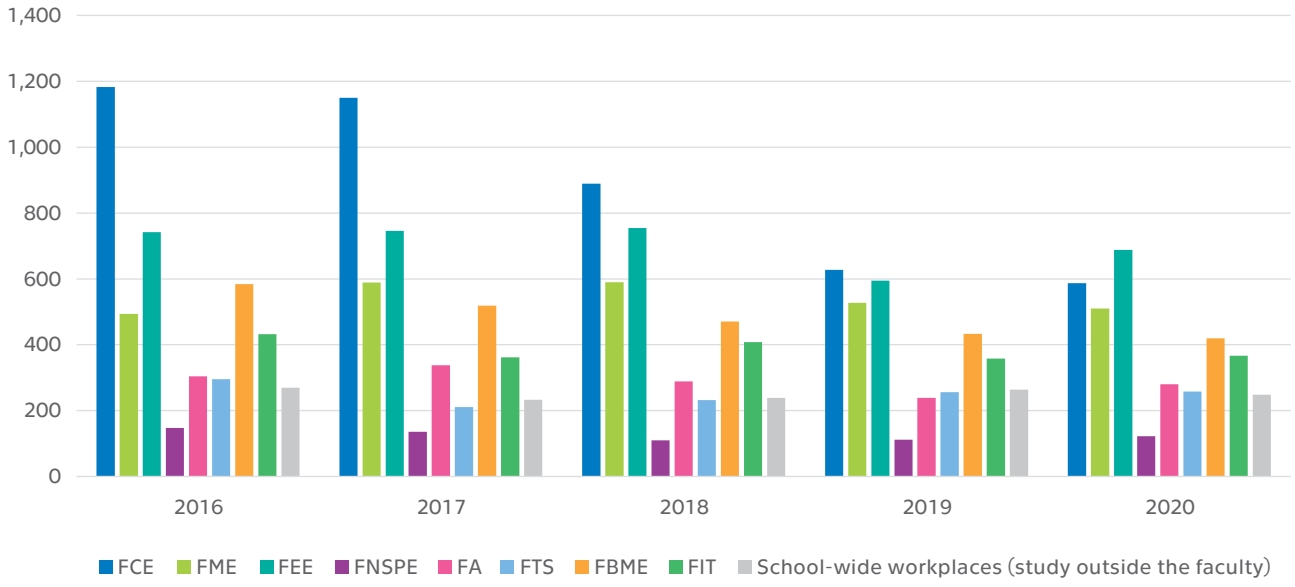


s studies		Continuing Master's studies				Doctoral studies			
Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (persons)	Number of applications	Number of admissions	Number of enrolments to study
		417	367	225	209	21	21	16	16
		417	367	225	209	21	21	16	16
		281	248	167	143				
		281	248	167	143				
		48	45	19	19	2	2	2	2
		330	294	192	166	7	7	7	7
		115	104	85	84	13	13	13	13
		821	716	491	413	65	65	55	55
		1,736	1,661	1,272	1,105	239	239	221	210
		163	146	110	80	20	20	17	15
		527	514	318	299	30	31	29	28
		3,501	3,480	2,487	2,166	375	377	344	330

NUMBER OF APPLICATIONS (Bc. STUDIES)



NUMBER OF APPLICATIONS (NMgr. STUDIES)



NUMBER OF APPLICATIONS (Ph.D. STUDIES)

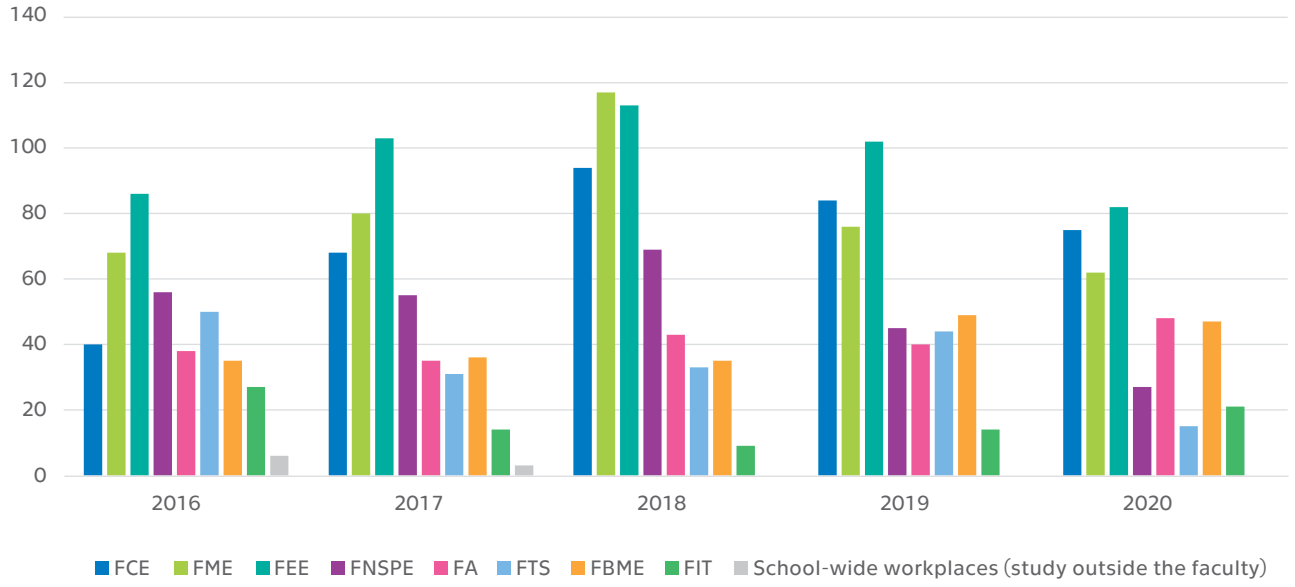


Table 6.1: Total academic and scientific staff and other employees (average headcount*)

CTU in Prague	Academic staff					
	TOTAL academic staff	Professors	Associate Professors	Assistant Professors	Assistant	Lecturers
Faculty of Civil Engineering	369.9	52.5	106.0	211.2	0.0	0.0
Number of women	92.6	6.6	19.1	66.9	0.0	0.0
Faculty of Mechanical Engineering	273.9	29.3	37.6	172.5	28.3	2.4
Number of women	26.4	0.4	3.4	19.7	0.0	2.0
Faculty of Electrical Engineering	256.8	51.1	68.2	112.3	0.5	24.7
Number of women	22.9	2.0	3.0	14.8	0.0	3.1
Faculty of Nuclear and Physical Engineering	150.0	26.0	34.1	87.2	1.0	1.4
Number of women	23.1	3.0	0.9	18.0	1.0	0.2
Faculty of Architecture	115.8	15.0	23.9	76.7	0.1	0.0
Number of women	36.1	1.0	5.9	29.3	0.0	0.0
Faculty of Transportation Sciences	130.1	8.9	29.6	88.7	2.9	0.0
Number of women	39.2	1.5	5.5	31.3	0.9	0.0
Faculty of Biomedical Engineering	103.0	9.5	16.3	25.9	50.3	1.0
Number of women	36.7	0.9	3.3	11.1	21.4	0.0
Faculty of Information Technology	99.3	4.4	16.7	78.3	0.0	0.0
Number of women	14.9	0.0	3.0	11.9	0.0	0.0
Masaryk Institute of Advanced Studies	43.5	1.9	9.5	31.4	0.0	0.0
Number of women	26.0	2.0	4.9	19.0	0.0	0.1
Total other departments	62.8	6.4	5.5	39.9	2.3	0.0
Number of women	7.0	0.1	1.0	4.1	1.6	0.0
TOTAL	1,605.0	204.7	347.4	924.0	85.4	29.5
Total number of women	324.9	17.5	49.8	226.1	24.8	5.4

Note: * The average overcount is the proportion of the total number of hours actually worked during the reference period from 1 January to 31 December (by all staff in the reference category; including FTE, excluding FTE) and the total annual working time pool per full-time equivalent employee.

Note: ** Researcher in this case means a researcher who is not an academic under Section 70 of Act No 111/1998 Coll., on Universities.

Note: *** A member of staff of a given research institution or university within five years of receiving the academic degree of Ph.D., or its equivalent. Works as part of a research team at the institution, usually under the supervision of experienced researchers on a specific task and publishes his/her results independently and as part of a creative team. Has an employment contract with the research institution a fixed-term contract (of 1–3 years) for one, maximum three consecutive periods. His/her salary is subject to the rules of the salary system of the institution, in addition to which he/she may receive remuneration under research grant projects.

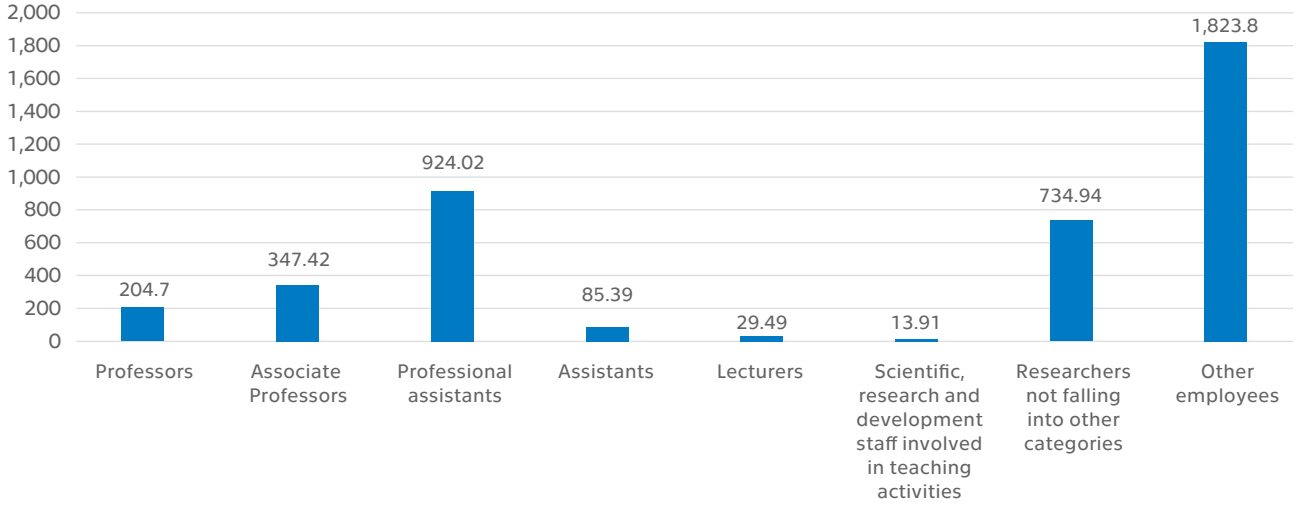
Note: **** The category ‚Other scientific, research and development personnel' includes technical and professional staff not directly involved in research but are indispensable to the research activity (e.g. research facility operators).

Note: ***** Other staff means all other staff not directly involved in education and research. This includes administrative, technical and other staff.

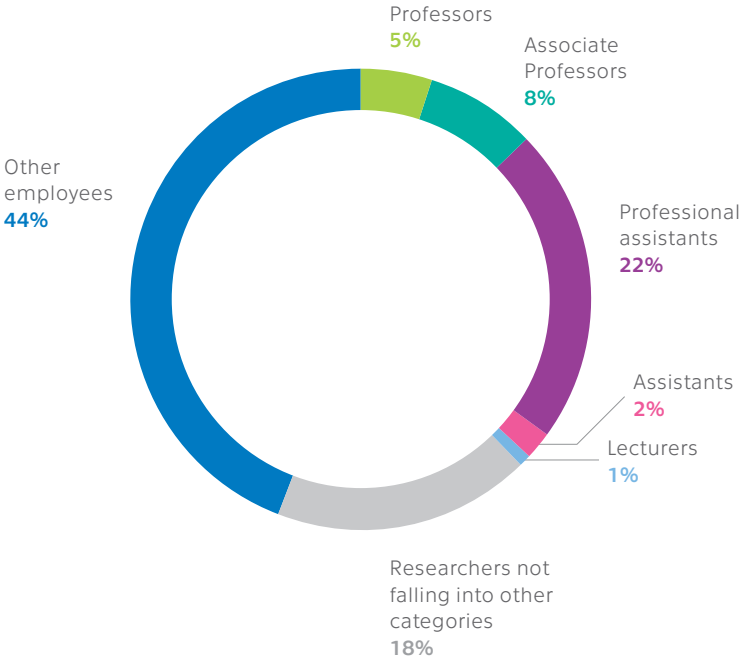
Note: ****** Faculty or other part of a higher education institution carrying out an accredited programme of study.

Scientific and professional staff**					Other staff*****	TOTAL employees
Scientific, research and development staff involved in teaching activities	Extraordinary professors	Postdoctoral fellows („postdocs")***	Researchers not falling into other categories	Other scientific, research and development personnel****		
0.3			82.1		220.4	672.4
0.0			25.1		127.5	245.2
3.8			24.1		257.3	555.3
0.9			4.3		88.8	119.5
0.0			196.5		202.8	656.1
0.0			15.9		103.9	142.8
0.4			119.2		113.5	382.7
0.1			31.6		71.7	126.4
0.1			7.4		57.6	180.8
0.0			2.6		39.9	78.6
0.0			16.5		130.1	276.7
0.0			6.6		67.9	113.6
0.0			26.4		41.4	170.8
0.0			8.0		25.5	70.1
0.0			20.6		59.2	179.1
0.0			2.4		33.8	51.0
0.7			0.6		28.5	72.6
0.0			0.7		19.6	46.2
8.7			241.7		712.8	1,030.8
0.3			35.4		402.9	445.3
13.9			734.9		1,823.8	4,177.2
1.3			132.4		981.5	1,438.7

STAFF STRUCTURE OF ČVUT IN 2020 (AVERAGE RECALCULATED NUMBERS)

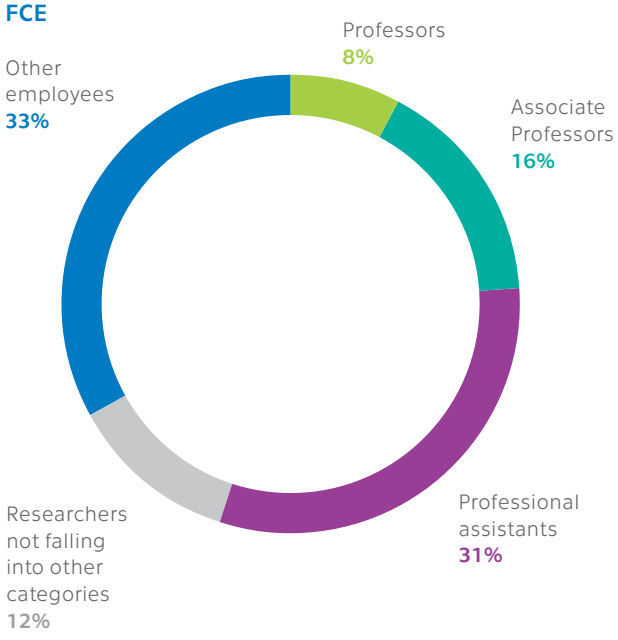


EMPLOYEE STRUCTURE OF CTU IN 2020



STAFF STRUCTURE BY INDIVIDUAL FACULTIES IN 2020

FCE



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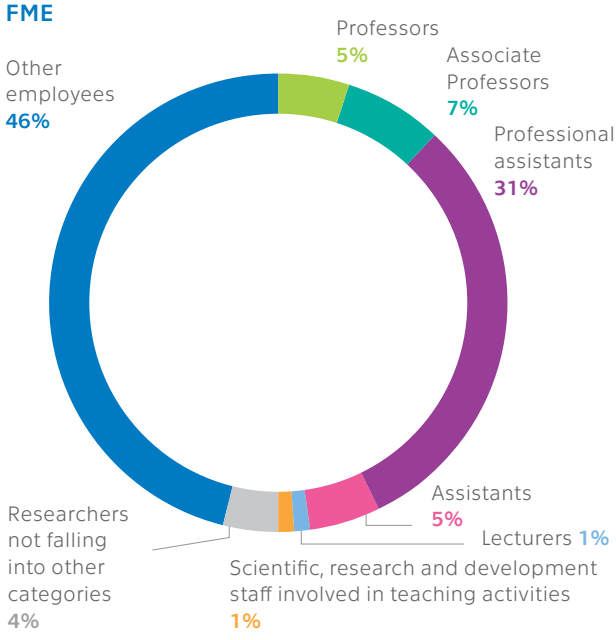

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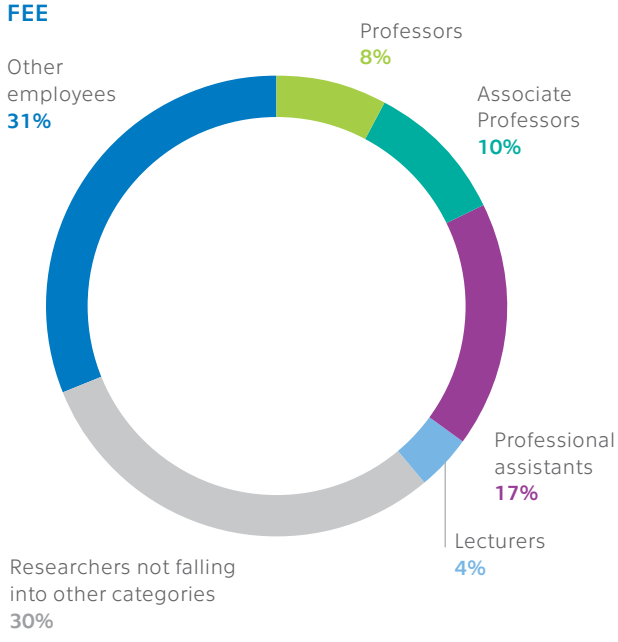

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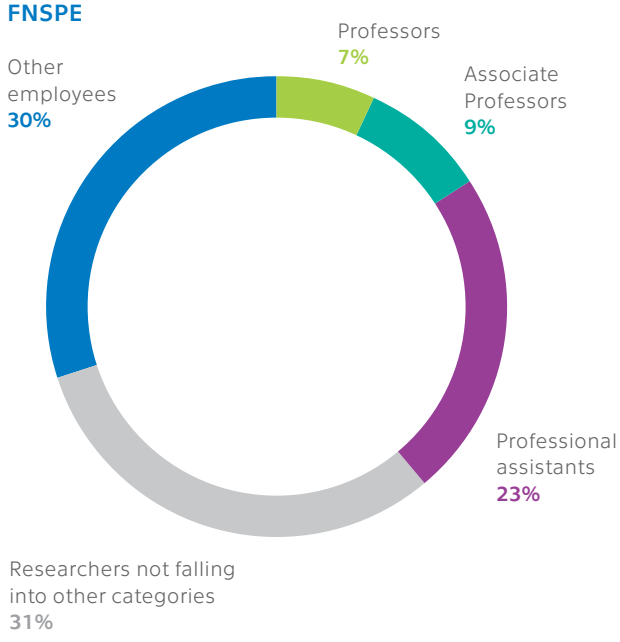
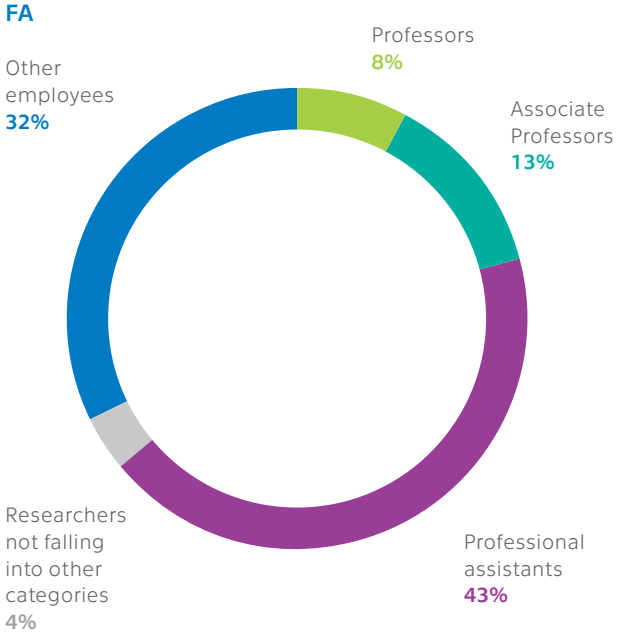


STAFF STRUCTURE BY INDIVIDUAL FACULTIES IN 2020

FA



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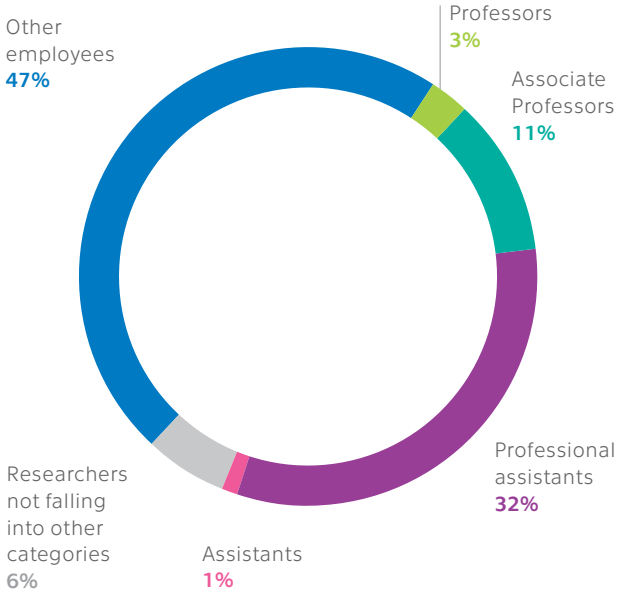

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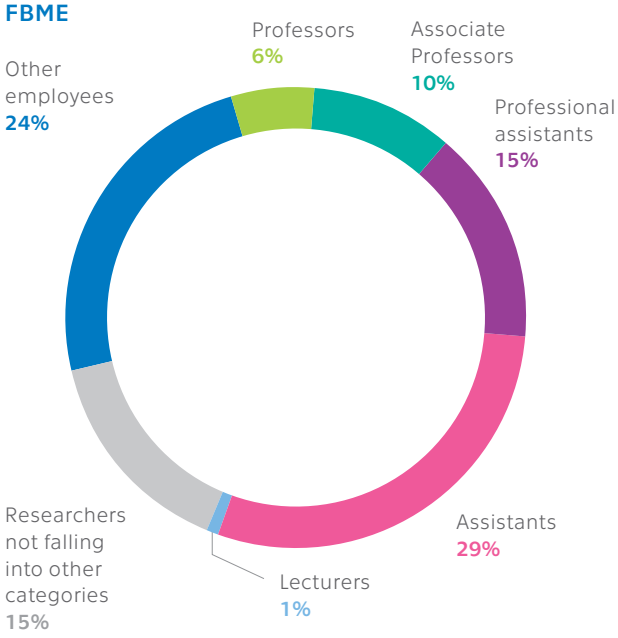

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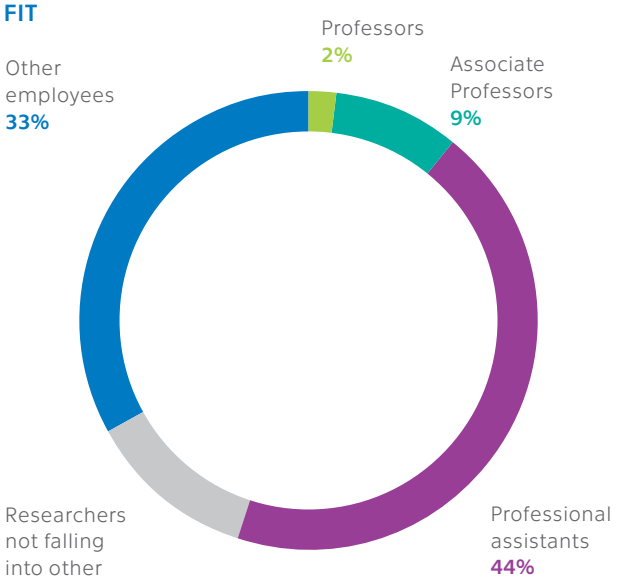

SCHOOL-WIDE WORKPLACE
(STUDY OUTSIDE THE FACULTY)

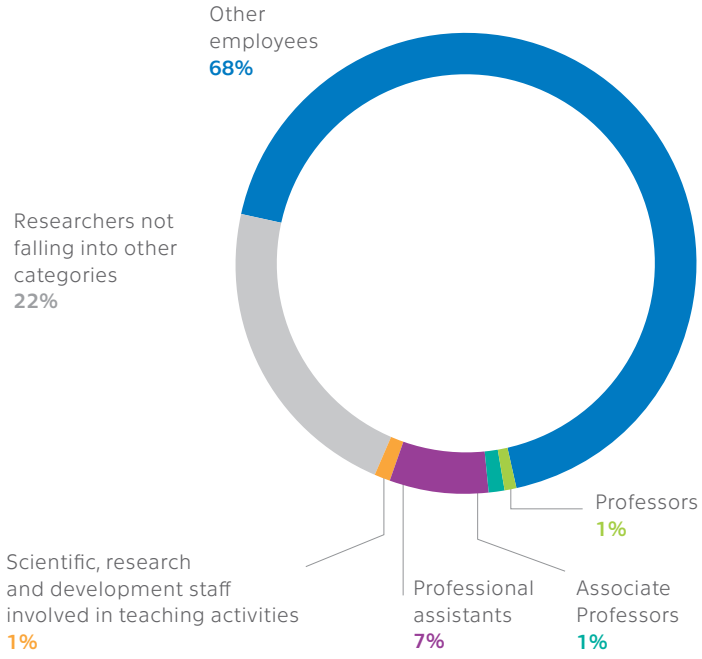

Table 6.2: Age structure of academic, scientific and other staff (number of persons*)

CTU in Prague	Academic staff											
	Professors		Associate Professors		Professional assistants		Assistants		Lecturers		Scientific, research and development staff involved in teaching activities	
	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 29 years	0	0	0	0	34	9	27	8	0	0	16	5
30–39 years	0	0	24	0	380	80	71	18	6	1	27	3
40–49 years	39	4	159	17	490	120	15	8	20	3	28	2
50–59 years	43	1	82	19	174	64	11	5	17	4	10	0
60–69 years	81	10	94	20	142	58	5	3	8	1	10	3
over 70 years	114	9	101	9	43	10	3	0	2	0	6	1
TOTAL	277	24	460	65	1,263	341	132	42	53	9	97	14

Note: * The total number of employees/workers is given regardless of the amount of time worked, but only in an employment relationship, not including persons working on FTE and SNE. Excludes other types of contractual relationships under the Civil Code which are in the nature of purchase of services.

Note: * The total number of employees/workers is given regardless of the amount of time worked, but only in an employment relationship, excluding persons working on FTE and FTE. Excludes other types of contractual relations under the Civil Code which are in the nature of purchase of services.

Note: *** Employee of the research institution or university within five years after receiving the Ph.D. degree or its equivalent. Works as part of a research team at the institution, usually under the supervision of experienced researchers on a specific task, and publishes his/her results independently and as part of a creative team. He or she has a fixed-term employment contract (of 1–3 years) with the research institution for one, maximum three consecutive periods. His/her salary is subject to the rules of the institution's payroll system, in addition to which he/she may receive rewards under research grant projects.

Note: **** The category „Other scientific, research and development personnel" includes technical and professional staff who are not directly involved in the research but are indispensable to the research activity (e.g. operators of research facilities).

Note: ***** Other staff means all other staff not directly involved in education and research. This includes administrative, technical and other staff.

Scientific and professional staff**								Other staff*****		TOTAL	of which women
Extraordinary professors		Postdoctoral fellows („postdocs")***		Researchers not falling into other categories		Other scientific, research and development personnel****					
TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women		
				439	111			364	132	880	265
				553	124			453	208	1,514	434
				165	33			609	329	1,525	516
				62	5			536	345	935	443
				37	1			382	210	759	306
				36	2			157	56	462	87
				1,292	276			2,501	1,280	6,075	2,051

Table 6.3: Numbers of academic and scientific staff by range of working hours and highest qualification attained (numbers of individuals by full-time equivalent)

CTU in Prague	Academic staff					
Faculty of Civil Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	5	0	18	0	21	6
0.31–0.5	8	0	13	3	27	10
0.51–0.7	2	1	3	1	3	1
0.71–1	48	6	97	18	152	43
more than 1	0	0	0	0	0	0
TOTAL	63	7	131	22	203	60
Faculty of Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	17	2	15	1	17	2
0.31–0.5	7	0	13	2	11	2
0.51–0.7	4	0	4	1	15	3
0.71–1	21	0	35	2	129	10
more than 1	0	0	0	0	0	0
TOTAL	49	2	67	6	172	17
Faculty of Electrical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0,3	4	0	4	0	23	0
0.31–0.5	7	0	10	0	14	3
0.51–0.7	5	0	3	0	4	1
0.71–1	45	2	65	3	111	7
more than 1	0	0	0	0	0	0
TOTAL	61	2	82	3	152	11
Faculty of Nuclear and Physical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	5	0	4	1	10	2
0.31–0.5	5	0	3	0	5	0
0.51–0.7	0	0	3	0	5	1
0.71–1	23	3	37	1	69	14
more than 1	0	0	0	0	0	0
TOTAL	33	3	47	2	89	17

		Scientific staff*		TOTAL	of which women
Other		TOTAL	Women		
TOTAL	Women				
6	2	35	11	85	19
27	9	43	15	118	37
2	0	17	4	27	7
35	18	61	20	393	105
0	0	0	0	0	0
70	29	156	50	623	168
Other		TOTAL	Women		
TOTAL	Women				
9	0	20	4	78	9
10	3	10	3	51	10
6	1	10	3	39	8
77	13	10	3	272	28
0	0	0	0	0	0
102	17	50	13	440	55
Other		TOTAL	Women		
TOTAL	Women				
5	1	74	5	110	6
5	2	92	8	128	13
4	1	37	1	53	3
24	9	133	12	378	33
0	0	0	0	0	0
38	13	336	26	669	55
Other		TOTAL	Women		
TOTAL	Women				
4	2	101	31	124	36
2	1	44	13	59	14
0	0	18	5	26	6
12	7	87	23	228	48
0	0	0	0	0	0
18	10	250	72	437	104

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Table 6.3: Numbers of academic and scientific staff by range of working hours and highest qualification attained (numbers of individuals by full-time equivalent)

CTU in Prague	Academic staff					
Faculty of Architecture**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	2	0	3	0	7	0
0.31–0.5	4	0	14	1	8	3
0.51–0.7	2	0	2	1	9	2
0.71–1	13	1	19	5	16	12
more than 1	0	0	0	0	0	0
TOTAL	21	1	38	7	40	17
Faculty of Transportation Sciences**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	4	0	5	1	21	5
0.31–0.5	4	1	10	1	13	5
0.51–0.7	3	0	1	0	6	1
0.71–1	4	1	28	6	47	14
more than 1	0	0	0	0	0	0
TOTAL	15	2	44	8	87	25
Faculty of Biomedical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	9	3	14	3	13	4
0.31–0.5	1	0	5	1	6	4
0.51–0.7	0	0	1	0	4	1
0.71–1	9	0	15	3	31	14
more than 1	0	0	0	0	0	0
TOTAL	19	3	35	7	54	23
Faculty of Information Technology**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	4	0	1	0	9	1
0.31–0.5	1	0	4	0	12	1
0.51–0.7	0	0	1	0	8	5
0.71–1	4	0	15	3	45	5
more than 1	0	0	0	0	0	0
TOTAL	9	0	21	3	74	12

		Scientific staff*		TOTAL	of which women
Other		TOTAL	Women		
TOTAL	Women				
5	2	9	4	26	6
47	14	4	3	77	21
11	2	5	2	29	7
23	11	1	0	72	29
0	0	0	0	0	0
86	29	19	9	204	63
Other		TOTAL	Women		
TOTAL	Women				
15	3	7	2	52	11
21	7	6	2	54	16
8	4	1	1	19	6
35	17	3	1	117	39
0	0	0	0	0	0
79	31	17	6	242	72
Other		TOTAL	Women		
TOTAL	Women				
21	4	28	11	85	25
17	11	24	7	53	23
2	1	2	0	9	2
37	17	15	7	107	41
0	0	0	0	0	0
77	33	69	25	254	91
Other		TOTAL	Women		
TOTAL	Women				
4	0	11	2	29	3
8	4	16	0	41	5
4	1	0	0	13	6
18	4	14	2	96	14
0	0	0	0	0	0
34	9	41	4	179	28

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Table 6.3: Numbers of academic and scientific staff by range of working hours and highest qualification attained (numbers of individuals by full-time equivalent)

CTU in Prague	Academic staff					
Masaryk Institute of Advanced Studies**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	2	0	4	1	1	1
0.31–0.5	2	0	9	6	17	10
0.51–0.7	0	0	0	0	0	0
0.71–1	3	2	11	3	27	13
more than 1	0	0	0	0	0	0
TOTAL	7	2	24	10	45	24
Total other departments**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	2	0	0	0	5	0
0.31–0.5	0	0	2	1	3	2
0.51–0.7	2	1	0	0	2	0
0.71–1	6	1	10	1	38	5
more than 1	0	0	0	0	0	0
TOTAL	10	2	12	2	48	7
CTU in Prague						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0.3	54	5	68	7	127	21
0.31–0.5	39	1	83	15	116	40
0.51–0.7	18	2	18	3	56	15
0.71–1	176	16	332	45	665	137
more than 1	0	0	0	0	0	0
TOTAL	287	24	501	70	964	213

Note: only the highest academic degree obtained is given

Note: * A researcher in this case means a person who is not an academic according to Section 70 of Act No. 111/1998 Coll., on Higher Education.

Note: ** Faculty or other part of the university implementing the accredited study programme.

		Scientific staff*		TOTAL	of which women
Other		TOTAL	Women		
TOTAL	Women				
0	0	1	0	8	2
4	2	2	0	34	18
2	1	0	0	2	1
12	8	0	0	53	26
0	0	0	0	0	0
18	11	3	0	97	47
Other		TOTAL	Women		
TOTAL	Women				
2	1	73	14	82	15
3	1	45	9	53	13
0	0	23	9	27	10
29	10	210	39	293	56
0	0	0	0	0	0
34	12	351	71	455	94
Other		TOTAL	Women		
TOTAL	Women				
71	15	359	84	679	132
144	54	286	60	668	170
39	11	113	25	244	56
302	114	534	107	2,009	419
0	0	0	0	0	0
556	194	1,292	276	3,600	777

Table 6.4: Managers (natural persons)

CTU in Prague	Rector/ Dean	Vice-Rector/ Provost	Academic Senate	Scientific/Artistic/ Academic Council
Rectorate of CTU	1	6	45	55
of which women	0	3	9	5
Faculty of Civil Engineering*	1	5		
of which women	0	1		
Faculty of Mechanical Engineering*	1	4		
of which women	0	0		
Faculty of Electrical Engineering*	1	5		
of which women	0	0		
Faculty of Nuclear and Physical Engineering*	1	4		
of which women	0	0		
Faculty of Architecture*	1	5		
of which women	0	2		
Faculty of Transportation Sciences*	1	5		
of which women	0	0		
Faculty of Biomedical Engineering*	1	4		
of which women	0	0		
Faculty of Information Technology*	1	5		
of which women	0	1		
Higher education institutes and agricultural or forestry estates				
of which women				
Total other departments***				
of which women				
Faculties*, higher education institutes and other workplaces total	8	37	0	0
of which women	0	4	0	0
TOTAL*****	9	43	45	55
of which women	0	7	9	5

Only units of the university and workplaces for educational and research, development and innovation, artistic or other creative activities or for the provision of information services or technology transfer are recorded in the table. Data for administrative, purpose-built facilities for cultural and sporting activities, for accommodation and catering or for the operation of the school are not included.

Note: * only faculties and units under them (according to the above characteristics)

Note: ** according to the Higher Education Act, Section 25, Article 2.

Note: *** workplace for educational and research, development and innovation, artistic or other creative activities or for the provision of information services or technology transfer pursuant to Section 22 (c) of Act No.111/1998 Coll.

Note: **** listed and similar workplaces for educational and research, development and innovation, artistic or other creative activities or for the provision of information services or technology transfer pursuant to Section 22(c) of Act No.111/1998 Coll., falling under the scope of a higher education institution.

Note: ***** the total may not reflect the actual status of individuals (one person may hold multiple positions within a university or faculty), it is a simple sum of cells.

Bursar/ Secretary**	Board of Directors	Director of an institute, university agricultural or forestry farm	Head of department/institute/ research institute****	Senior management TOTAL *****
1	15			123
0	2			19
1			27	34
0			2	3
1			25	31
0			3	3
1			27	34
0			5	5
1			10	16
0			1	1
1			17	24
1			3	6
1			11	18
1			0	1
1			8	14
0			2	2
1			6	13
0			1	2
		5	12	17
		1	2	3
		5	0	5
		2	0	2
8		10	143	206
2		3	19	28
9	15	10	143	329
2	2	3	19	47

Table 6.5: Academic and scientific staff with foreign citizenship (average recalculated numbers******)

CTU in Prague	Academic staff				
	Professors	Associate Professors	Professional assistants	Assistants	Lecturers
Faculty of Civil Engineering					
in that: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	0.44	0.64	2	0	0
Other EU countries	0	0	0.5	0	0
other non-EU countries	0	0	1	0	0
Women out of total (regardless of nationality)	0	0	2	0	0
Faculty of Engineering					
of which: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	1	0	2	0	0
Other EU countries	0.25	0	0	0	0
other non-EU countries	0.1	0	2	0	0
Women out of total (regardless of nationality)	0	0	1	0	0
Faculty of Electrical Engineering					
of which: Germany	0	1	0	0	0
Poland	0	0	1	0	0
Austria	0	0	0	0	0
Slovakia	1	2.07	1.57	0	0
Other EU countries	0	1	0.83	0.19	1
other non-EU countries	0	0	3.73	0	1.31
Women out of total (regardless of nationality)	0	0	0.83	0	1
Faculty of Nuclear and Physical Engineering					
including: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	1	1	2.8	1	0.1
Other EU countries	0	0	2	0	0
other non-EU countries	1	0	1	0	0
Women out of total (regardless of nationality)	0	0	3	0	0

Scientific, research and development staff involved in teaching activities	Scientific and professional staff**			Other staff*****
	Postdoctoral fellows („postdocs")***	Researchers not falling into other categories	Other scientific, research and development personnel****	
		0.67		0
		1		0
		0		0
		1.6		2.5
		1.93		0
		4.14		0
		4.5		0
		0.48		0.09
		0		0
		0		0
		0.6		4.49
		1.86		1
		1.59		2.07
		1.9		2.47
		1.87		0
		0		0
		0		0
		10.62		2.44
		14.91		0.85
		34.26		3.23
		7.99		3.23
		1.1		0
		2.6		0
		0		0
		14.06		0
		4.14		0
		12.86		0
		8.65		0

>>>

Table 6.5: Academic and scientific staff with foreign citizenship (average recalculated numbers******)

CTU in Prague	Academic staff				
	Professors	Associate Professors	Professional assistants	Assistants	Lecturers
Faculty of Architecture					
including: Germany	0	0	0	0	0
Poland	0	0	1	0	0
Austria	0	0	0	0	0
Slovakia	1	0	0.6	0	0
Other EU countries	1	0.5	0.33	0	0
other non-EU countries	0	0	1	0	0
Women out of total (regardless of nationality)	0	0	0.33	0	0
Faculty of Transportation Sciences					
of which: Germany	0	0	0	0	0
Poland	0	0	1.45	0	0
Austria	0	0	0	0	0
Slovakia	0	1.25	3.25	0.1	0
Other EU countries	0	0	0	0	0
other non-EU countries	0	0	0.71	0	0
Women out of total (regardless of nationality)	0	1	0.25	0	0
Faculty of Biomedical Engineering					
of which: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	1	1.2	0.5	0.7	0
Other EU countries	0	0	0	0	0
other non-EU countries	0	0	2.33	1.67	0
Women out of total (regardless of nationality)	0	0	2.83	1.37	0
Faculty of Information Technology					
of which: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0.5	0	0	0
Slovakia	0	0	3.5	0	0
Other EU countries	0	0	4.43	0	0
other non-EU countries	0	0	2.88	0	0
Women out of total (regardless of nationality)	0	0	3.41	0	0
Masaryk Institute of Advanced Studies					
including: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	0	0.32	1.12	0	0
Other EU countries	0	0.29	0	0	0
other non-EU countries	0	0.5	2.33	0	0
Women out of total (regardless of nationality)	0	0.5	1.13	0	0

Scientific, research and development staff involved in teaching activities	Scientific and professional staff**			Other staff*****
	Postdoctoral fellows („postdocs")***	Researchers not falling into other categories	Other scientific, research and development personnel****	
		0		0
		0		0
		0		0
		0.5		1,6
		0.25		0
		0		0
		0.25		1,6
		0		0
		0		0
		0		0
		1.33		1.51
		0.5		0
		0.93		2.45
		1.26		0
		0		0.5
		0		0
		0		0
		0.33		0.03
		0		0.1
		0.63		0
		0.33		0.5
		0.54		0
		1.37		0
		0		0
		0.2		3.91
		6.5		2.5
		6.06		2.5
		4.36		4
		0		0
		0		0
		0		0
		0.29		2.15
		0		0
		0		0.33
		0.62		1.17

>>>

Table 6.5: Academic and scientific staff with foreign citizenship (average recalculated numbers******)

CTU in Prague	Academic staff				
	Professors	Associate Professors	Professional assistants	Assistants	Lecturers
Total other workplaces					
of which: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	0	0	0	0	0
Other EU countries	0	0	0	0	0
other non-EU countries	0	0	0	0	0
Women out of total (regardless of nationality)		1	0	0	0
TOTAL UNIVERSITY					
of which: Germany	0	1	0	0	0
Poland	0	0	3.45	0	0
Austria	0	0,5	0	0	0
Slovakia	5.44	6.48	17.34	1.8	0.1
Other EU countries	1.25	1.79	8.09	0.19	1
other non-EU countries	1.1	0.5	16.98	1.67	1.31
Women out of total (regardless of nationality)	0	1.5	14.53	1.37	1

Note: * Faculty or other part of the university implementing the accredited study programme.

Note: ** A researcher in this case means a researcher who is not an academic according to Section 70 of Act No. 111/1998 Coll., on Higher Education.

Note: *** Employee of a given research institution or university within five years of receiving a Ph.D. or equivalent. Works as part of a research team at the institution, usually under the supervision of experienced researchers on a specific task, and publishes his/her results independently and as part of a creative team. He or she has a fixed-term employment contract (of 1–3 years) with the research institution for one, maximum three consecutive periods. His/her salary is subject to the rules of the institution's payroll system, in addition to which he/she may receive rewards under research grant projects.

Note: **** The category „Other scientific, research and development personnel" includes technical and professional staff who are not directly involved in the research but are indispensable to the research activity (e.g. operators of research facilities).

Note: ***** Other staff means all other staff not directly involved in education and research. This includes administrative, technical and other staff.

Note: ****** Average converted number means the ratio of the total number of hours actually worked in the reference period from 1 January to 31 December by all employees (in the category under review; including FTEs, excluding FTEs) to the total annual working time pool per full-time employee.

	Scientific and professional staff**			
Scientific, research and development staff involved in teaching activities	Postdoctoral fellows („postdocs")***	Researchers not falling into other categories	Other scientific, research and development personnel****	Other staff*****
		6.02		0.16
		4.58		0
		0.25		0
		12.38		13.67
		4.85		0.1
		23.38		8.4
		2.35		4.45
		10.68		0.75
		9.55		0
		0.25		0
		41.91		32.3
		34.44		4.55
		83.85		18.98
		30.95		17.42

Table 6.6: Newly appointed associate professors and professors (numbers)

CTU in Prague	number			Average age of new appointees***
	At the university*		Academic staff appointed at another university**	
	Total	Of these, core staff of the HEI in question		
Faculty of Civil Engineering****				
Professors appointed in 2020	2	1		55
of which women	1	0		56
Associate professors appointed in 2020	3	3		53
of which women	0	0		
Faculty of Engineering****				
Professors appointed in 2020	2	2		44
of which women	0	0		
Associate Professors appointed in 2020	3	3		43
of which women	1	1		42
Faculty of Electrical Engineering****				
Professors appointed in 2020	1	1		48
of which women	0	0		
Associate professors appointed in 2020	5	5		38
of which women	0	0		
Faculty of Nuclear and Physical Engineering****				
Professors appointed in 2020	0	0		
of which women	0	0		
Associate Professors appointed in 2020	3	2		44
of which women	0	0		
Faculty of Architecture****				
Professors appointed in 2020	1	0		62
of which women	1	0		62
Associate Professors appointed in 2020	4	4	2	49
of which women	1	1	0	56

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Table 6.6: Newly appointed associate professors and professors (numbers)

CTU in Prague	number			Average age of new appointees***
	At the university*		Academic staff appointed at another university**	
	Total	Of these, core staff of the HEI in question		
Faculty of Transportation Sciences****				
Professors appointed in 2020	0	0		
of which women	0	0		
Associate professors appointed in 2020	0	0		
of which women	0	0		
Faculty of Biomedical Engineering****				
Professors appointed in 2020	0	0	1	
of which women	0	0	0	
Associate Professors appointed in 2020	2	1	1	43
of which women	1	1	1	42
Faculty of Information Technology****				
Professors appointed in 2020	1	0		54
of which women	0	0		
Associate professors appointed in 2020	1	1		38
of which women	0	0		
TOTAL professors	7	4	1	51
of which women	2	0	0	59
TOTAL associate professors	21	19	3	44
of which women	3	3	1	47

Note: * Included are all habilitations and appointments that took place in a given calendar year at a given HEI, regardless of whether the newly appointed associate professors and professors were tribally affiliated with that HEI.

Note: ** The number of associate professors and professors who are tribally affiliated to the given HEI but have been appointed at another HEI is given.

Note: *** The average age is calculated from the total number of new appointments at a given HEI (faculty or total number).

Note: **** Faculty or other part of a university implementing an accredited study programme

Table 7.1: University involvement in international cooperation programmes (regardless of funding source)

CTU in Prague	H2020/ 7th Framework Programme EK		Other	TOTAL
	TOTAL	Of which Marie-Curie Actions		
Number of projects*	69	3	48	117
Number of students sent**	73	–	143	216
Number of accepted students***	153	–	255	408
Number of academic and scientific staff seconded****	60	–	145	205
Number of academic and scientific staff recruited*****	3	1	39	42
Grants in thous. CZK******	469,808	10,059	86,573	556,381

Note: * These are ongoing projects in a given year.

Note: ** Outgoing students (i.e. number of departures) – who have completed a stay abroad in 2020; students whose stay started in 2019 are also counted. Only students whose stay lasted more than 4 weeks (28 days) are counted. If the HEI reports other lengthy trips, please indicate this in a note to the table.

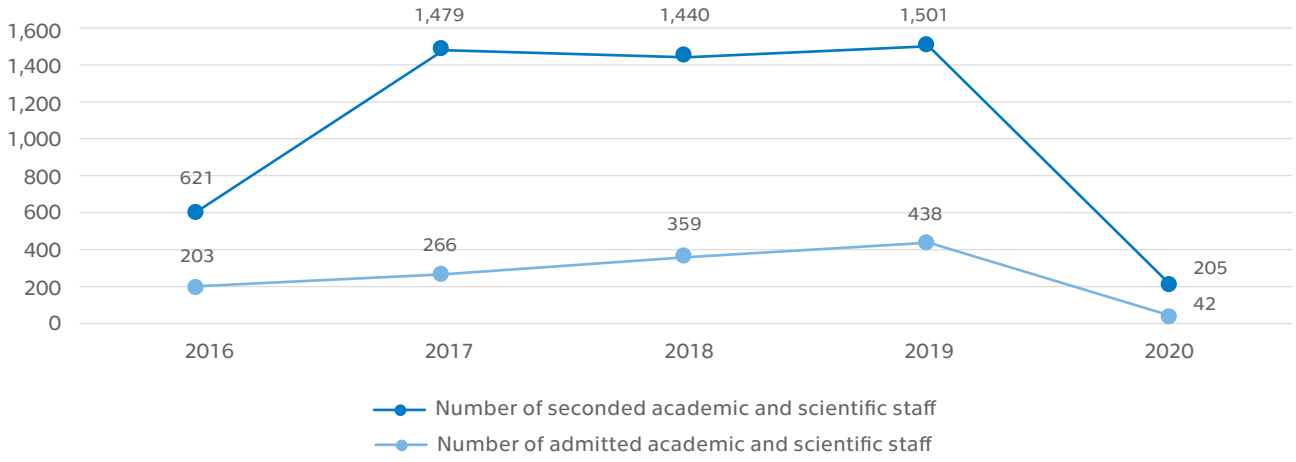
Note: *** Arriving students (i.e. number of arrivals) – who arrived in 2020; students whose stay started in 2019 are also counted. Only students whose stay lasted more than 4 weeks (28 days) are counted. If the HEI reports other lengthy trips, please indicate this in a note to the table.

Note: **** Outgoing academic staff (i.e. numbers of trips) – who undertook an overseas placement in 2020; staff whose placement started in 2019 are also counted.

Note: ***** Incoming academics (i.e. arrival numbers) – who arrived in 2020; those whose stay started in 2019 are also counted.

Note: ****** The amounts represent the total financial resources of the projects, including co-financing by the Ministry of Education and Science.

UNIVERSITY INVOLVEMENT IN INTERNATIONAL COOPERATION PROGRAMMES – ACADEMIC AND SCIENTIFIC STAFF (REGARDLESS OF FUNDING SOURCE)



INVOLVEMENT OF THE UNIVERSITY IN INTERNATIONAL COOPERATION PROGRAMMES – STUDENTS (REGARDLESS OF THE SOURCE OF FUNDING)

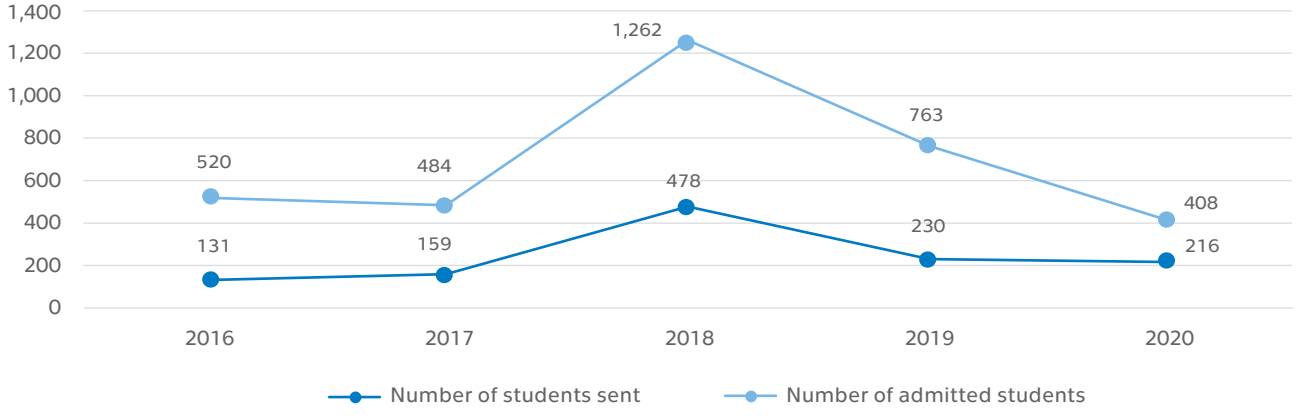


Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Islamic Republic of Afghanistan	0	0	0	0	4
Republic of Albania	0	0	0	0	0
Antarctica	0	0	0	0	0
Democratic and People's Republic of Algeria	0	0	0	0	2
Territory of American Samoa	0	0	0	0	0
Principality of Andorra	0	0	0	0	0
Republic of Angola	0	0	0	0	3
Antigua and Barbuda	0	0	0	0	0
Republic of Azerbaijan	0	0	0	0	34
Republic of Argentina	2	0	0	0	3
Commonwealth of Australia	8	0	0	0	0
Republic of Austria	15	0	0	0	3
Commonwealth of the Bahamas	0	0	0	0	0
Kingdom of Bahrain	0	0	0	0	0
People's Republic of Bangladesh	0	0	0	0	2
Republic of Armenia	0	0	0	0	1
Barbados	0	0	0	0	0
Kingdom of Belgium	29	2	0	0	2
Bermuda	0	0	0	0	0
Kingdom of Bhutan	0	0	0	0	0
Plurinational State of Bolivia	0	0	0	0	2
Bosnia and Herzegovina	0	0	0	0	16
Republic of Botswana	0	0	0	0	0
Bouvet Island	0	0	0	0	0
Federal Republic of Brazil	0	0	0	0	13
Belize	0	0	0	0	0
British Indian Ocean Territory	0	0	0	1	0
Solomon Islands	0	0	0	0	0
British Virgin Islands	0	0	0	0	0
Republic of Kosovo	0	0	0	0	5
State of Brunei Darussalam	0	0	0	0	0
Republic of Bulgaria	0	0	0	0	10
Republic of the Union of Myanmar	0	0	0	0	1
Republic of Burundi	0	0	0	0	0
Republic of Belarus	0	0	0	0	101
Kingdom of Cambodia	0	0	0	0	1
Republic of Cameroon	0	0	0	0	1
Canada	5	0	0	1	11
Republic of Cape Verde	0	0	0	0	0
Cayman Islands	0	0	0	0	0

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	4
0		0	1	1
0	0	0	0	0
0	1	0	1	4
0	0	0	0	0
0	0	0	0	0
0	0	0	0	3
0	0	0	0	0
2	2	0	1	39
2	2	0	1	10
1	0	1	1	11
4	2	2	3	29
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
1	1	0	0	3
0	0	0	0	0
2	8	12	2	55
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
1	1	0	0	18
0	0	0	0	0
0	0	0	0	0
2	1	0	4	20
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	5
0	0	0	0	0
2	1	2	2	17
0	0	0	0	1
0	0	0	0	0
1	1	1	1	105
0	0	0	0	1
0	0	0	0	1
2	3	1	1	23
0	0	0	0	0
0	0	0	0	0

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Central African Republic	0	0	0	0	0
Democratic Socialist Republic of Sri Lanka	0	0	0	0	5
Republic of Chad	0	0	0	0	1
Republic of Chile	1	0	0	0	0
People's Republic of China	5	0	0	0	56
Republic of China (Taiwan)	33	0	0	0	7
Territory of Christmas Island	0	0	0	0	0
Cocos (Keeling) Islands Territory	0	0	0	0	0
Republic of Colombia	0	0	0	0	1
Union of the Comoros	0	0	0	0	0
Department of Mayotte	0	0	0	0	0
Republic of the Congo	0	0	0	0	0
Democratic Republic of the Congo	0	0	0	0	0
Cook Islands	0	0	0	0	0
Republic of Costa Rica	1	0	0	0	0
Republic of Croatia	2	0	0	0	5
Republic of Cuba	0	0	0	0	2
Republic of Cyprus	0	0	0	0	3
Czech Republic	0	0	0	0	0
Republic of Benin	0	0	0	0	0
Kingdom of Denmark	14	1	0	0	1
Dominican Republic	0	0	0	0	0
Dominican Republic	0	0	0	0	0
Republic of Ecuador	0	0	0	0	2
Republic of El Salvador	0	0	0	0	0
Republic of Equatorial Guinea	0	0	0	0	0
Federal Democratic Republic of Ethiopia	0	0	0	0	1
State of Eritrea	0	0	0	0	0
Republic of Estonia	3	0	0	0	2
Faroe Islands	0	0	0	0	0
Falkland Islands (Malvinas)	0	0	0	0	0
South Georgia and the South Sandwich Islands	0	0	0	0	0
Republic of Fiji	0	0	0	0	0
Republic of Finland	15	0	1	0	5
Province of Aland	0	0	0	0	0
Republic of France	20	0	0	2	146
French Guiana	0	0	0	0	0
French Polynesia	0	0	0	0	0
French Southern and Antarctic Territories	0	0	0	0	0
Republic of Djibouti	0	0	0	0	0

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	0
0	0	0	0	5
0	0	0	0	1
0	0	0	0	1
7	8	4	7	87
4	5	2	2	53
0	0	0	0	0
0	0	0	0	0
1	0	0	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	1	3
2	3	2	5	19
0	0	0	0	2
0	0	0	0	3
0	0	0	0	0
0	0	0	0	0
2	1	1	2	21
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1
0	0	0	0	0
1	1	1	1	9
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	1	2	2	27
0	0	0	0	0
14	17	4	8	209
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Republic of Gabon	0	0	0	0	0
Georgia	0	0	0	0	5
Republic of Gambia	0	0	0	0	0
Palestinian Autonomous Territories	0	0	0	0	1
Federal Republic of Germany	54	3	0	0	38
Republic of Ghana	0	0	0	0	0
Gibraltar	0	0	0	0	0
Republic of Kiribati	0	0	0	0	0
The Hellenic Republic	0	0	0	0	14
Greenland	0	0	0	0	0
Grenada	0	0	0	0	1
Region of Guadeloupe	0	0	0	0	0
Territory of Guam	0	0	0	0	0
Republic of Guatemala	0	0	0	0	0
Republic of Guinea	0	0	0	0	0
Cooperative Republic of Guyana	0	0	0	0	0
Republic of Haiti	0	0	0	0	0
Heard Island and MacDonald Islands	0	0	0	0	0
Vatican City State	0	0	0	0	0
Republic of Honduras	0	0	0	0	0
Hong Kong Special Administrative Region of the People's Republic of China	0	0	0	0	0
Hungary	2	1	0	0	3
Republic of Iceland	1	0	0	0	0
Republic of India	3	0	0	2	122
Republic of Indonesia	0	0	0	0	2
Islamic Republic of Iran	0	0	0	0	6
Republic of Iraq	0	0	0	0	3
Ireland	0	0	0	0	3
State of Israel	2	0	0	0	5
Republic of Italy	10	0	0	0	20
Republic of Côte d'Ivoire	0	0	0	0	0
Jamaica	0	0	0	0	0
Japan	7	0	0	0	2
Republic of Kazakhstan	0	0	0	0	282
The Hashemite Kingdom of Jordan	0	0	0	0	5
Republic of Kenya	0	0	0	0	0
Democratic People's Republic of Korea	0	0	0	0	0
Republic of Korea	12	0	0	0	12
State of Kuwait	0	0	0	0	0

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	0
0	0	0	0	5
0	0	0	0	0
0	0	0	0	1
18	22	14	15	161
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	1	0	0	16
0	0	0	0	0
0	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0		0	0
0	0	0	0	0
1	0	0	2	3
2	0	1	0	3
1	4	1	2	13
0	0	0	0	1
0	11	0	4	140
1	0	0	0	3
0	0	0	2	8
0	0	0	0	3
1	0	1	0	5
2	3	2	5	19
8	9	2	5	54
0	0	0	0	0
0	0	0	0	0
2	3	1	2	17
2	4	2	11	301
0	0	0	0	5
0	0	0	0	0
0	0	0	0	0
2	2	2	0	30
0	0	0	0	0

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Republic of Kyrgyzstan	0	0	0	0	21
Lao People's Democratic Republic	0	0	0	0	0
Republic of Lebanon	0	0	0	0	4
Kingdom of Lesotho	0	0	0	0	0
Republic of Latvia	2	0	0	0	3
Republic of Liberia	0	0	0	0	0
State of Libya	0	0	0	0	0
The Principality of Liechtenstein	2	0	0	0	0
Republic of Lithuania	9	0	0	0	9
The Grand Duchy of Luxembourg	0	0	0	0	1
Macao Special Administrative Region of the People's Republic of China	0	0	0	0	0
Republic of Madagascar	0	0	0	0	0
Republic of Malawi	0	0	0	0	0
Malaysia	1	0	0	0	1
Republic of Maldives	0	0	0	0	0
Republic of Mali	0	0	0	0	0
Republic of Malta	3	0	0	0	0
Martinique	0	0	0	0	0
Islamic Republic of Mauritania	0	0	0	0	0
Republic of Mauritius	0	0	0	0	0
United Mexican States	1	0	0	0	6
Principality of Monaco	0	0	0	0	0
Mongolia	0	0	0	0	7
Republic of Moldova	0	0	0	0	15
Montenegro	0	0	0	0	1
Montserrat	0	0	0	0	0
Kingdom of Morocco	0	0	0	0	3
Republic of Mozambique	0	0	0	0	0
Sultanate of Oman	0	0	0	0	0
Republic of Namibia	0	0	0	0	1
Republic of Nauru	0	0	0	0	0
Federal Democratic Republic of Nepal	0	0	0	0	2
The Netherlands	16	3	0	0	6
Country of Curaçao	0	0	0	0	0
Aruba	0	0	0	0	0
Saint Martin (NL)	0	0	0	0	0
Bonaire, Saint Eustatius and Saba	0	0	0	0	0
New Caledonia	0	0	0	0	0
Republic of Vanuatu	0	0	0	0	0

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	21
0	0	0	0	0
0	0	0	0	4
0	0	0	0	0
1	1	1	1	9
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
2	2	1	1	24
0	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	2
0	0	0	0	0
0	0	0	0	0
0		0	0	3
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	3	2	4	18
0	0	0	0	0
0	0	0	0	7
0	0	0	0	15
0	0	0	0	1
0	0	0	0	0
0	0	0	0	3
0	0	0	0	0
2	0	2	0	4
0	0	0	0	1
0	0	0	0	0
0	0	0	0	2
11	13	4	7	57
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
New Zealand	0	0	0	0	0
Republic of Nicaragua	0	0	0	0	0
Republic of Niger	0	0	0	0	0
Federal Republic of Nigeria	0	0	0	0	6
Niue	0	0	0	0	0
Norfolk Territory	0	0	0	0	0
Kingdom of Norway	3	1	0	0	0
Commonwealth of the Northern Mariana Islands	0	0	0	0	0
US Minor Outlying Islands	0	0	0	0	0
Federated States of Micronesia	0	0	0	0	0
Republic of the Marshall Islands	0	0	0	0	0
Republic of Palau	0	0	0	0	0
Islamic Republic of Pakistan	0	0	0	0	5
Republic of Panama	0	0	0	0	0
Independent State of Papua New Guinea	0	0	0	0	0
Republic of Paraguay	0	0	0	0	0
Republic of Peru	0	0	0	0	2
Republic of the Philippines	0	0	0	0	1
Pitcairn Islands	0	0	0	0	0
Republic of Poland	3	0	0	0	13
Republic of Portugal	22	4	0	0	9
Republic of Guinea-Bissau	0	0	0	0	0
Democratic Republic of Timor-Leste	0	0	0	0	0
Commonwealth of Puerto Rico	0	0	0	0	0
State of Qatar	0	0	0	0	0
Region of Réunion	0	0	0	0	0
Romania	5	0	0	0	16
Russian Federation	2	0	0	1	884
Republic of Rwanda	0	0	0	0	0
Community of Saint Bartholomew	0	0	0	0	0
Saint Helena, Ascension and Tristan da Cunha	0	0	0	0	0
Federation of Saint Kitts and Nevis	0	0	0	0	0
Anguilla	0	0	0	0	0
Saint Lucia	0	0	0	0	0
Community of Saint Martin	0	0	0	0	0
Territorial Community of Saint Pierre and Miquelon	0	0	0	0	0
Saint Vincent and the Grenadines	0	0	0	0	0
Republic of San Marino	0	0	0	0	0
The Democratic Republic of São Tomé and Príncipe	0	0	0	0	0
Kingdom of Saudi Arabia	0	0	0	0	4

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	6
0	0	0	0	0
0	0	0	0	0
2	3	1	3	12
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	5
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	2	2	2	9
0	0	0	0	1
0	0	0	0	0
2	5	2	9	34
4	4	1	1	41
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	21
4	12	2	8	912
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0		0
0	0	0	0	0
0	0	0	0	0
2	2	4	0	12

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Republic of Senegal	0	0	0	0	0
Republic of Serbia	0	0	0	0	4
Republic of Seychelles	0	0	0	0	0
Republic of Sierra Leone	0	0	0	0	0
Republic of Singapore	7	0	0	0	0
Slovak Republic	3	0	0	4	1066
Socialist Republic of Vietnam	0	0	0	0	23
Republic of Slovenia	21	1	0	0	6
Federal Republic of Somalia	0	0	0	0	0
Republic of South Africa	0	0	0	0	2
Republic of Zimbabwe	0	0	0	0	0
Kingdom of Spain	32	1	0	0	49
Republic of South Sudan	0	0	0	0	0
Republic of Sudan	0	0	0	0	1
Sahrawi Arab Democratic Republic	0	0	0	0	0
Republic of Suriname	0	0	0	0	0
Svalbard and Jan Mayen	0	0	0	0	0
Kingdom of Swaziland	0	0	0	0	0
Kingdom of Sweden	26	0	0	0	5
Swiss Confederation	10	0	0	0	5
Syrian Arab Republic	0	0	0	0	25
Republic of Tajikistan	0	0	0	0	2
Kingdom of Thailand	3	0	0	0	2
Republic of Tajikistan	0	0	0	0	
Tokelau	0	0	0	0	0
Kingdom of Tonga	0	0	0	0	0
Republic of Trinidad and Tobago	0	0	0	0	0
State of the United Arab Emirates	0	0	0	0	0
Republic of Tunisia	0	0	0	0	5
Republic of Turkey	1	0	0	0	43
Turkmenistan	0	0	0	0	0
Turks and Caicos Islands	0	0	0	0	0
Tuvalu	0	0	0	0	0
Republic of Uganda	0	0	0	0	0
Ukraine	0	0	0	1	425
Republic of Northern Macedonia	0	0	0	0	7
Arab Republic of Egypt	0	0	0	0	10
United Kingdom of Great Britain and Northern Ireland	25	0	0	0	4
Bailiwick Guernsey	0	0	0	0	0
Bailiwick Jersey	0	0	0	0	0

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	0
1	2	0	1	8
0	0	0	0	0
0	0	0	0	0
0	0	0	0	7
17	27	14	17	1,144
2	4	2	4	35
2	2	1	4	36
0	0	0	0	0
1	2	0	0	5
0	0	0	0	0
11	12	4	7	115
0	0	0	0	0
0	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
4	4	1	3	43
11	1	4	1	32
0	0	0	0	25
0	0	0	0	2
0	0	0	0	5
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2	0	2	2	6
0	0	0	0	5
2	4	2	5	57
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
4	14	4	11	458
0	0	0	0	7
0	0	0	0	10
4	5	11	4	53
0	0	0	0	0
0	0	0	0	0

>>>

Table 7.2: Mobility of students, academic and other staff by country*****
(irrespective of funding source) (the HEI simply fills in the table with the relevant values without further intervention)

CTU in Prague	Number of students sent*			Number of admitted students**	
Country	Total	Graduate internships (from total)******	Virtually[1] (of total)	Virtually[1] (of total)	Total
Isle of Man	0	0	0	0	0
United Republic of Tanzania	0	0	0	0	1
United States of America	23	0	0	0	17
US Virgin Islands	0	0	0	0	0
Burkina Faso	0	0	0	0	0
Eastern Republic of Uruguay	0	0	0	0	0
Republic of Uzbekistan	0	0	0	0	10
Bolivarian Republic of Venezuela	0	0	0	0	1
Wallis and Futuna Territory	0	0	0	0	0
Independent State of Samoa	0	0	0	0	0
Republic of Yemen	0	0	0	0	1
Republic of Zambia	0	0	0	0	0
Other	0	0	0	0	0
TOTAL	464	17	1	12	3,710

Note: * Outgoing students (i.e. number of departures) – students who have completed their stay abroad in 2020; students whose stay started in 2019 are also counted. Only students whose stay lasted at least 2 weeks (14 days) are counted.

Note: ** Arriving students (i.e. number of arrivals) – students who arrived in 2020; students whose stay started in 2019 are also counted. Only students whose stay lasted at least 2 weeks (14 days) are counted.

Note: *** Outgoing academic/other staff (i.e. number of departures) – staff who have completed their stay abroad in 2020; staff whose stay started in 2019 are also counted. Only staff whose stay lasted at least 5 days are counted.

Note: ****Incoming academic/other staff (i.e. numbers of arrivals) – staff who arrived in 2020; staff whose stay started in 2019 are also counted. Only staff whose stay lasted at least 5 days are counted.

Note: ***** Table 12.3 Mobility of students and academic and other staff by country lists all countries; the purpose is to facilitate the processing of the data obtained by the MoEYS. At the same time, it should not represent an additional burden for universities to complete. If there is no mobility from a given country, please do not fill in the cell.

Note: ****** Graduate internship means a practical internship in a foreign company or organisation for a period of 2–12 months, started after successful graduation and completed within one year of graduation. The graduate traineeship is implemented on the basis of a tripartite agreement between the student, the sending higher education institution and the receiving organisation, institution, enterprise.

Note: [1] If virtual mobility has not been implemented at the HEI, enter zero. If it has taken place but data are not available, please provide a qualified estimate and comment on the cell(s)/column (e.g. qualified estimate). If a qualified estimate cannot be provided, leave the cell blank and comment on the cell(s)/column (e.g. n/a).

Number of seconded academic staff***	Number of admitted academic staff****	Počet vyslaných oNumber of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	0
0	0	0	0	1
7	2	5	7	61
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	2	0	2	14
2	2	0	0	5
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1
0	0	0	0	0
0	0	0	0	0
198	248	133	198	4,951

Table 7.3: Graduate mobility** (numbers and proportions of graduates)

CTU in Prague	Bachelor studies	
	proportion	number
Faculty of Civil Engineering*		
Percentage [%] and number of graduates who went on a foreign stay of at least 14 days during their studies	6,3%	25
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	2,4%	7.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Electrical Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	6,9%	22.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Information Technology*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	8,8%	20.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Transportation Sciences*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	0,8%	1.0
Percentage [%] and number of doctoral graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Nuclear and Physical Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	2,0%	2.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Architecture*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	1,1%	2.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Biomedical Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	0,4%	1.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
University-wide departments (study outside faculties)*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	7,0%	10.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
CTU in Prague		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	4,5%	90.0
Percentage [%] and number of doctoral graduates whose length of stay abroad was at least 1 month (i.e. 30 days)		

Note: * A faculty or other part of a university implementing an accredited study programme.

Note: ** Total values for both the faculty (last field in the top row for each faculty) and the college (all blank fields for the college in the structure of the LFS) are not the sum or average of the previous data in the rows or columns. The values in these cells need to be calculated separately.

Master's studies		Continuing Master's studies		Doctoral studies		TOTAL**	
proportion	number	proportion	number	proportion	number	proportion	number
	0	9.9%	44	45.5%	15	9.6%	84
				45.5%	15.0	45.5%	15.0
	0.0	9.0%	29.0	0.0%	0.0	5.6%	36.0
				0.0%	0.0	0.0%	0.0
	0.0	17.4%	58.0	11.8%	4.0	12.2%	84.0
				11.8%	4.0	11.8%	4.0
	0.0	24.6%	33.0	50.0%	1.0	14.9%	54.0
				50.0%	1.0	50.0%	1.0
	0.0	12.1%	11.0	0.0%	0,0	5.2%	12.0
				0.0%	0.0	0.0%	0.0
	0.0	22.4%	17.0	16.7%	4.0	11.6%	23.0
				16.7%	4.0	16.7%	4.0
	0.0	36.3%	74.0	0.0%	0.0	19.5%	76.0
				0.0%	0.0	0.0%	0.0
	0.0	5.5%	8.0	0.0%	0.0	2.3%	9.0
				0.0%	0.0	0.0%	0.0
	0.0	16.4%	20.0	0.0%	0.0	11.2%	30.0
				0.0%	0.0	0.0%	0.0
	0.0	15.7%	294.0	16.6%	24.0	10.1%	408.0
				16.6%	24.0	16.6%	24.0

Table 8.1: Conferences (co-)organised by the university (numbers)

CTU in Prague	With more than 60 participants		International Conference**	
	Physical***	Virtual***	Physical***	Virtual***
Faculty of Civil Engineering	3	3	0	5
Faculty of Mechanical Engineering	3	0	1	1
Faculty of Electrical Engineering	0	1	0	1
Faculty of Nuclear and Physical Engineering	1	4	1	3
Faculty of Architecture	0	1	0	1
Faculty of Transportation Sciences	0	2	0	2
Faculty of Biomedical Engineering	0	4	1	0
Faculty of Information Technology	1	4	1	1
Klokner Institute	0	0	0	0
Masaryk Institute of Advanced Studies	0	0	0	0
University Centre for Energy Efficient Buildings	0	1	0	0
Czech Institute of Informatics, Robotics and Cybernetics	2	17	0	8
Institute of Technical and Experimental Physics CTU	0	0	0	0
TOTAL	10	37	4	22

Note: * Faculty or other part of the university implementing the accredited study programme

Note: ** An international conference is a conference in which at least one foreign speaker participates and all papers are localized in at least one of the following languages – English, French, German, or in a language specific to the discipline of the conference, e.g. for philology.

Note: *** A conference falls into a category if more than 50% of the participants (also estimated) attended the conference in a given form. Categories are exclusive.

CONFERENCES (TOGETHER) ORGANISED BY THE UNIVERSITY

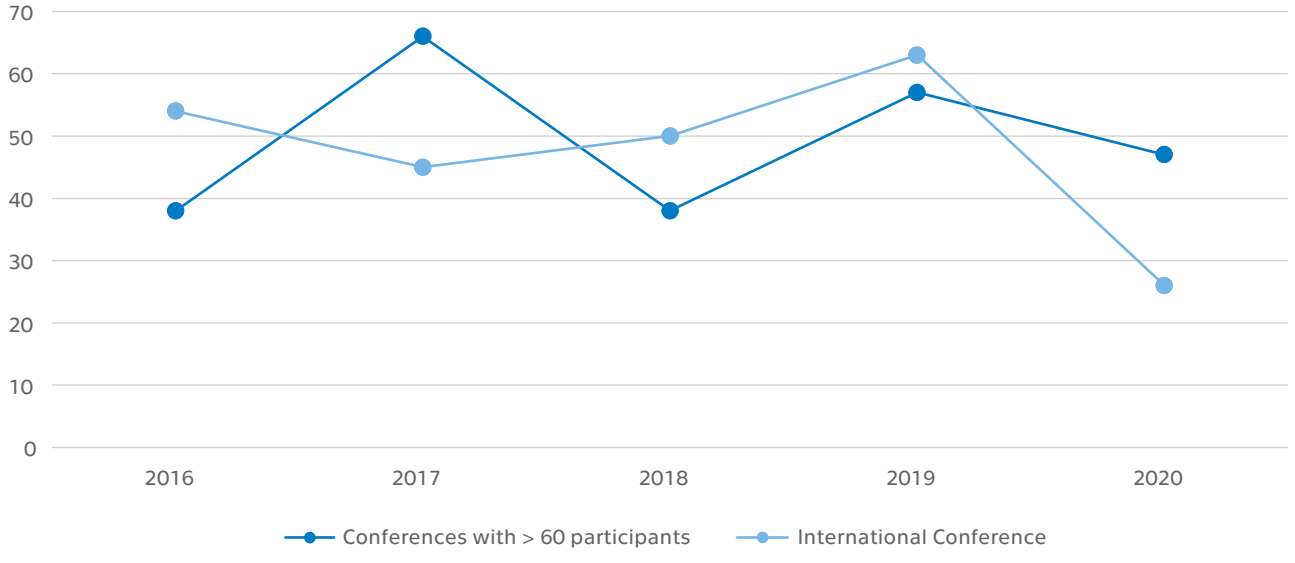


Table 8.2: Experts from the application sphere* involved in teaching and practice in accredited study programmes (numbers)

CTU in Prague	Persons having an employment relationship with the university or a part thereof			Persons who do not have an employment relationship with the university or any part thereof		
	Number of persons involved in teaching	Number of persons involved in the supervision of the thesis	Number of people involved in providing work experience**	Number of persons involved in teaching	Number of persons involved in the supervision of the thesis	Number of people involved in providing work experience***
Faculty of Civil Engineering	119					
of which women	42					
Faculty of Electrical Engineering	28	94		4		3
of which women	5	9				
Faculty of Nuclear and Physical Engineering	102		2	4	60	3
of which women	50		1	2	30	1
Faculty of Architecture	42	25				
of which women	12	5				
Faculty of Transportation Sciences	211	211			1	
of which women	65	65				
Faculty of Biomedical Engineering	95	52	13			37
of which women	41	20	11			26
Faculty of Information Technology	23	17	13	12	59	
of which women	4		11	3	11	
Masaryk Institute of Advanced Studies	19	15	1	9		
of which women	9	7	1	5		
TOTAL	639	414	29	29	120	43
of which women	228	106	24	10	41	27

Note: * Experts from the application sphere involved in at least one third of the time schedule in teaching at least one course or are supervisors of the student's thesis. If the individual is a full-time employee of the university/faculty, he/she should have at least as many the same amount of time outside the HEI/faculty.

Note: ** Faculty or other unit of the university carrying out an accredited programme of study/field of study.

Note: *** These are persons with direct responsibility for the student's professional practice.

Table 8.3: Study fields/programmes**** that have in their content the compulsory completion of professional practice*** for at least 1 month* (numbers)

CTU in Prague	Number of fields of study/ programmes****	Number of active studies					
		Bachelor studies		Master's studies		Continuing Master's studies	
		Academic profile	Professional profile	Academic profile	Professional profile	Academic profile	Professional profile
Faculty of Civil Engineering	1		58				
Faculty of Biomedical Engineering	16	2	10				4
TOTAL	17	2	68				4

Note: * The duration of the individual compulsory work experience could be shorter, but it must be at least 1 month in total.

Note: ** Faculty or other part of the university implementing the accredited study programme/discipline

Note: *** A compulsory internship is one that is part of the accreditation of a given field of study, which may be part of a course or a separate course. These are professional professional practices.

Note: **** HEI shall provide the data related to the lowest accredited unit – graduate study programme, if the study programme is not divided into study programmes, the data for the study programme

Table 8.4: Transfer of knowledge and research results into practice

CTU in Prague	IN THE CR	Abroad	Number TOTAL	TOTAL revenue
Number of new spin-off/start-ups*				
Patent applications filed	29	7	36	
Patents granted**	46	19	65	
Registered utility models	102	1	103	
Licensing agreements in force at 31.12.	16		16	
Licensing agreements newly concluded	7		7	420,000.00 CZK
Contract research***, consultancy and advisory services***				
Paid training courses for employees of application entities***				

Note: * These are newly established spin-off/start-up companies supported by the university in 2020 (numbers).

Note: ** In the case of the European patent, the item „Abroad" is only reported once in the table, regardless of the number of countries designed.

Note: *** The definitions of the items relating to income and the values in the table for these items correspond to the Annual Financial Report 2020 for HEIs (Table 6). The SVS shall fill in these items at its discretion.

A licence agreement is defined as the grant of a right, to an agreed extent and in an agreed territory, to acquire or licence any of the intellectual and industrial property rights. Licensing agreements are concluded for patented inventions or registered utility models, industrial designs, topographies of semiconductor products, new plant varieties and animal breeds or trademarks by means of a written agreement. The provider authorises the acquirer to exercise the intellectual and industrial property rights to the agreed extent and in the agreed territory and the acquirer undertakes to provide certain remuneration (royalties) or other property value. In doing so, the acquirer is not at risk of being accused of infringing the intellectual property or copyright of the licensor.

Contract research is custom research that is based on collaboration (interaction) specifically meeting the research needs of the application entities and is carried out by the higher education institution for the application entity according to its requirements and needs. It receives funding for this research from the HEI. Typically, this includes large-scale projects, original research and written reports. Usually, the research is commissioned by one particular external organisation (for its needs). It is not decisive whether the funding spent by the application entity on such contract research comes from public or private sources. Contract research cannot be considered to be a case where the university is the recipient of earmarked support for applied research.

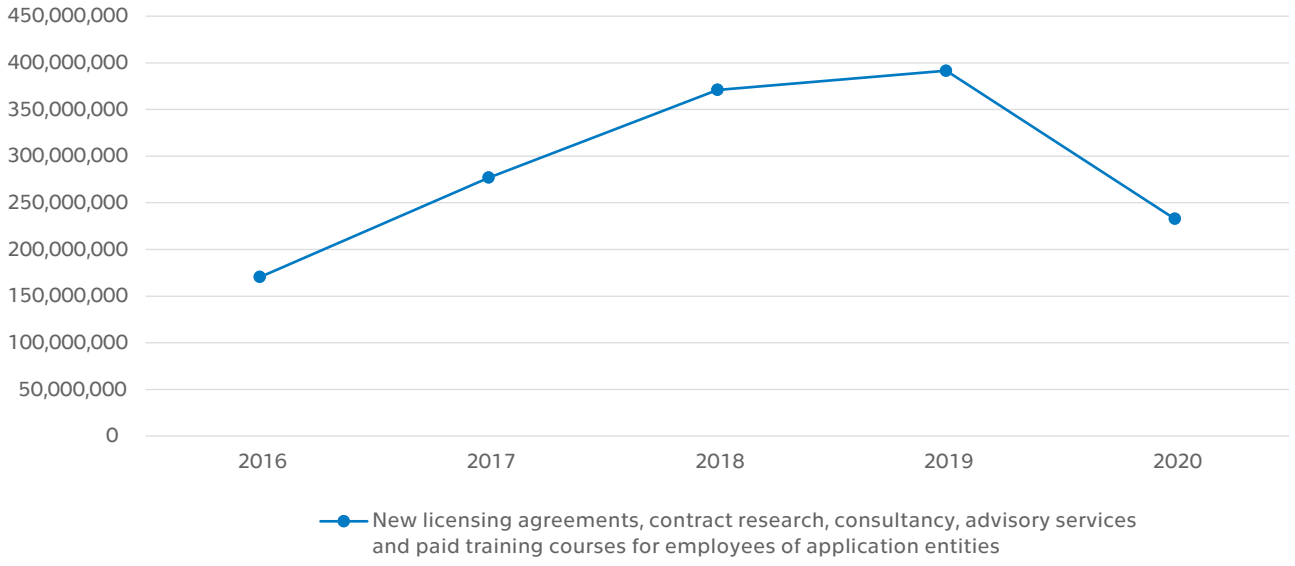
Paid training courses to improve the qualifications of employees of the application entities (e.g. corporate training courses). An application sector entity is defined here as a legal entity whose main activity is not research and development. It can be a business entity, a public administration body, a non-profit organisation, etc. – always with the condition that the main activity is not research. Revenue will be included from those training courses which are ‚bespoke', i.e. agreed with the organisation concerned for its staff. This does not involve quantifying the costs of participants in training courses who are employed by a company that meets the above definition. On the contrary, these are courses that were created in agreement with the selected company because it wanted to train its employees.

Consultation and advice is based on the provision of expert advice, opinion or action, which depends on a high level of intellectual input from the higher education institution to the client. The university provides consulting and advisory services to application entities for a fee and in accordance with market conditions. The main desired outcome of the consultancy is not the creation of new knowledge, but the understanding or comprehension of a certain condition.

The table will be supplemented with data from faculties

Summary information on Table 8.4		
New licensing agreements, contract research, consultancy, advisory services and paid training courses for employees of application entities	Number TOTAL	Total revenue
	854	232,788,128.70 CZK
	Average revenue per 1 order	
	272,586 CZK	

TRANSFER OF KNOWLEDGE AND RESEARCH RESULTS INTO PRACTICE (TOTAL INCOME IN CZK)



NEWLY CONCLUDED LICENCE AGREEMENTS

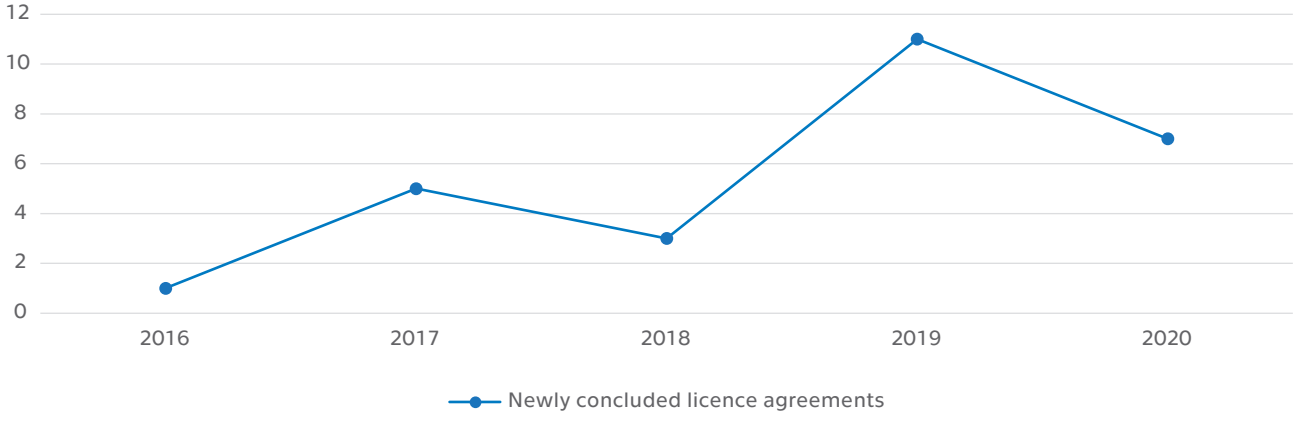
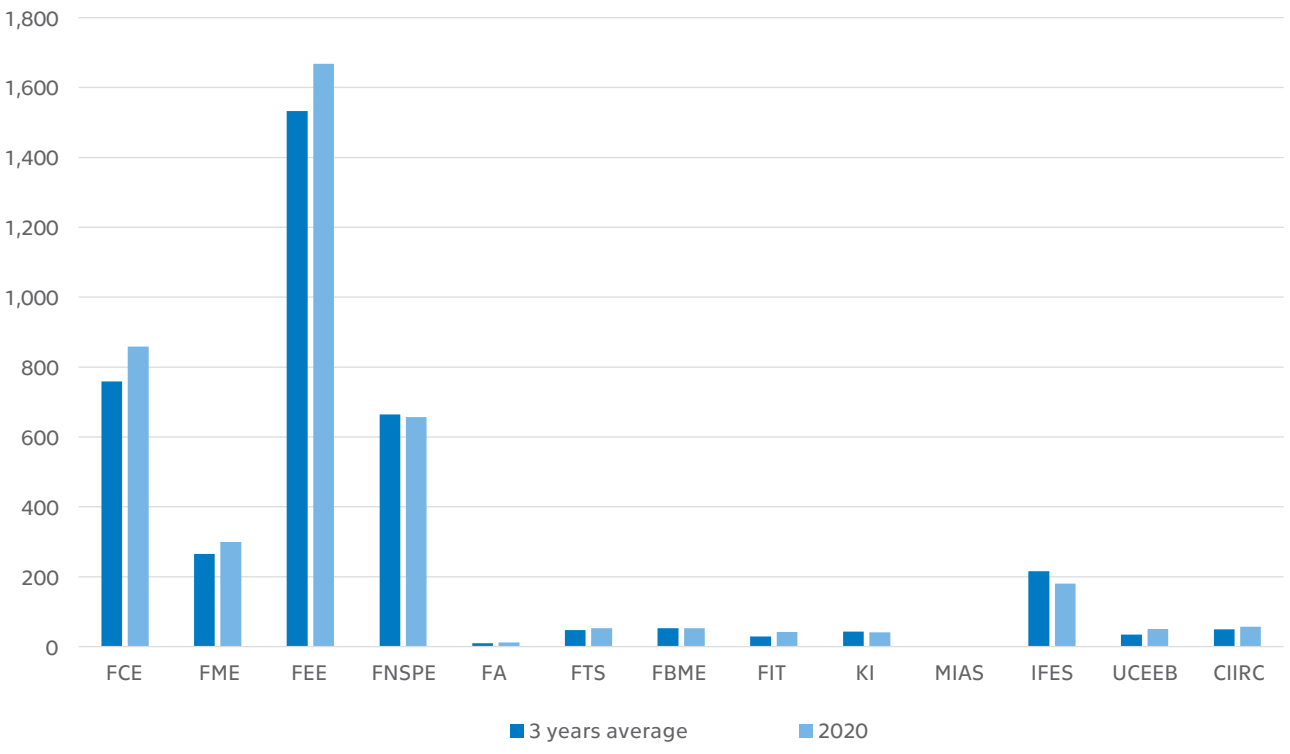


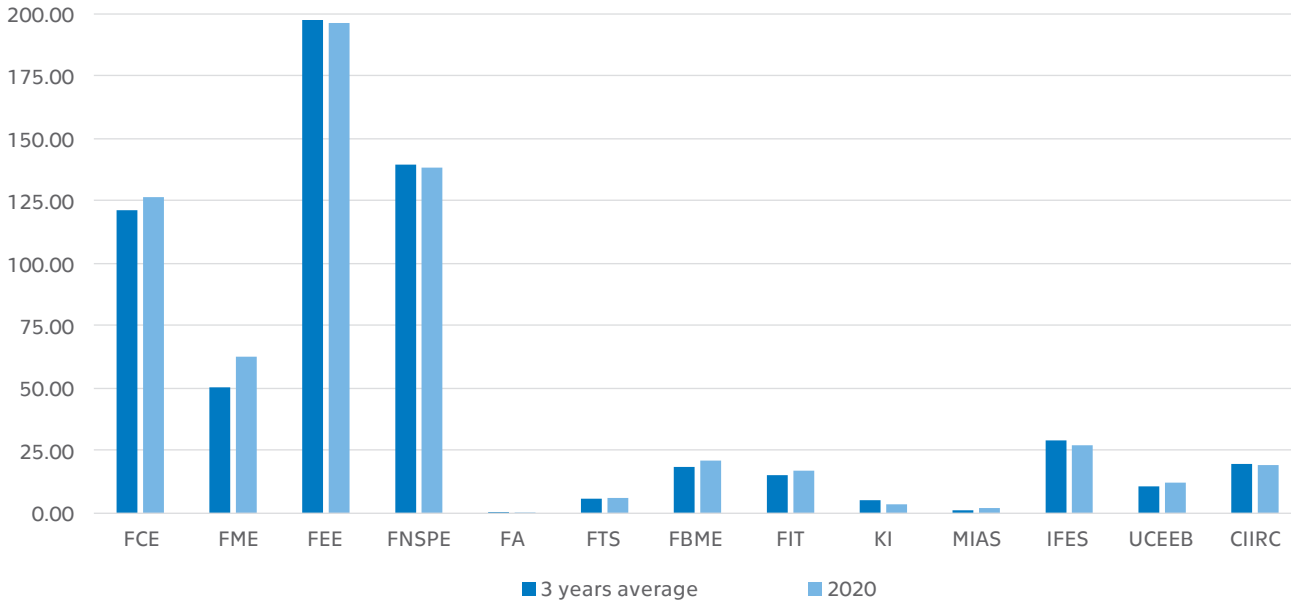
Table 8.5: Citations and impacted publications standardized median of disciplines (converted to number of full-time equivalents) (number of persons)

CTU in Prague	Citation			Publications		
	3 years average	2020	2020 per FTE	3 years average	2020	2020 per FTE
Faculty of Civil Engineering***	759.19	858.47	1.29	121.47	126.62	0.19
Faculty of Engineering***	265.50	299.34	0.55	50.53	62.68	0.12
Faculty of Electrical Engineering	1,532.90	1,667.82	2.54	197.74	196.43	0.30
Faculty of Nuclear and Physical Engineering	664.13	657.12	1.72	139.70	138.45	0.36
Faculty of Architecture	9.82	12.34	0.07	0.44	0.30	0.00
Faculty of Transportation Sciences	46.90	52.67	0.19	5.90	6.15	0.02
Faculty of Biomedical Engineering	53.15	52.26	0.31	18.65	21.10	0.13
Faculty of Information Technology	28.80	42.21	0.24	15.26	17.10	0.10
Klokner Institute	43.26	41.45	0.57	5.25	3.55	0.05
Masaryk Institute of Advanced Studies	1.06	0.35	0.00	1.27	2.10	0.03
Institute of Technical and Experimental Physics	215.75	180.75	2.80	29.17	27.28	0.42
University Centre for Energy Efficient Buildings	35.03	50.49	0.38	10.74	12.29	0.09
Czech Institute of Informatics, Robotics and Cybernetics	49.08	57.27	0.27	19.74	19.38	0.09
University total	3,704.55	3,972.54		615.85	633.44	
University average			1.10			0.18

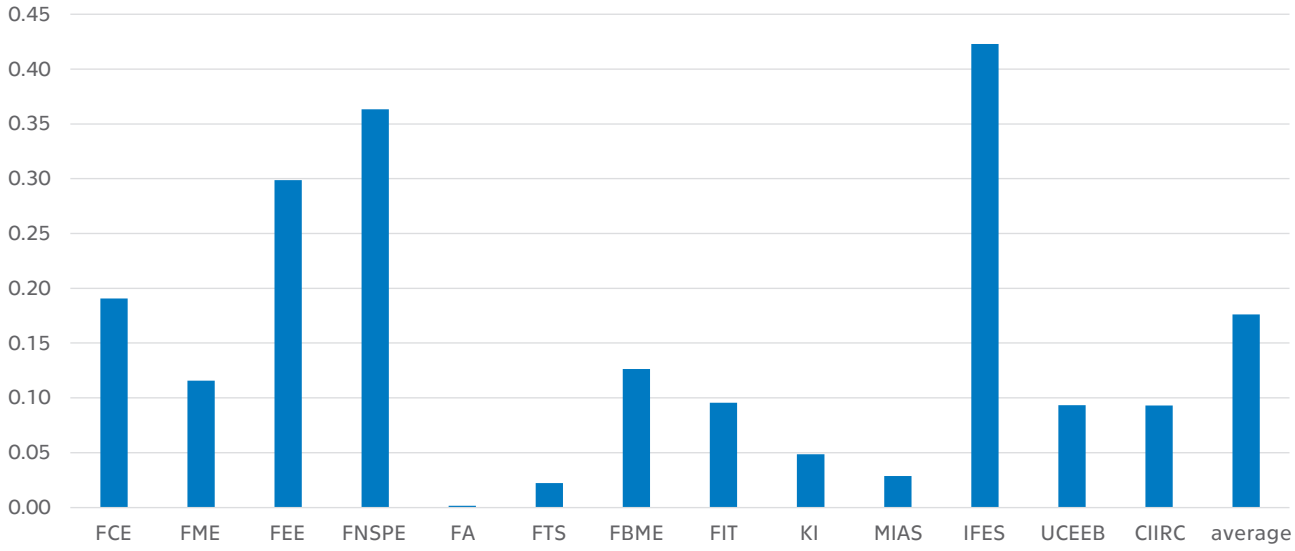
CITATION



PUBLICATIONS



2020 PUBLICATION POINTS PER FTE



2020 CITATION POINTS PER FTE

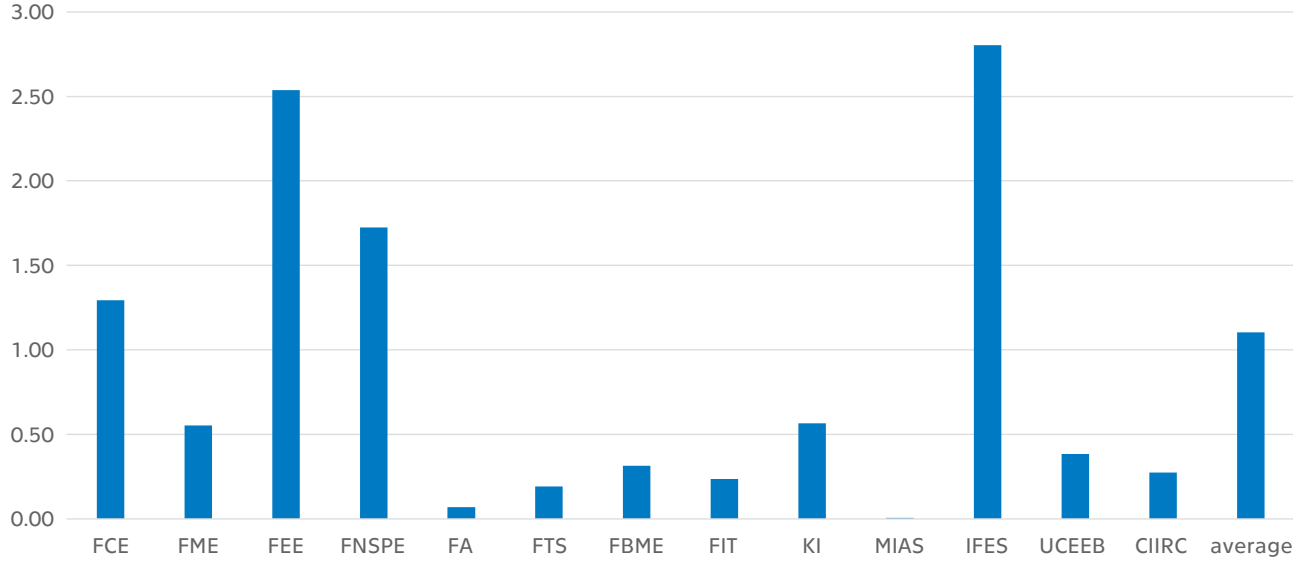


Table 8.6: Faculty citation performance from the perspective of the QS and THE rankings

CTU in Prague	CTU average	Faculty of Civil Engineering	Faculty of Mechanical Engineering	Faculty of Electrical Engineering	Faculty of Nuclear and Physical Engineering	Faculty of Architecture
QS Ratio of foreign academic and scientific staff	12%	4%	4%	19%	17%	5%
QS Ratio of international students	21%	16%	17%	28%	21%	26%
QS Citations / Academics and researchers	8.5	3.7	5.4	6.4	27.4	0.1
THE Citation / Publication	5.3	4.8	7.4	5.1	4.6	10.6

CTU does not submit citation data from QS and THE rankings, they extract data directly from Scopus and modify them according to their own methodology. A precise retrospective analysis of the impact of citations on the rankings is not possible for the following reasons:

Both QS and THE use a complex process of standardisation and weighting within topics and publication type, this process is not public, the weights change each year according to the averages within each category

QS a the vyberou údaje mírně odlišně (i když oba údaje sbírají od společnosti Scopus)

QS and THE use a different methodology to calculate the final score (Citation per faculty member vs. Citation per publication)

To get a clearer picture of faculty performance in terms of evaluation, available internal data was used and custom evaluation methodologies were developed:

Citation data provided by the Central Library of CTU, 2016–2020

The absolute number of publications and citations was normalized annually according to the weight of the evaluation agencies: (2020*0.30) + (2019*0.25) + (2018*0.20) + (2017*0.15) + (2016*0.10)

Using staff data (provided by the HR department of R CTU) and citation data (normalized for the year), scores for citations per faculty (QS) and citations per paper (THE) can be calculated.

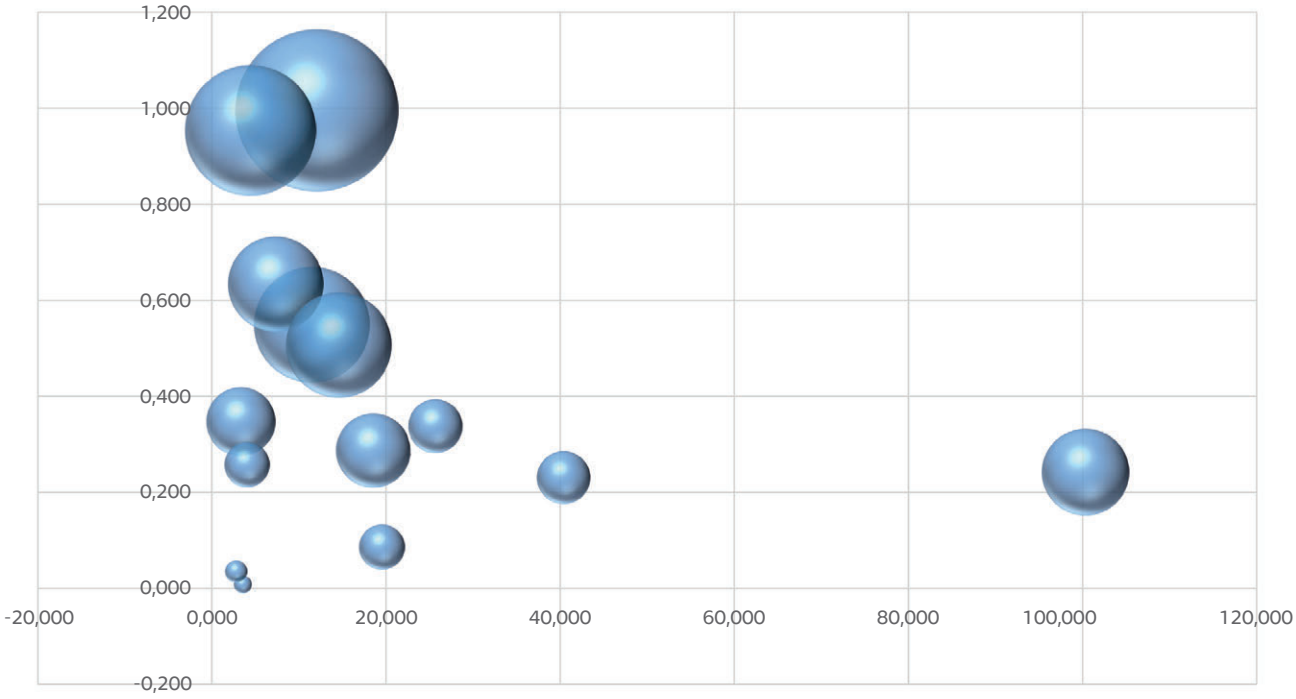
Thus, the results will not be the same as the assessment agencies' scores (especially since it is not known how the assessment agencies assign weight by subject and sub-subject), but they provide a broad picture of faculty performance with an „assessment filter."

Example: using this internal methodology to look at citations from an evaluation perspective, we have a result of Citations per academic/researcher = 8.5. This is the result of the absolute number of citations from 2016–2020 weighted by year and then divided by academic/researcher FTE: ((25,322*0.30) + (24,665*0.25) + (20,739*0.20) + (17,728*0.15) + (16,072*0.10)) / 2,613.79 = 8.5

Faculty of Transportation Sciences	Faculty of Biomedical Engineering	Faculty of Information Technology	Klokner Institute	Masaryk Institute of Advanced Studies	Institute of Technical and Experimental Physics	University Centre for Energy Efficient Buildings	Czech Institute of Informatics, Robotics and Cybernetics
8%	7%	17%	2%	10%	47%	10%	23%
25%	9%	28%	0%	9%	0%	0%	0%
1.7	1.8	0.7	1.5	0.0	114.9	1.7	1.2
9.3	2.2	2.2	6.6	1.0	7.3	2.6	3.0

Table 8.7: International evaluation panel

CTU in Prague	Contracts		Citation
	kEUR/FTE	IF/med/FTE	points
Faculty of Civil Engineering	11.47	0.550	1.011
Faculty of Mechanical Engineering	18.52	0.288	0.416
Faculty of Electrical Engineering	12.06	0.996	2.004
Faculty of Nuclear and Physical Engineering	4.43	0.955	1.293
Faculty of Architecture	3.51	0.008	0.022
Faculty of Transportation Sciences	19.51	0.087	0.154
Faculty of Biomedical Engineering	3.32	0.348	0.358
Faculty of Information Technology	4.02	0.259	0.153
Klokner Institute	100.33	0.243	0.570
Masaryk Institute of Advanced Studies	2.78	0.036	0.034
Institute of Technical and Experimental Physics	7.30	0.634	0.684
University Centre for Energy Efficient Buildings	40.36	0.232	0.210
Czech Institute of Informatics, Robotics and Cybernetics	25.64	0.339	0.216
TOTAL	14.56	0.507	0.832



Note: * Comparison of CTU units according to impacted publications (vertical axis, for each publication IF/median of the field corresponding to the author's share of the unit's employees), citation rate (size of the sphere indicating the unit's location) and income from economic activity (horizontal axis), all per 1 FTE. The sphere not marked with a solid line indicates the average of the CTU.

Table 12.1: Accommodation, catering	
CTU in Prague	**Number of**
Total bed capacity of university halls of residence	7,418
Number of beds in rented facilities	0
Number of applications/reservations for accommodation submitted as of 31. 12. 2020	10,122
Number of successful applications/reservations for accommodation as of 31. 12. 2020	8,927
Number of bed days in 2020	1,982,292
Total number of terminated contracts (pandemic)*	1,266
Total number of modified contracts (pandemic)**	2,295
Total number of contracts with exceptions (pandemic)***	871
Number of main meals issued to students in 2020	284,855
Number of main meals issued in 2020 to college staff	46,681
Number of main meals issued in 2020 to other diners	354,504

Note: * Number of contracts that were terminated during the year as a result of the government's anti-pandemic accommodation measures.

Note: ** Number of contracts that were modified during the year as a result of the government's anti-pandemic accommodation measures. This does not have to be a formal modification of the contract, but a change in performance – typically a reduction in the price of accommodation where accommodation is retained by the student although not physically used.

Note: *** Number of contracts that remained in force for the exemption from the accommodation ban resulting from the government's anti-pandemic accommodation measures. This includes, for example, students with work orders, volunteers, students who have declared a college residence, etc.

ACCOMMODATION SERVICES AT CTU

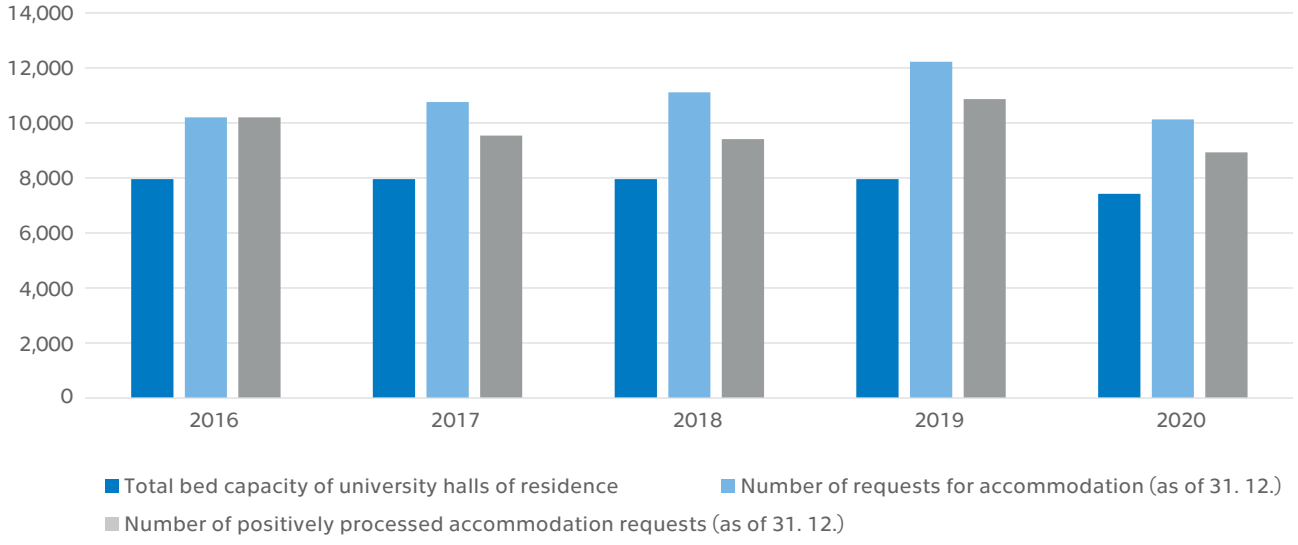


Table 12.2: University libraries	
CTU in Prague	**Number of**
Increase in the library collection for the year	4,281
of which increase in physical units	4,242
of which e-books in permanent purchase	39
Total library stock	488,349
of which physical units	485,413
of which e-books in permanent purchase	2,936
Number of periodical titles subscribed:	
– Physical	234
– electronically (estimate)*	7
– in both forms**	0

Note: * Only periodical titles that the library itself subscribes to (or receives as a gift, exchange) in paper or electronic versions are listed; other periodicals that library users have access to as part of full-text resource consortia are not included.

Note: ** Only titles where both forms are paid for separately are included in the number of titles in both forms (i.e. if the printed form is prepaid and the electronic form is free as a bonus, only the printed form is included, etc.).

Note: Electronic units include only individually purchased titles, not books and periodicals that are part of subscription „packages" from publishers of scholarly and scientific literature.

LIBRARY FUND (PHYSICAL UNITS, E-BOOKS ON PERMANENT PURCHASE)