CTU

CZECH TECHNICAL UNIVERSITY IN PRAGUE

ANNUAL REPORT ON ACTIVITIES 2021

Annual Report on Activities of CTU in Prague in 2021

Prague, May 2022

Annual Report on Activities of CTU in Prague for 2021
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Dear readers,

You hold in your hands the report of another year that has been significantly affected by the coronavirus pandemic. It cannot be said that we have learned to live with covid in 2021, but we have certainly learned to work with it - at least on a research and scientific basis. Likewise, we have adapted to the restrictions in place for teaching, but also for cultural and social events.
I am deeply convinced that it would be a mistake to limit the world of the Czech Technical University in Prague only to "technology". As one of the most important Czech universities and one of the oldest universities with a technical focus in Central Europe, we are the bearers and representatives of certain values and principles that cannot be compromised. And here we are already moving from the universal, in a way, purely scientific and technical world to the cultural and social world.
The attitude and approach of the CTU affects not only its academic staff, domestic and foreign students or the administration of the Rector's Office and individual faculties and institutes. We are also a role model or even a model of behaviour for many "external students". In difficult times, we should never forget this. And I dare to say that we are succeeding, for which I thank all people associated with the CTU brand from the bottom of my heart.
Let me now summarize what happened at our university in 2021.

Election of new leadership

I will start with what happened towards the end of 2021, but which will have a significant impact on our institution for years to come. Five new deans have been elected by the academic senates of their respective faculties.
As far as the position of Rector is concerned, on 27 October the Academic Senate of the Czech Technical University in Prague elected me as the person nominated as Rector of the CTU in Prague. In the first round of the election, I received 30 votes out of a total of 36, and I was the only candidate proposed to the Academic Senate of the CTU. My second term of office will last until 2026.
I firmly believe that together we will form a team that will lead constructive discussions on various topics, but will always be aware of the necessary unity in (re)presenting CTU to the outside and inside world and together we will strive for the development of teaching, research and spreading the good name of CTU in the Czech Republic and around the world.

The coronavirus continued to affect our lives

Even covid did not prevent us from continuing with important international projects. We also succeeded in transferring knowledge from the scientific environment to the application sphere. The coherence of these activities was very important in relation to addressing the needs of society in the face of the ongoing crisis. CTU confirmed its excellence not only on a national but also on an international scale, interdisciplinary with the participation of all faculties, university institutes and units. We commemorated one year since the first successful clinical use of the CoroVent pulmonary ventilator, but we also reintroduced a way to minimize the effects of covid pneumonia using laser therapy - both thanks to the Faculty of Biomedical Engineering. Experts from the same faculty are making 3D models of patients' hearts to help doctors improve the success rate of operations. However, the Faculty of Civil Engineering also cared about hearts - and about the "heart of the Vltava"; it began preparing an extensive interactive exhibition about our national river.
For example, we also helped in an area that has become highly topical due to the pandemic: the application of the Faculty of Information Technology offered people an easier passage through the insolvency process.

Contactless study - and graduation

I am truly grateful for the technology that in today's world makes it possible to keep teaching even though it has been forbidden for more people to meet in person. Teachers, students, as well as individual faculties and university institutes of CTU have seamlessly continued distance education, which, moreover, has been continuously improved.
We were even the first university in the Czech Republic to hold a contactless graduation. It happened at the Faculty of Nuclear and Physical Engineering in March 2021.

Of course, you will read about other innovations in this annual report, including how digitisation has had a huge impact on our lives - a covid necessity perfectly tested in practice; from February 2021, for example, students can download an electronic certificate of study bearing an electronic seal and a qualified time stamp from the CTU information system.
However, digitalization is also related to privacy protection, which is why the CyberSec&AI Connected 2021 conference was held at the university and with our organizational participation, which focused on the role of artificial intelligence (AI) in the field of Internet user privacy. The aim was to bring together representatives from academia and industry on issues related to privacy in the digital world.
At the end of my first term, I also initiated the creation of the university think-tank UNI-T, which aims to create independent solutions to society's problems and draws on the competences of specialists from the academic sphere.

Study programmes - we think of everyone, bilingually

In 2021, the CTU offered accredited bachelor's, master's and doctoral study programmes in accordance with the study plans mainly in the Czech language and selected programmes in English for both domestic and foreign students. Thus, we continue to pursue one of our goals, which is the internationalisation of teaching in a perfectly bilingual environment. Bilingualism is ensured, for example, through the website, but also through the dedicated projects Study at CTU or Study in Prague. The needs of students with disabilities are also taken into account. An important role at CTU is also played by the support of future female students of technical disciplines within the project Girls, beware!
With its study programmes, CTU responds promptly to the development of social challenges in all areas of its activities. The interconnection of teaching and practice is a very important evaluation criterion when studying at CTU, and the requirements of practice are transferred into the topics of qualification papers in accordance with the trend in the given field. Individual faculties and university institutes approach the involvement of practice in teaching individually and on the basis of subject specifics.
The CTU also offers a wide range of educational activities within the framework of lifelong learning (LLL) and the University of the Third Age (U3V). In this case, too, given the focus of the university, attention is paid to technical disciplines, which are increasingly interdisciplinary and are also reflected in the social sciences. Since 2021, the new czv.cvut.cz portal has been fully used to make the offer more transparent, facilitate registration and course administration.
I am convinced - and I know this from personal meetings with many of the participants - that the University of the Third Age means for many people the opportunity to be part of the academic world in general, something that was often denied to them by the communist regime during their youth and active study years. I am happy that at least now, in a more or less free time and in a democratic world, we can offer this academic belonging to those interested. And I thank all the faculties (their programmes are detailed in the annual report) for their varied educational offerings.
At the same time, I would like to highlight the activities of the Masaryk Institute of Advanced Studies, which last year significantly participated in the activities of CTU and also found its enthusiastic audience. For example, language courses for employees and the public, Czech language courses for foreign students and a specialisation course for coaches were held here. As part of the support for the integration of foreign workers at CTU, the MIAS also organised Czech language courses and a cultural history course Czech Culture and Civilization.
In general, a total of 586 lifelong learning courses were implemented at CTU in 2021, with a total of 2,691 enrolled participants.

For students to be successful

Coronavirus has affected all education in the Czech Republic, starting from primary schools. The disparity in the level of preparation of individual secondary school students, i.e. candidates for higher education, has increased, especially in mathematics. We are trying to compensate for their different levels of knowledge right from the start and prepare them for a demanding course of study that is primarily based on mathematics and science.
In order to minimise academic failure, faculties and units try to eliminate it during the first months of study. For this reason, elective courses are offered, for example, so-called repertories, designed for the repetition of learned material, or individual consultations with teachers and study counsellors. Various forms of online mentoring, already in place or newly applied, have proved to be very useful. Many thanks to all the mentors (and their parent companies) who participate in the education of our students.
I will not list here all the activities and programmes offered by our faculties and institutes that contribute to increasing the knowledge and competitiveness of CTU graduates, but I firmly believe that you will read them yourself in the annual report. It is a long and enjoyable reading. And it is far from just the measures we have taken in relation to the coronavirus (such as limiting the extension of studies, etc.).

Scholarships for the best, counselling for the needy

A scholarship is a motivational element that supports particularly talented or otherwise outstanding students at CTU. The support is directed towards participation in study stays abroad and at faculty events as well as a reward for an excellent bachelor's or master's thesis. The best studio projects are also rewarded in this way. The use of the scholarship is also possible in case of a difficult social situation, so that the studies can be successfully completed. Each faculty approaches the use of scholarship programs differently, but always in accordance with the CTU Scholarship Regulations.
Information and counselling services are provided through the Centre of Information and Counselling Services of CTU, Career-

Centre of CTU and the ELSA Centre for the Support of Students with Specific Needs. All of these centres are used by all faculties with an emphasis on continuous improvement of the professional qualifications of the staff of these centres and the quality of the services provided in accordance with the individual needs of students.
The Centre for Information and Counselling Services of the CTU supports students to be successful in their studies and in their professional and personal lives. CIPS is particularly focused on working with students who have problems with procrastination and computer addiction - problems that have unfortunately seen a marked increase due to the pandemic environment and distance learning.
Naturally, this chapter also includes the activities of our developing Career Centre, which helps with subsequent employment (although our graduates generally have no problem with it, which, in addition to the results in international rankings of individual universities, I consider another highly important indicator of the quality of CTU), or the programme to support exceptionally talented students. It is worked with these students from the first year of study in the form of motivational scholarships. They also have the opportunity to participate, for example, in the research activities of individual departments as student researchers, etc.
And, of course, we help every one of the thousands of students who find themselves in a difficult life/social situation. Talent development and emphasis on access to education will never cease to be a priority for CTU!
Because we value our students, we are interested in their life stories after graduation - this is where the Alumni Association comes in. In the future, I believe in a significant development of its activities and significance. In cooperation with it, but not only in this way, we intend to deal even more with the statistics of the employment of our graduates (including those who are five years or more after graduation) on the labour market. It will be a successful statistic. That is why the interest in studying at CTU is growing again. We help this, of course, with regular events such as Open Days, career fairs, etc.

We're doing the best we can

As I have already said, I do not want to list here at this time the specific facts that you will read in the annual report, whether it is about numbers or about the activities and achievements of individual faculties and institutes, their staff and students. But I fully recommend that you read this annual report leaf by leaf, and I implore you to do so. It is the most eloquent calling card of the Czech Technical University in Prague.
With the utmost respect and humility, I thank all those who have contributed to CTU becoming an increasingly successful, important and sought-after university and research and scientific institution, even in international comparison. At the same time, we have once again managed to practically help during the global pandemic, which makes me doubly happy. On 30 November 2021, I presented a medal for deployment in times of crisis to, for example, the CoroVent pulmonary ventilator team from FBME or colleagues from the CIIRC, thanks to whom the full-face mask for frontline doctors, the RP95-M protective half-mask produced by 3D printing or the "Pipette" robot with its fine and precise pipetting of samples for testing COVID-19 disease were developed.
I believe that everyone at CTU on their own is "doing the best they can". Despite this, in 2021 we still modified the Career Code, which continuously improves the quality of teaching and creative activities and their evaluation according to European standards with an emphasis on the requirement of excellence and international competitiveness. In addition, the Career Code was supplemented by the Code of Ethics, approved by the Academic Senate of CTU.
In 2021, emphasis was also placed on supporting the university's information infrastructure, e.g. the use of the Anlupa.cz application, which helps all those seeking funding for their research, experimental development and innovation and international projects. In its digital development plans, CTU supports the principle of Open Access publishing of preprints, e.g. by using the university's D-Space repository or departmental repositories within arXiv.org.
Efforts of the individual faculties and institutes of CTU are aimed at creating suitable conditions for promising young pedagogical and scientific workers in post-doc positions.
Across CTU, deepening professional relations at the level of the state administration and with the industrial sector plays a very important role.
Great attention should be paid to the issue of cooperation with the application sphere in the creation and transfer of innovations and their commercialisation. Contractual arrangements for the transfer of copyright and a wide range of other professional services focused on the administration of the commercialisation of science and research results and the support of start-up companies are now provided by the section of the Vice-Rector for Development and Strategy of CTU. Within this framework, the company CTU Tech, Ltd. was established in September 2021. The Patent Centre of the CTU Rectorate plays an important role in the eventual securing of patent protection in successful projects not only in Europe, but also in the countries of America, Asia and Africa.
Another significant achievement was the permanent commissioning of the S.A.W.E.R. system installed in the Czech National Pavilion at the EXPO 2020 in Dubai. The process of its technical integration and launch was completed a month before the opening of the gates of the world exhibition to the public, which was postponed by a year due to the pandemic and it was opened on 1 October 2021.

How to measure success

CTU is successful not only in the academic, scientific and research field, but also in the field of sports - the long list of medals won by our athletes and other sportsmen is a telling proof of this. Participation in the Czech Academic Games held in September in Olomouc was a significant success. CTU took 4th place in the competition of universities with 40 gold medals. The CTU sports team was also very successful at the VI. World Games in November in Rome, where with the participation of 39 universities from 13 countries, it finished second in the overall ranking.

CTU is also an annual organizer of a number of sports competitions, the most important of which is the Academic Cross-Country Running Championship and the 17th November Run, which took place on 20 November 2021 in Prague's Obora Hvězda under my auspices.
These sporting achievements are easily measurable. Not so easy with science, research and education. Therefore, the evaluation at CTU is based on data based on qualitative and quantitative information stored in the information system and validated by the individual CTU units. 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"), where, for example, the results of publishing, applied research and other activities of creative workers in the scientific community are recorded. The V3S Application is used to submit the results of the CTU to the Register of Information on Results (RIR), to experts for statistical analyses and for internal evaluations.
At the same time, CTU has been participating in the international QS World University Ranking for several years, where it was ranked 403rd in 2021, improving its ranking by nine places compared to the previous year. This is the best ranking that CTU has ever achieved in this ranking, placing it in the top 31 per cent of the world's top-ranked universities.

Science and culture are connected vessels

In my introduction I mentioned the undeniable socio-cultural responsibility of the Czech Technical University. Despite the obstacles caused by the pandemic, culture at CTU was alive, exhibitions and concerts were held online. At the end of 2020, the new TV "station" TV9P was broadcast for the first time, and the interest of those involved made it possible to extend the programme until the end of 2021. My office on the 9th floor of the Rector's Office was regularly transformed into a TV studio, from where music programmes and interviews with interesting personalities were broadcast. The faculties and units of the CTU were also actively involved in the programme.
I am also really happy that as part of the investment development of the CTU, the Fragner Gallery in the Old Town was purchased in 2020 and became part of the cultural and scientific centre Betlemska Beseda. In the future, we intend to further develop its activities so that the Bethlehem Chapel will not only be a venue for CTU ceremonial events, but also a pleasant meeting place for people across various disciplines on the occasion of diverse social and cultural events. In the context of these events, I must mention another joyful achievement - the completed collection for the organ in Bethlehem Chapel. Thanks to all the contributors and organisers of the collection. I look forward to seeing you at the next concert organized, hopefully without restrictions, by Betlémská Beseda and CTU.

"Space" of CTU became one of the centres of the Czech Republic

The past has presented us with great challenges. The biggest was the COVID-19 pandemic and all that went with it. I would like to recall what has been said many times before, CTU has stood the test with excellence; I have witnessed the great activity of everyone – students and staff, cooperation with companies and volunteers.
I helped coordinate everything and tried to manage everything based on real data and a rational approach. I am glad that together we overcame this crisis and not only protected CTU, but helped everyone – for example with our lung ventilators or masks.
Without the hard work of the university's management, old and new deans, other faculty members, academic staff, employees and students, the public would not evaluate the Czech Technical University as a scientific institution capable of "serving the needs of the people and the nation" from one day to the next. Our tools helped at the right time in the right place. CTU has become one of the centres of the Czech Republic. I thank everyone – academics, staff and students. Without their work and support, we would not have fought so gloriously against covid.
In the field of education, we are now preparing for the launch of the institutional accreditation environment and the digitisation of agendas. I wish that CTU as an excellent research university closely linked to society and the state will develop towards even greater relevance and excellence on a European and global scale. At CTU, we now have an environment that allows for teamwork and consensus-based problem solving. We can talk to each other and understand each other. This is the foundation on which we must build.
I hope that the CTU will move much higher in the world rankings, will be an attractive and pleasant place for students and researchers from around the world, will be an important player in international cooperation and public discussion of the future of society and the world, and will also be a partner to other universities in the Czech Republic and the world in the field of joint research and teaching.
I would also like to thank all the members of the Board – deans, directors of university institutes and other units – for the fact that we are able to create a friendly and factual environment that always leads us to finding solutions to problems in the complex "universe" of CTU.

doc. RNDr. Vojtěch Petráček, CSc.
Rector of the CTU in Prague

_On 30 November 2021, the Bethlehem Chapel hosted the ceremony of awarding medals to CTU experts for exceptional performance in times of crisis. Rector of CTU doc. Vojtěch Petráček awarded 106 medals to researchers and other personalities who, through their innovations and personal or team involvement, contributed to the solution of the coronavirus pandemic situation in the Czech Republic and abroad. The medals were designed for this special occasion by Czech medallist, sculptor and publicist Michal Vitanovský.

Rector of CTU doc. Vojtěch Petráček said: "I would like to thank all those who have joined the fight against coronavirus on their own initiative. Not only our researchers, but also students and volunteers came up with ideas. What our university has done during the pandemic is incredible! And it's great that the work of CTU experts continues and new innovations and auxiliary steps keep appearing. Tonight we are meeting with representatives of our core teams and representatives of the various faculties and units, whom I would also like to thank very much. Without your work and enthusiasm, the first wave of the pandemic would have been much more of a crisis."

The awards included the CoroVent pulmonary ventilator team from FBME, a full-face mask for frontline physicians, the RP95-3D protective half-mask from CIIRC produced by 3D printing, the RP95-M mask from CIIRC produced by plastic injection moulding, and the robotic assistant "Pipette" with fine and precise pipetting of samples for COVID-19.

_STORIES OF 2021


CZECH SPRING

S.A.W.E.R. wins the Best Innovation Award at the Dubai EXPO

CTU's participation in the EXPO 2020 World Exhibition in Dubai, which was postponed due to the pandemic and held from 1 October 2021 to 31 March 2022, was a huge success. The S.A.W.E.R. (Solar Air Water Earth Resource) system, which can produce water from dry desert air using solar energy, won the Best Innovation Award. Over one million people visited the Czech pavilion at the Dubai EXPO.

The development, installation and verification of the operation of the unique device, which is the result of the scientific research skills of scientists from the University Centre for Energy Efficient Buildings and the Faculty of Mechanical Engineering of the Czech Technical University, is a powerful story with an international success ending. In the conditions that prevailed in the World Expo venue, it proved its capabilities, so that the award for best innovation given to it at the end of the exhibition by the Dubai government organisation under the patronage of Sheikh Muhammad bin Rashid Maktoum, Ruler of Dubai and Prime Minister of the United Arab Emirates, is thoroughly deserved. It is a unique technology that can extract water from the air, even in low humidity, for example in the middle of the desert. The S.A.W.E.R. system also won second place in the American Exhibitor magazine competition at the EXPO.

The Czech innovation was among several thousand others presented in Dubai by two hundred nations and among almost five hundred finalists in the competition. "This is an innovation that, without exaggeration, can help people from all over the world from thirst, and therefore from starvation. It blends and connects nature and technology, creating an unexpected symbiosis. I wish this extraordinary international success to my colleagues and I thank them immensely for spreading the good name of CTU, especially to associate professor Tomáš Matušek," commented the huge success at the world exhibition, CTU rector doc. Vojtěch Petráček.

CTU shone at the world exhibition not only with the successful S.A.W.E.R. device. The second significant clue was drones, representing robotic projects of the Faculty of Electrical Engineering CTU (FEE). Visitors could see them in a rotating exhibition called Robot's 100th Birthday from 23 October to 14 November 2021.

Department of Cybernetics at FEE, uses the world's unique high-precision helicopter control technology, which is proving to be significantly the most reliable and successful of all competing solutions. Current drones are able to move autonomously along a predetermined safe route while responding to unexpected obstacles. "We are honoured that our faculty, through the Multirobotic Systems Group, is represented at EXPO 2020, the world's largest showcase of future technologies. Martin Saska represents the world's leading workplace in the development of autonomously controlled drones. And I am particularly pleased that not only PhD students, but also Master's and even Bachelor's students are getting a place in this," said Prof. Petr Páta, Dean of FEE.

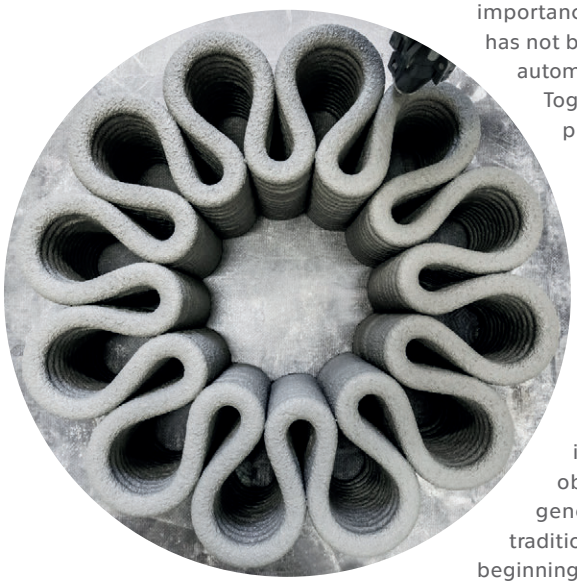
However, the experts from UCEEB are not behind and continue to improve the S.A.W.E.R. system. They are currently working on an improved version that will withstand the cold and be usable for military purposes. They are also working on making the system smaller than the current container so that an object the size of, for example, an ordinary bottle can be used in the future.

_S.A.W.E.R., a system for recovering water from the air, is used as a two-stage system in which a desiccant - a material that binds water vapour to its surface by adsorption - is used in the first stage. This removes the water content from the outside air and retains it. The dehumidified air is then drawn back outdoors. At the same time, additional outdoor air with its natural water vapour content is drawn into the system, which is first heated to such a high temperature that the water vapour can be released from the surface of the desiccant, thereby humidifying the incoming desert air. The warmer the air is, the more water vapour it can hold. The cooler then receives significantly more humid air than the outside desert air, allowing the cooler to extract much more water by condensation from the air.

The prototype S.A.W.E.R. unit that was tested in the desert uses a total outdoor air flow of 2,000 m^3/h and in the dry and hot desert environment (Riyadh climate conditions), this prototype produced an average of 100 litres of water per day in autonomous operation (the system's energy needs are fully covered by solar energy via solar collectors). However, water production is realistically dependent on the amount of air that is blown through the unit and the energy available, and therefore water production can be orders of magnitude higher.

In addition, if the plant is connected to the grid and does not have to rely on solar energy alone, the production is roughly double. In such a dry and hot desert environment, the S.A.W.E.R. has eight times the water production of conventional pure condensing plants. A fine-tuned demonstration unit installed in the Czech Republic's pavilion at the Dubai EXPO produced up to 1,300 litres of water per day at the end of the World Expo.

3D printing in the construction industry



Robotic fabrication technology, i.e. 3D printing, has been of great importance to builders and architects for several years. The use of industrial robots has not been common in the construction industry, but with the advancing wave of automation, the principles of Industry 4.0 are also entering this conservative sector. Together with TU Liberec, the Klokner Institute is collaborating on the 3D STAR project, which is exploring the possibilities of additive manufacturing and setting out the directions that future construction could take. Scientific and technical staff from the experimental and mechanical engineering departments play a key role here. The 3D printing processes being developed focus on innovative printing materials and their applications. Experience with conventional 3D printers using conventional materials (plastic) is used to develop printing from concrete. Experimental department staff are developing a cement composite (concrete) mix with ideal properties directly for an additive form of 3D printing. The mechanical engineering department contributes its expertise in product shape design, extrusion system and print control. Last but not least, a very important element is the optimization software itself, in which the desired object is "sliced" into individual print layers and the print head trajectory is generated so that printing is continuous. By shifting the focus of work from traditional design to motion path programming, the profession of civil engineer is beginning to overlap with that of robotic systems programmer. Computer-controlled machines have no problem with any shape, mix ratio or precision in the millimetre, millilitre or gram range. Exact measurement and control of outputs greatly expand the possibilities for optimising process control throughout the print.

We print on the TEST BED plotter, which was developed by the staff of TU Liberec. In 2021, different types of print heads were tested depending on the mixture to be printed, the shape of the printed object and the speed and method of printing. The cement composite is adjusted in terms of consistency, amount of individual components and reinforcement by means of dispersed reinforcement depending on the technological requirements and requirements for the final mechanical and physical parameters of the printed object. The possibilities of the material used appear to be extensive. From the printing of concrete of common strengths, we are moving up to printing using very high-value concretes.

The printed objects or parts of them were tested in the laboratory's loading machines and the results were used as a basis for computational models, which are continuously refined and used for structural assessments.

In 2022, the project will be preparing more extensive practical applications. In addition to the test bodies, for example, a footbridge will be printed and subjected to load tests.

_The 3D printer for the production of cement mixtures was assembled by TU Liberec staff and installed in the premises of the KÚ as part of a joint research project. The main role of the KU is to develop the printing material, implement the printing and test the structural elements.

_Bratčice

Water in the city

_Humpolec, Stromovka Park

_Tábor: T. G. Masaryk Square

The university's Centre for Energy Efficient Buildings has produced a guide to planning the transformation of public spaces for leaders of smaller municipalities and a methodology on sustainable stormwater management in urban environments.

The aim of the Certified Methodology for Planning Public Spaces in Small Municipalities, which is the result of a three-year effort by a team of urban planners and social scientists at UCEEB led by Ing. arch. Martina Sýkorová and Mgr. et Mgr. Michaela Malá, was to give mayors and municipal councillors the opportunity to become equal partners in a dialogue with unrepresentative experts and authorities, to have their own vision, to be able to weigh the advantages and disadvantages of proposed solutions and to make informed decisions. The main part of the publication helps representatives of smaller municipalities to orient themselves in the issue of public spaces for subsequent negotiations, guides them step by step through the process of preparing and formulating the study assignment and describes recommended procedures for selecting a developer.

The methodology on sustainable stormwater management in urban environments was developed in a two-year collaboration between teams from UCEEB, under the leadership of Ing. arch. Martina Sýkorová, and the University of J. E. Purkyně in Ústí nad Labem, headed by Ing. Jan Macháč, Ph.D. The publication «Water in the City: A Methodology for Rainwater Management in Relation to Green Infrastructure» guides city officials through the preparation, planning, implementation and maintenance of rainwater management (RWM) measures in relation to blue and green infrastructure.

«Due to the increasingly frequent manifestations of climate change, with alternating prolonged periods of drought and heavy rainfall, not only academia, but also local and state government representatives and the general public are becoming aware of the need to better manage rainwater. In cities, however, we are still faced with the traditional view that considers rainwater as a problem that needs to be solved as quickly as possible by removing it from the environment,» says Ing. arch. Martina Sýkorová.

The certified methodology is aimed at city representatives who want to manage rainwater more sustainably and use this approach to support other urban systems. It helps to navigate through the various more technical and nature-friendly RWM measures, describes their procedural process from permitting to maintenance, and highlights the positive impacts of RWM measures and the blue and green infrastructure system on the scale of the entire city and individual public spaces.

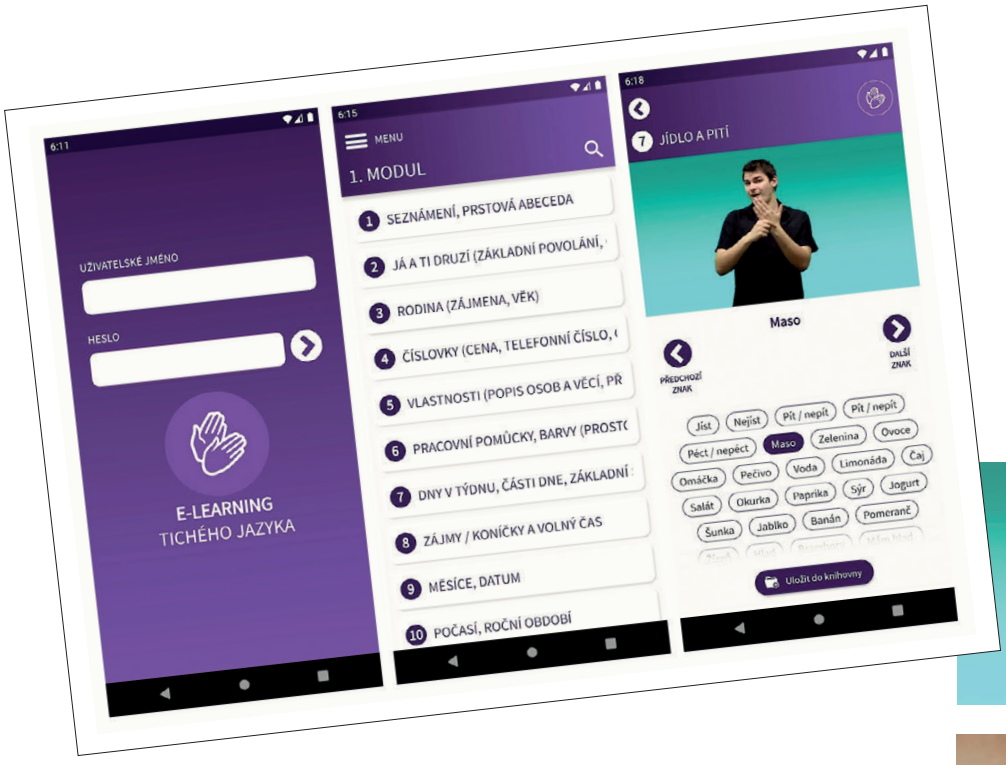
The story of the faculty is also the story of the students, of whom we are rightly proud.

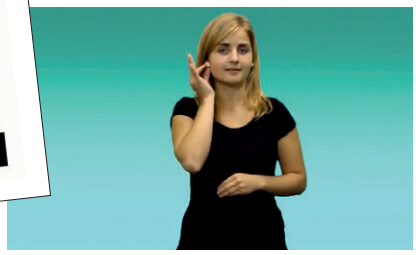
In the story of FBME of 2021 we would like to introduce one of our students, young, talented, perceptive and humble Petr Štěpánek, studying Information and Communication Technologies in Medicine. He says about his studies: "I chose it mainly for its project teaching. Every year in it, together with my colleagues, we have the opportunity to choose our own semester project, which we can devote ourselves to.» Gradually, he moved more and more towards practical applications of engineering in biology and enrolled in courses beyond his degree programme, which he attended at various faculties of Charles University. As part of his semester project, he delved into the design and construction of his own 3D bioprinter, experimenting in particular with the production of his own bioinks.

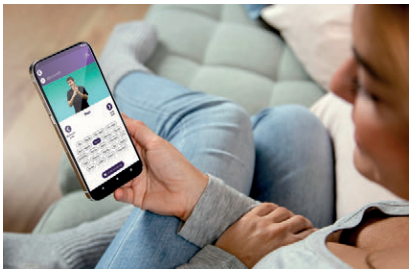
It was only a matter of time before he became more interested in molecular biology. He wanted to understand the internal phenomena taking place in cells in all living organisms. He became interested in genomics, a branch of genetics that studies genomes and their origin, function and evolution, and began to process and interpret this information as part of another of his semester projects. He had his entire genome sequenced and began working on bioinformatics analysis. He put together a team of developers and designers and together they are developing an app that aims to motivate users to be responsible about their health using recommendations based on statistically based and measurable health data from genome analysis. From this effort, the startup Macromo has gradually emerged, working with the university company Genespector and the European laboratories of Eurofins Genomics. Petr continues to pursue similar themes in his undergraduate thesis. He is working on analysing the genomes of a family with an atypical form of Wilson›s disease, a metabolic disorder in which copper builds up in the body.

He was also instrumental in the creation of the Next Zone Community Center, a combination hardware incubator, startup incubator and event space designed for students and others who need a space to work on their own projects and startups. The centre has approximately 1200 m2 of space and hosts a large number of networking and educational events.

However, the list of his activities doesn›t end there, he has even been to America in February and was invited to tour the MIT labs. And we›ll definitely be hearing about him again.







Easier learning of signing new app makes sign language easier

The new Silent Language app will help social workers, educators and other participants in sign language courses to simplify their learning. Developed in collaboration between the Faculty of Information Technology and the non-profit organisation Silent World, it includes over 3,700 short videos with words and sentences in sign language, an alphabetical Video Dictionary and is directly linked to the existing e-learning system.

FIT graduate Ing. Jindřich Žák followed up his diploma thesis with a prototype prepared as part of the bachelor thesis of FIT student Bc. Alžběta Gogoláková and the result is the Silent language application. It primarily serves as a support tool for learning sign language for students of physical or online courses organized by Silent World. Thanks to it, students can practice and repeat signs and entire sentences at any time.

«Although I believe that learning with a ‹live› lecturer is not very well replaceable, the advantage of the app is that the student can play the video of the sign or sentence repeatedly and can practice it at home before the next class at Silent World,» adds the author Ing. Jindřich Žák.

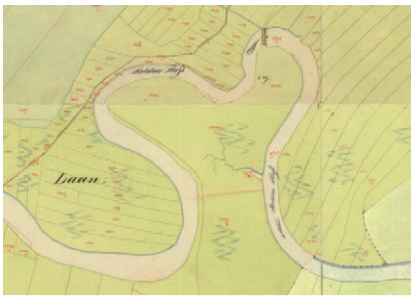
The app consists of teaching modules, each containing 10-20 lessons with specific topics (e.g. weather, seasons, family, age). As students gain knowledge, more modules are made available to sign language students. The basis of each lesson is a set of short videos where the teacher demonstrates the word or sentence in sign language. The videos showing the whole sentence are often accompanied by a short text description with the individual signs that make up the sentence. For example, the sentence «I failed to bake a cake, I will throw it away,» consists of the characters «I + cake + bake + failed + throw away.» The resulting app is directly related to Silent World Sign Language courses. The possibilities for further use are discussed.

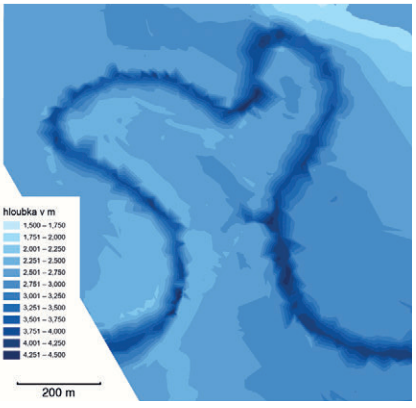
«I am very happy that there is cooperation with the Faculty of Information Technology of the Czech Technical University in Prague, where a useful tool is being created as part of the final thesis and is being used further. It helps the non-profit sector and, in this case, our students to orient themselves in learning sign language,» says Leoš Mačák, director of the non-profit organization Tichý svět - chráněná pracoviště, o. p. s.

The Silent Language app is available for students of sign language courses to download on Google Play or AppStore.

_"Although I believe that learning with a 'live' lecturer is not very well replaceable, the advantage of the app is that the student can play the video with the sign or sentence repeatedly and can practice it at home before the next lesson in Silent World," adds the author Ing. Jindřich Žák.

Disappeared Heart of the Vltava





Above:

_Heart of the Vltava on the map of Stable cadastre from the mid-19th century

_Ortophoto from the middle of the 20th century

_Sonar measurement output - map of the depths of the Lipno reservoir with the Heart of the Vltava visible

Part of the project „Vltava - Changes in the Historical Landscape as a Result of Floods, Dam Construction and Changes in Land Use with Links to Cultural and Social Activities in the Vicinity of the River", which is being carried out by a team of scientists led by Prof. Jiří Cajthaml from the Department of Geomatics at the Faculty of Civil Engineering of the Czech Technical University in Prague, was also a survey of the „Heart of the Vltava". This specific meander of the Vltava riverbed disappeared in 1958 under the surface of the Lipno dam.

Research using sonar

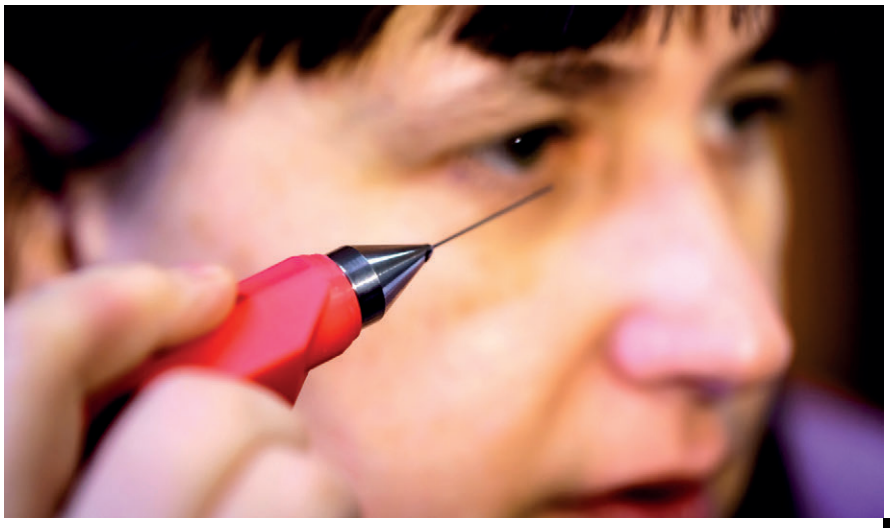
Using sonar and other techniques, the researchers decided to find out whether the shape of the riverbed had changed after the site was flooded. "The accuracy of the fishfinder sonar is quite good and gives satisfactory results, even though it only measures in points and the depth relief between the measured points has to be modelled mathematically. During the measurement itself, we were very surprised that the "Heart of the Vltava" is still practically identical to the representation on the old maps, including the small pool on the eastern part of the heart. The old channel is very identifiable and practically unchanged. The deposition of sediment in the reservoir has not obscured it in any way," said Prof. Jiří Cajthaml.

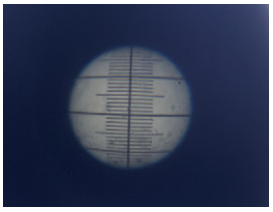
The Vltava before the cascade was formed

The "Heart of the Vltava" was only a small part of the research, which is very extensive and focuses on the shape of the Vltava in the period before the Vltava Cascade was formed. In addition to fieldwork, the researchers collected and processed data from old topographic maps, located old photographs and used archival film footage. They have also dealt with the subject of historical floods, historical and contemporary hydrotechnical works such as weirs, mills and dams, and have also been studying the phenomenon of rafting. The area of social geography and documentation of vanished villages was also included.
The whole project includes a number of activities – a large exhibition, the creation of a monograph on the old Vltava River and a web map interface presenting not only the historical watercourse and the landscape around it, but also tourist attractions and historical and contemporary hydrotechnical works in the area. The project runs from 2018-2022.

For the general public in the media

The project designed to educate the general public has been widely used in the media already at this stage, thanks to the proactivity of the entire team consisting of scientists from the Department of Geomatics and the Department of Hydraulic Engineering of the Faculty of Civil Engineering of the CTU, as well as specialists from the Faculty of Science of the Charles University. A number of articles about the research were published and the work of the scientists, their field and the activities of the faculty were widely publicised.





Eye endoscope

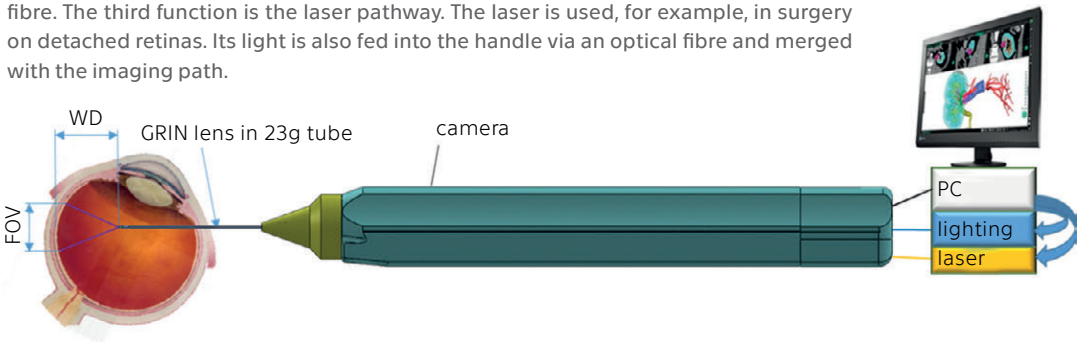
Faculty of Mechanical Engineering boasts a unique result of cooperation with the company Stavus, a. s., an endoscope for intraocular operations with an integrated camera in the handle. One of its exceptional features is the ability to image the structures of the ciliary body in vivo and, if necessary, to perform interventions in it without the instrument touching the back of the lens capsule. This is because touch causes local damage to the tissue and consequent opacification. The joint team, led by Ing. Šárka Němcová, Ph.D., from the Institute of Instrumentation and Control Technology and is now working with doctors from Příbram Hospital and the Central Military Hospital in Prague to certify the endoscope.

New diagnostic and surgical methods for modern medicine require new devices. Efforts to make surgical procedures minimally invasive place high demands on the miniaturization of those parts of the instruments that enter the body. Eye surgery is particularly critical. The task of the ophthalmic endoscope is to image the internal structures of the eye with sufficient magnification and resolution. A probe – a thin needle – is inserted into the eye, inside which is an optical element or system that transmits an image from the patient›s eye to the device›s camera. Current ophthalmic endoscopes most commonly use a bundle of optical fibres to transmit the image. However, this limits the resolution to only the order of tens of thousands of pixels, as only a certain number of fibres can fit into the probe, and those on the periphery are also used for illumination.

Therefore, the endoscope developed at the Faculty of Mechanical Engineering combines three optical functions: imaging, illumination and laser path. One device can therefore be used for diagnosis and corrective interventions. It is equipped with the largest needle diameter, after which there is still no need to suture the wound. Unlike other endoscopes, this one has gradient optics in the probe - an optical fibre with a refractive index that varies continuously from the centre to the edge, which acts as a connecting lens. The transmitted image is processed by additional optical elements to form the final image on the camera chip, which is located in the handle of the device.

The probe has two versions - a straight and an angled view, and the probe tips are interchangeable. The angled view is a specialty of this particular instrument. Until now, physicians have not been able to view the ciliary body and the hinge apparatus of the lens in vivo, and they particularly value this possibility. In addition to the imaging function, the endoscope has an illumination system, with light being fed into the handle via an optical fibre. The third function is the laser pathway. The laser is used, for example, in surgery on detached retinas. Its light is also fed into the handle via an optical fibre and merged with the imaging path.

_New diagnostic and surgical methods require new types of instruments. The requirements for minimally invasive surgical procedures place high demands on the miniaturization of those parts of the instruments that enter the body. This requirement for minimal size is particularly critical in eye surgery. At the Faculty of Mechanical Engineering, CTU, Institute of Instrumentation and Control Technology, Department of Precision Mechanics and Optics, in cooperation with Stavus, a. s. a prototype of the ophthalmo-endoscope has been developed.



Inspite of the pandemic

After a year of preparation and another year of waiting to see if the pandemic of the covid would allow the event to take place, the Faculty of Architecture hosted the European Association for Architectural Education (EAAE) conference on 25-27 August. The aim of the annual meeting of representatives of European schools of architecture was to debate the education of architects, urban planners and landscape architects. The subtitle of the conference was New Dimensions.

The main star of the opening evening was the American architect Steven Holl. „Young people have the opportunity to see the future optimistically, ecologically, environmentally, humanly, and to understand this we need to listen to them, to give them freedom," the world-renowned architect told the students and teachers. His lecture took place online, and at the end he invited the audience to Ostrava, where, according to the project of his office, a new dominant feature of the city, a concert hall, is to be built.

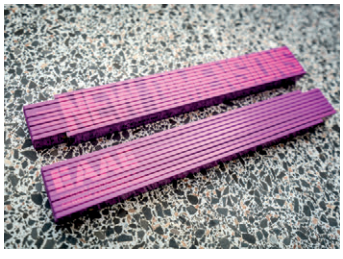
_Eric Luiten _Oya Atalay Franck

_Inaki Alday _Jenny B. Osuldsen

The conference program focused primarily on reflecting on the scaling up and intersection of disciplines in practice and education. Keynote presentations were given by landscape architects Jenny B. Osuldsen, partner at the famous Norwegian studio Snøhetta, Eric Luiten, professor at the Faculty of Architecture and the Built Environment at Delft University of Technology, and Inaki Alday, dean of the School of Architecture at Tulane University in New Orleans.

With an emphasis on safety in a pandemic, the conference was held in a hybrid format, with some participants physically present and some connecting online. There were over 170 registrants, 74 of which were in attendance. Few had hoped for such a large turnout, especially after a one-year break.

The accompanying programme, which took the conference participants to Villa Tugendhat or the Sonberk winery, provided a unique experience. At the end, a social evening awaited them at the Royal Canonry of the Premonstratensians in Strahov, including a visit to the library, and a gala dinner in the historic refectory. From the venue with its magnificent view of the city, the participants certainly took away good memories.



Robotic drones search for people in distress, extinguish fires in high-rise buildings and map historic buildings

Researchers from the Multi-Robot Systems (MRS) group have flight tested a swarm of autonomous small multi-rotor helicopters (drones) in the desert of the United Arab Emirates in 2021. The MRS group, which operates within the Department of Cybernetics in the Faculty of Electrical Engineering of CTU, has been working on the involvement of drones in humanitarian search and rescue operations.

"We were inspired by nature in the implementation of this project. Birds or fish doubting in flocks are equipped with sensory organs that allow them to stick together and react to the situation as a whole, for example to avoid predators. Our swarm mimics this group movement; autonomous robots exchange only minimal information during flight, yet act in a coordinated manner," says Dr. Martin Saska, Group Leader of Multi-Robot Systems.

Along with the possibilities of using a drone swarm in humanitarian search and rescue operations, the robotics team also explored the area of deploying drones in rescue operations in multi-storey buildings, especially in the event of a fire. In the UAE, given the number of skyscrapers and solvent clients occupying the top floors, there is a high demand for alternative firefighting systems. One of the scenarios being addressed by the MRS group is moving in the direction of developing a drone that will be able to fly up to the tenth floor of a building and fire a fire extinguishing capsule through the window inside. The second challenge lies in the ability of drones to locate survivors of security incidents in multi-storey buildings.

The MRS Group in 2021 has also made advances in the field of robotic drones. The current ones can move autonomously in the interiors of buildings along a predetermined safe route, responding to unexpected obstacles as they do so. Their development is being carried out as part of the world's unique Dronument project, which uses technology to record rare historical assets and assist preservationists in their restoration.

Visitors to the Czech Republic's pavilion at the EXPO 2020 World Exhibition in the United Arab Emirates had the opportunity to see what forms robots can take a hundred years after the word was first heard in Karel Čapek's play R.U.R. Six «aerial robots» from the Multirobotic Systems Group were at the centre of a gala presentation organised by the Faculty of Electrical Engineering of CTU in Dubai on Sunday 31 October 2021. The meeting was personally supported by the Ambassador of the Czech Republic to the United Arab Emirates Jiří Slavík.

_The initial weeks were for Kate, Eliška, Tomáš and Martin were really very challenging, especially the transition to American to the American way of studying, which is much more based on intensive independent work within the topics taught than on memorization of knowledge.

First students of the dual-degree Smart Cities programme

In autumn 2020, the first four Czech students entered the newly accredited Smart Cities study programme in a dual-degree format. The dual-degree programme is completed with both a Czech title Mgr. and an American title MSc. and is taught entirely in English. In the first year the study takes place at our Faculty od Transportation Sciences in Prague and in the second year at our partner university UTEP in the USA. After a very demanding administrative process related to the COVID-19 pandemic and despite a blanket ban on travel to the USA still in force at that time, it was finally possible to send all four "scouts" of this program to sunny Texas at the beginning of August 2021. The first weeks were very challenging for Katka, Eliška, Tomáš and Martin, especially the transition to the American way of studying, which is much more based on intensive independent work within the taught topics than on memorization of knowledge. Another very stressful factor for the whole group was the serious illness of one of them, which required more than a month of hospitalization and subsequent specialized transport back to the Czech Republic. Paradoxically, this very serious event, which tested the functionality of the entire system of organization of this unique study program, resulted in the strengthening of our mutual relations and the development of new cooperation with other departments of the partner university UTEP. We are very pleased to announce that the "rescue mission" was successful and Tomas is recovering enough that we can now focus on the continuation of his interrupted studies.

Of course, the final thesis, which Katka, Eliška and Martin will defend at UTEP in the USA, is also part of the final exams. The topics addressed are closely related to current projects in the UTEP environment. These include the solution of a parking system for the entire UTEP campus and a system to simplify border crossing clearance between the cities of Juarez (Mexico) and El Paso (USA), as El Paso is right on the border and at least half of UTEP students go through this process on a daily basis. It is a combination of modelling and creating standard and non-standard scenarios to create a functional architecture for both of the aforementioned tasks, either using systems analysis tools or diagrams according to the UML standard.

All three have joined research teams at UTEP as research assistants, gaining a range of valuable experience and opportunities to learn about the commercial environment of US technology and transportation companies. The local community is open to them and generally creates very comfortable conditions for quality scientific research. The partnership project also includes the establishment of a unique joint workplace Dual Twin Lab - SmartLab located at the Institute of Logistics and Transport Management, where various transport simulations are modelled using virtual and augmented reality and scientific research projects of the CTU and UTEP are addressed.

Development of an implant that may prevent chronic pain after heart surgery

A specially engineered magnesium wire coated with a biodegradable polymer that fully dissolves in the body will relieve pain for patients after heart and lung surgery. The previously used steel wire is poorly tolerated by the body. The new solution was jointly developed by a team of scientists from the Faculty of Nuclear and Physical Engineering of the Czech Technical University in Prague, the Institute of Structure and Mechanics of Rocks of the CAS (ÚSMH) and the Institute of Physics of the CAS (FZÚ).

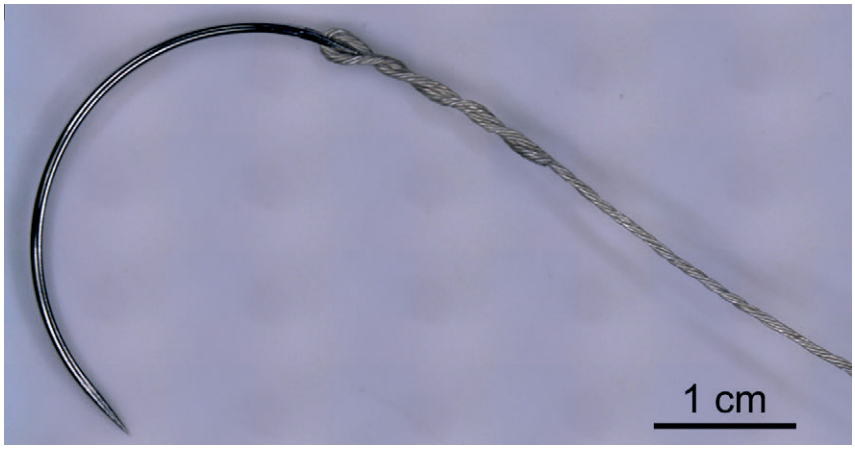
Long-term chest pain after heart and lung surgery is one of the manifestations of nickel allergy, which is found in steel wires. These are used when it is necessary to cut the sternum and then fix the halves back together. That is why scientists from our faculty, the Institute of Medical Research and the Faculty of Medicine have developed a specially modified magnesium wire coated with a biodegradable polymer that fully dissolves in the body. Thanks to the composition of the implant, which is natural to the human body, there is no negative reaction and therefore no chronic pain. The need to remove the wire can also be avoided, which is a great advantage, especially for paediatric patients.

The faculty's research is carried out by Ing. Karel Tesař. „Currently, in cooperation with the General University Hospital in Prague, we are evaluating the first implantations that have taken place on the sternum of pigs. The results so far look very promising. In parallel, we are trying to develop new methodologies for dynamic testing in a simulated body environment that would reduce the need for live animals," says Karel Tesar.

The research at the Institute of Mechanical Engineering is carried out by doc. Ing. Karel Balík, CSc., who together with his team has developed a device that coats a flexible magnesium wire with a special polymer material so that it has the required properties and can be used in surgery. This is because if the implant were made only of magnesium, it would dissolve in the body before the bone had set.

The research also involves the 1st Faculty of Medicine of Charles University, the Biomedical Centre of the Faculty of Medicine of Charles University in Pilsen, the Institute of Physiology of the CAS and the Institute of Animal Physiology and Genetics of the CAS. The results of the project were selected for the final round of the 2nd year of national competition Transfera Technology Day. Karel Tesař and his colleagues won not only financial award, but also contacts to potential investors or those interested in purchasing the developed technology.

_State of the cable after one month in the medium simulating the environment of the body. Material of the wires is gradually replaced by phosphates of calcium, which the body subsequently to repair damaged bone. (Photo: ÚSMH AV ČR v. v. i.)



_Biodegradable rope prototype based on thin Mg wires coated with polymer. It is designed for bundling of the sternum after invasive surgery heart surgery, especially in children. The development FJFI CTU in Prague, Institute of Structure and Mechanics of Rocks of the CAS and the Institute of Physics of the CAS. (Photo: ÚSMH AV ČR v. v. i.)

_Vladimir Kučera in his office at CIIRC CTU

Professor Vladimír Kučera received the highest scientific award - the Czech Head

_Vladimir Kučera receives the Czech Head Award at the Czech Head Gala Ceremony (Photo: BcA. Ondřej Kalmán)

Prof. Vladimír Kučera from the Czech Institute of Informatics, Robotics and Cybernetics has become a laureate of the National Government Award Czech Head. The most prestigious Czech scientific award for his lifetime contribution to the development of automatic control theory on a global scale was awarded to him by the Government of the Czech Republic on the proposal of the Council for Research, Development and Innovation at the Czech Head gala on 5 December 2021.

The scientific contribution of Professor Vladimír Kučera is seen primarily in three groundbreaking results that have advanced the world science in the field of automatic control. These are the original synthesis of discrete control circuits, also known as the method of polynomial equations; the Youla-Kučera parametrization of stabilizing controllers; and the non-interactive control of complex systems, known in the literature as "decoupling": a problem that was formulated 80 years ago and which could not be solved. The Youla-Kucera parametrization is Professor Kučera's most important result ever, which started a completely new direction of research in automatic control theory. It is not only widely cited, but also used in the applications we encounter every day. These include multipurpose control systems, typically optimal control, robust control, fault suppression, vibration damping, closed-loop system identification, adaptive control, or control that switches stabilizing controllers when environmental influences change or tolerates random faults in the control circuit. Recently, their use, for example, for safer control of autonomous vehicles has become increasingly important.

"Discovering a new finding with many citations and applications is an achievement, but the greatest achievement is the result that the scientific community names after the author," says Prof. Vladimír Kučera. "I have received many awards, but I value the Czech Head the most. It is also an encouragement to me for further creative work," he adds.

Professor Vladimír Kučera has been the Deputy Director of the CIIRC at CTU since 2015, having previously served as the Director of the Masaryk Institute of Advanced Studies at CTU, Dean of the Faculty of Electrical Engineering at CTU and also as the Director of the Institute of Information Theory and Automation of the CAS. In all positions he has made a significant contribution to the development of these institutions. Vladimír Kučera is also a very popular lecturer, he has been lecturing for decades not only at CTU. He has been the principal investigator or co-investigator of projects with a total support of more than 1.1 billion crowns.

"Professor Vladimír Kučera was at the birth of the CIIRC CTU and since the beginning he has supported our institute not only with his academic results, which I consider truly exceptional in the world context, but also managerially. He has raised several generations of his followers and has helped Czech science to gain respect abroad. I am honoured to have such a colleague," says Prof. Vladimír Mařík, Scientific Director of the CIIRC CTU.

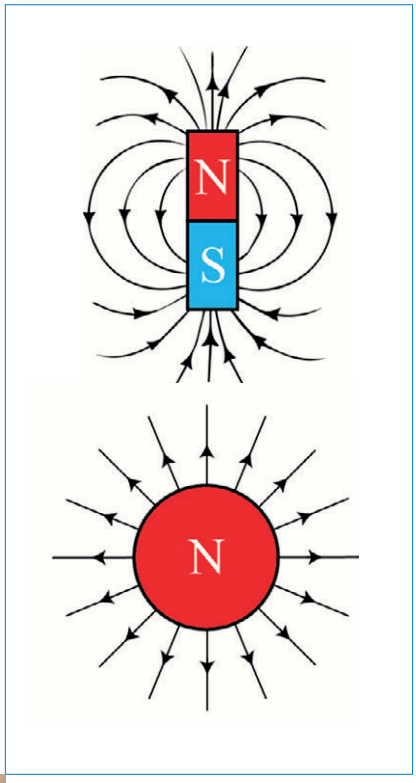
Magnetic Monopoles - the next physics revolution on the horizon?

Magnetic monopoles are hypothetical particles carrying a magnetic charge. They have not been observed in nature so far, but their existence is not ruled out, on the contrary, many physical theories directly predict their existence. Their very existence would explain, for example, why electric charges occur only in integer multiples of the electron's charge. So it is actually a mystery why monopoles have not yet been observed. The traditional answer to this problem is that the mass of magnetic monopoles is predicted to be too large, about 1016 GeV, which is 1014 times that of the heaviest elementary particles known to date, such as the Higgs boson. Such heavy monopoles are impossible to produce in terrestrial particle accelerators. However, in relatively recent times it has become apparent that certain types of magnetic monopoles might have masses achievable at existing accelerators. As theoretical physicists from Institute of Experimental and Applied Physics have described in a recent paper, such a monopole could weigh as little as 2.37 TeV (i.e. only about 20 times more than the Higgs boson) and thus be safely within reach of the largest current LHC accelerator at CERN.

With this in mind, there are of course experiments directly aimed at finding magnetic monopoles. The most important of these is the MoEDAL experiment at the LHC, of which the IEAP is an active member. While the „core" of the experiment is passive detectors, the contribution of the IEAP is the active Timepix pixel detectors, which can measure in real time not only the passage of a particle through the detector, but also its direction and energy and thus identify its type (mass and electric or magnetic charge).

From previous failures to detect magnetic monopoles, one can derive their mass and magnetic charge limits, but only if the effective cross section (probability) for the formation of a pair of monopoles and antimonopoles in a given physical situation is known. While for ordinary elementary particles this effective cross section can be calculated from a given model using the so-called perturbation theory, in the case of magnetic monopoles this approach fails because the relevant coupling constant (magnetic charge) is much larger than one. Therefore, in a paper accepted last year in Nature, the MoEDAL collaboration used for the first time a non-failure method for the purpose of data analysis, calculating the probability of producing a monopole and an antimonopole in a very strong magnetic field (up to 1016T) that prevails for a brief moment when ultra-relativistic heavy ions collide.

Hopefully, the noose around the still leaking magnetic monopoles is slowly beginning to tighten and we may soon see a new revolution in physics.



_Comparison of a conventional bar magnet (magnetic field lines form closed loops) with a magnetic monopole (field lines have a beginning/end in the monopole).

_MoEDAL experiment with Timepix detectors.

Organ for Bethlehem Chapel

Another big story, this time not only with a technical touch, came to a close at the end of 2021: the inauguration of a new organ took place in the Bethlehem Chapel on 14 December on the occasion of the CTU Christmas Concert. The impressive musical instrument from the workshop of organist Vladimír Šlajch will be used instead of the existing electronic organ not only at graduation ceremonies and other academic occasions. The University is also planning a series of organ concerts and other artistic events where the quality of the sound will enhance the cultural experience.
A new instrument for the chapel has been thought of at the CTU since the 1990s, but the necessary financial resources to produce it were lacking. Therefore, in 2014, through the Society of Alumni and Friends of the CTU, the public collection «Pipes for the CTU» was announced, with the renowned architect and CTU graduate Eva Jiřičná as its face. In 2019, it was decided that the school would entrust the realization of the organ to Vladimír Šlajch.

_Beautiful single-manual pipe organ with 26 registers is a multifunctional instrument with a spruce wood case. Instruments of this type were and are common in Italian and Spanish cathedrals, but in Bohemia it is an absolutely rare technical solution.

(Photo on the opposite page: Roman Sejkot)

The beautiful single-manual pipe organ with 26 registers is a multifunctional instrument with a spruce wood case. Some of the manual registers can be divided into bass and treble, which will allow for a sufficient number of tonal combinations and ensure a similar plasticity of sound as is usually provided by larger two-manual organs, but a reasonable version of which would be too large for the Bethlehem Chapel, especially given the given spatial proportions and placement possibilities. Instruments of this type were and are common in Italian and Spanish cathedrals, but in Bohemia it is an absolutely rare technical solution. According to Vladimír Šlajch, the organ for Bethlehem Chapel is the last great instrument of his career. After their completion, he will devote himself only to smaller commissions and his other interests. «I wish the entire CTU the joy of the project, and the instrument empathetic and capable organists who will make it resound in the course of time,» said Vladimír Šlajch. The architectural design of the organ and its placement in the interior was also the work of an expert group under the leadership of prof. arch. Mikuláš Hulec from the Faculty of Civil Engineering of the Czech Technical University, Department of Architecture. «The cooperation on such a unique project as the construction of a large organ was undoubtedly a creative experience for everyone and at the same time an honour. Of course, the organ is the work of Vladimír Šlajch, but he kindly accepted suggestions, comments and opinions from other participating experts, which eventually co-shaped the final form and placement of the instrument in the chapel,» said Prof. Mikuláš Hulec. Initial considerations were to have the organ built against one of the chapel walls, which is usually the case. The architect Eva Jiřičná came up with the idea of placing the organ in an open space. Because of the experienced operation in Bethlehem Chapel, when the assembly of university representatives comes to the stage with a solemn step, the solution that took into account the expected and verified sound radiation of the proposed organ with the help of a small portable pipe instrument won out in the end. The diagonal placement in the open space, at the back left as seen from the stage, is atypical, but it makes the organ clearly and distinctly audible from any position in Bethlehem Chapel.


VERITAS VINCIT

_FACULTIES, UNIVERSITY INSTITUTES AND OTHER CONSTITUENT PARTS OF CTU IN 2021

In 2021, life at the Faculty was divided into two completely different periods. In the spring, all teaching was done by distance learning, and in the autumn we all rejoiced when the semester was completed by in-person teaching/physical meetings. This not only brought joy to the teachers, but most importantly it was in the interest of our students. Contact teaching cannot be replaced by distance learning, but the pandemic gave us the important task of implementing some online tools to support standard teaching.

I am very pleased to see more students enrolled for the 2021/2022 academic year after several years of decline, and I hope this trend continues. I am proud that our students have won many awards, including international ones. Departments are involving more and more talented students in research projects or contract research. They initially work as student researchers, later becoming members of research teams during their master's and especially doctoral studies. We award the best theses in civil engineering with the Professor Bažant Prize, in architecture with the Professor Vodera Prize and in geodesy with the Professor Kořistka Prize. And what is very important - our graduates are successful in practice.

Thus, we strive to fulfil the basic mission of the Faculty, characterised by three key words: tradition - quality - perspective. We are an excellent institute with a tradition of more than three hundred years, which obliges us to ensure that the quality of our teaching and creative activities is as high as possible and that our graduates and employees have a clear perspective for their employment.

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 that cannot function well without the interconnection of study and practice. That is why we continue to introduce BIM and VR (virtual reality) into teaching. Due to the pandemic, the summer semester was held remotely, but in the winter semester of the following year it was possible to fully resume the contact form. A project was carried out at the Faculty, which set out the basic points of a strategy for implementing innovations from distance learning to full-time teaching. Eleven proposals for accreditation of Master's degree programmes were prepared during the year, which build on the traditional teaching of civil engineering and related engineering disciplines. There was also a proposal for accreditation of a completely new bachelor's degree programme in Scenic Technologies, which will be implemented in cooperation with the Faculty of Mechanical Engineering and the Faculty of Electrical Engineering. The Faculty places great emphasis on the involvement of experts from practice in teaching. Cooperation with professional chambers and partner organisations has been developed, student competitions at local and international level, internships for students, excursions and lectures by experts from practice have been prepared.

Projects

Scientific, research and development activities are among the key priorities at the Faculty and the Faculty achieves excellent results in them. The research teams are involved in a number of projects of GA CR, TA CR and other grant systems. The integration into international projects within H2020, COST, IEA, etc. is also significant. The Faculty has a long tradition of cooperation with commercial entities in the form of contract and applied research within the projects of TA CR or other providers. Last but not least, it also offers a wide range of services of authorized laboratories and expert services. External collaboration with other universities, institutes of the CAS, departmental institutes, companies and foreign institutions is also important. Funding of scientific research activities is mainly based on domestic grants and projects. The Faculty actively supports young researchers, 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 placements of students and academic staff. The Erasmus+ programme is the dominant one, but there are many possibilities for study trips today and some remain unused. The majority of study trips are within Europe, but there are also a number of long-term study trips to more distant destinations and there are also quality offers in the „joint degree" and

„double degree“ programmes, which the faculty supports financially, as well as study trips based on international agreements. The growing interest and number of international students, especially in doctoral programmes, is encouraging. Many of them came to study on the basis of the activities of the departments and their visiting staff, but also on the basis of school-wide activities (e.g. Study at CTU, Study in Prague).

Awards

The first prize in the Map of the Year competition went to the Portal Czech Historical Atlas, created by the Department of Geomatics in cooperation with the Historical Institute of the Czech Academy of Sciences. The award was given in the category of Digital Cartographic Products and Applications on the Internet. The work was led by Prof. Jiří Cajthaml from the Department of Geomatics.

Students Kristýna Klůsová and Jiří Petrželka won the international round of the Saint Gobain student competition in Paris. They received the extremely valuable „student prize“, awarded on the basis of a democratic vote of the top eighty global student teams.

The Josef, Maria and Zdeňka Hlávková Talent Award, designed for talented students up to 33 years of age, was awarded to Ing. Tomáš Dejmek, PhD student in Civil Engineering.

Significant events and happenings

In the first half of the year, most events were postponed or transferred to online form. Access to virtual computer rooms continued to be available for students. Two online open days for prospective students were successfully held with live streaming from the Faculty. In August, the faculty joined the Open House Prague project in a contact form. The Student Grant Competition (SGS) and the 19th Summer School of HVAC, International Architectural Competition INSPIRELI AWARDS were held. The students stayed in touch with the practice and our partners thanks to the fact that we converted the so-called Technical Thursdays into an online form. We prepared video interviews and podcasts about the results of our students' professional activities and success under the heading Builders by Heart. After a complete renovation, the two main large lecture halls in Building B were reopened, equipped not only with state-of-the-art didactic technology but also with unique acoustic cladding.

The third mission of the faculty

The Faculty actively cooperates with regional authorities within the framework of local development, both in the framework of direct cooperation and operational programmes (OP VVV Prague growth pole). Cooperation in the region of Kladno and Bustehrad through the 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 tries 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 reacted flexibly to the current developments in the situation with covid-19. The key in its approach was to deal with the related hazards in a timely manner, rational assessment of the situation and crisis planning.

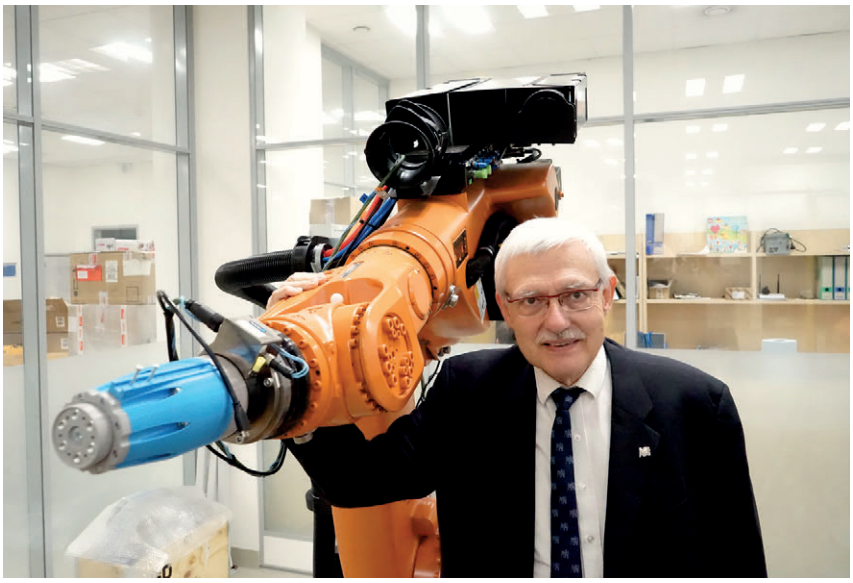
Personalities of the year 2021

doc. Dr. Ing. Pavel Dostál

from the Department of Hydrometeorology and Landscape Engineering broadens the general public's view of the Faculty's professional competence through his comments to the media and also helps to co-create the Faculty's image in terms of high professional credibility.

Prof. Ing. Jiří Cajthaml, Ph.D.,

from the Department of Geomatics, has helped to create a unique communication theme with his initiative - research in the area of the Vltava river heart. This partial result of the research had a great positive response in the media and contributed significantly to the popularization of the Faculty of Civil Engineering of CTU and its activities.



Faculty of Mechanical Engineering is a traditional faculty of the Czech Technical University, which has been operating in the Czech lands since 1864 and still fulfils the same mission in research, education and also cooperation with industry, to which it attaches great importance. Recently, however, we have been seeking a new balance between basic and applied research and between supporting industry and the risks involved. The interest in collaboration is so great that the faculty's attention has turned too much to applied research. Therefore, we have initiated a number of activities aimed at an internal focus on new fundamental research topics. The goal is to create a balance between published and applied results and a symbiosis between the two. Furthermore, the faculty is repeatedly forced to make strategic decisions about the development of new directions of its activities, which are associated with considerable risks difficult to grasp by a public university, but which have a significant long-term impact on the Czech Republic. Given the emphasis the faculty places on its societal role, this is not an easy issue to deal with. Nevertheless, we are constantly striving to contribute to making industrial enterprises already operating in the Czech Republic competitive in global markets with benefits for the economy and standard of living of the Czech Republic, and to be a sought-after attractive country for research, development and production of new high-tech products with high added value. The aim of the activities of the Faculty of Mechanical Engineering is to contribute to the development of the Czech economy.

Prof. Ing. Michael Valášek, DrSc.
Dean of the Faculty of Mechanical Engineering of CTU
(2014 - April 2022, replaced in office by
doc. Ing. Miroslav Španiel, CSc.)

_The Catalyst turboprop engine is the first completely redesigned turboprop engine in 30 years that has reduced fuel consumption fuel consumption by up to 20%, increased thrust by 10% and extended service life by 30%.

FACULTY OF MECHANICAL ENGINEERING

Study programs

In 2021, the Faculty of Mechanical Engineering primarily submitted an application for accreditation of two basic bachelor programmes Mechanical Engineering and Engineering. They represent the traditional design of two concurrent degree programmes, which actually only differ in the level of examination of 14 core subjects. After an administrative delay, the faculty received accreditation in February 2022 for a maximum period of 10 years. This renews and secures the accreditation of the teaching of all substantial degree programmes at the Faculty for the next decade. Further, as part of the application for institutional accreditation of CTU, the Faculty prepared and guaranteed the educational areas of Engineering, Technology and Materials and Energy Enginnering. It also participated in other areas of education - Computer Science, Cybernetics. It also prepared for accreditation a follow-up Master's degree programme in Aeronautics and Astronautics. However, it was not accepted by NAU with reference to the ongoing institutional accreditation.

Projects

Although covid pandemic restrictions were still in effect in the first half of 2021, research projects were successfully completed. These were mainly focused on extended National Centres of Competence, but also on-going OPIE projects. Furthermore, the remarkable ESA project CZARM, a collaboration with a consortium of Czech companies for the construction of a Czech robotic arm for space, was successfully obtained in 2021.

_Božek's steam engine predates the Institute of Internal Combustion Engines

_Airplane STOL Cruiser

International cooperation

The pandemic did not favour international contacts, but in spite of this, the cooperation with GE Aviation from the USA continued successfully and on 30 September 2021 at Berlin Schönefeld Airport the GE Catalyst engine made its first flight on the flying testbed of the Faculty of Engineering consisting of a Beechcraft King Air 350. The flying testbed is a converted aircraft equipped with measurement servers that allow the experimental engine to be monitored in flight by up to 400 sensors and its behaviour also recorded. The first flight of the Catalyst engine is a testament to the strong partnership between GE Aviation and CTU and is the result of a tremendous effort at a very difficult time. Innovations developed together not only led to this success, but set the stage for further collaboration.

The faculty also prepared and implemented the extension of the POST-DOCI project initiated under the CTU Future Fund to all faculty departments. The postdocs, selected through an extensive selection process, will start their scientific research activities in 2022.

Awards, other important events

Even in difficult pandemic times, students receive awards. Student Jan Merunka received the Professor Jaroslav Buchar Prize 2021 for his outstanding bachelor thesis "CFD study of airflow around human body simulators with different complex geometries" in the field of projects solved with Ansys tools.

There are high hopes for hydrogen technologies in the context of decarbonisation and sustainable transport on the ground and in the context of the goals set out by the European Green Deal. The production and use of hydrogen has a long tradition in our country. That is why the Faculty decided to participate together with the Ústí nad Labem City Museum and the company Sev.en Energy in the rescue of historic hydrogen compressors from the 19th century. Thanks to our financial contribution, these were saved from destruction and transported to the museum. In 2021, the Faculty of Mechanical Engineering commemorated 100 years since the founding of the Institute of Internal Combustion Engines, which was located on Charles Square and was then headed by the famous Jan Zvoníček, and 70 years since the founding of the Institute of Automobiles, Tractors and Agricultural Machines, which was located in Štěpánská Street with laboratories also on Charles Square and headed by Professor Petránek. These institutes were merged in 1966 to form the Department of Automobiles and Internal Combustion Engines, which was later joined by the Department of Rail Vehicles. The current Centre for Sustainable Mobility Vehicles grew out of it.

Significant application developments in 2021 include the acquisition of three notable patents. First and foremost, the European patent «Multi-spindle machine tool», which provides a process for increasing the productivity of the most powerful type of machine tool by additional 75%. The second is the European patent «Method for determining the position of the centre of a machine tool held in a cooperating gripper head and a cooperating gripper head», which brings a procedure to increase the rigidity of physically coupled robots by 30 times. The third is the US patent «Autonomous device for extracting water from the air», which protects the S.A.W.E.R. device, also exhibited at the Dubai World Expo (ended on March 31st, 2022).

Third mission of the Faculty

As part of its third mission the Faculty primarily dealt with various situations arising from the covid-19 pandemic in the first half of 2021, and renewed its close contact with industrial partners in the second half of 2021. It ensured a presentation at the International Engineering Fair, where it presented a number of innovations at the CTU stand. It also held two press conferences at the fair. The first press conference was, held on the occasion of five years since the conclusion of the collaborative research agreement. The partners, i.e. the Faculty of Engineering and GEAC, presented their joint intention to test a synthetic sustainable aviation fuel (SAF) with the Catalyst turboprop engine for sustainable air transport and signed a memorandum to this effect. At the second press conference, the Faculty, together with Direct FLY, presented a prototype of a new innovative aircraft, the STOL Cruiser, which combines short take-off and landing aircraft and higher cruise speed aircraft into one solution.

Personalities of the Year 2021

are newly appointed professors and associate professors.

Prof. Ing. Tomáš Dlouhý, CSc., delivered his professorial lecture already in 2020, but was appointed professor for structural and process engineering in 2021. His specialty is energy engineering, where he deals with the increase of combustion in boilers, especially recovery in the combustion of wet biomass with a view to the decarbonisation of the energy sector.

Doc. Ing. Jan Čížek, Ph.D., presented his habilitation lecture and was appointed associate professor for the field of production and material engineering. He is involved in surface engineering with a focus on creating bioactive layers for joint replacements that have improved mechanical and biocompatible properties.

We must also mention **Mgr. Radka Preclíková**, who is currently administering an important OP VVV CAAT project at the Faculty. It is she who has made considerable efforts to obtain international projects to ensure the sustainability of OP VVV and other projects at the Faculty.

Faculty of Electrical Engineering provides world-class education in electrical engineering, computer science, electronics, telecommunications, automatic control, cybernetics, robotics and computer engineering, and power engineering. In 2021, we commemorated our 70th anniversary with an exhibition and related events for the academic community and the public.

Similar to 2020, last year was significantly impacted by the coronavirus pandemic. We are all the more pleased to have delivered our teaching in the winter term 2021/2022 in full-time mode, thanks in large part to our students and staff being considerate and respecting the safe contact policy.

The quality of our researchers and teachers is best reflected in the fact that, even in these difficult times, the Faculty has maintained a high standard of teaching and research, which is also reflected in our international ranking. According to prestigious rankings, we have long been the highest ranked electrical engineering faculty in the Czech Republic. And what we are extremely pleased about is that last year our computer science courses also moved up to the highest position in the Czech Republic.

We continue to work to raise this bar in the international environment of contemporary science and academic research, to the benefit of our students, who can thus become involved in cutting-edge scientific projects unusually early, often already at the undergraduate level. This is also made possible by the fact that we have only eight students per lecturer, so that we can take a truly individual approach to them, devoting ourselves to them and developing their skills and talents.

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

FACULTY OF ELECTRICAL ENGINEERING

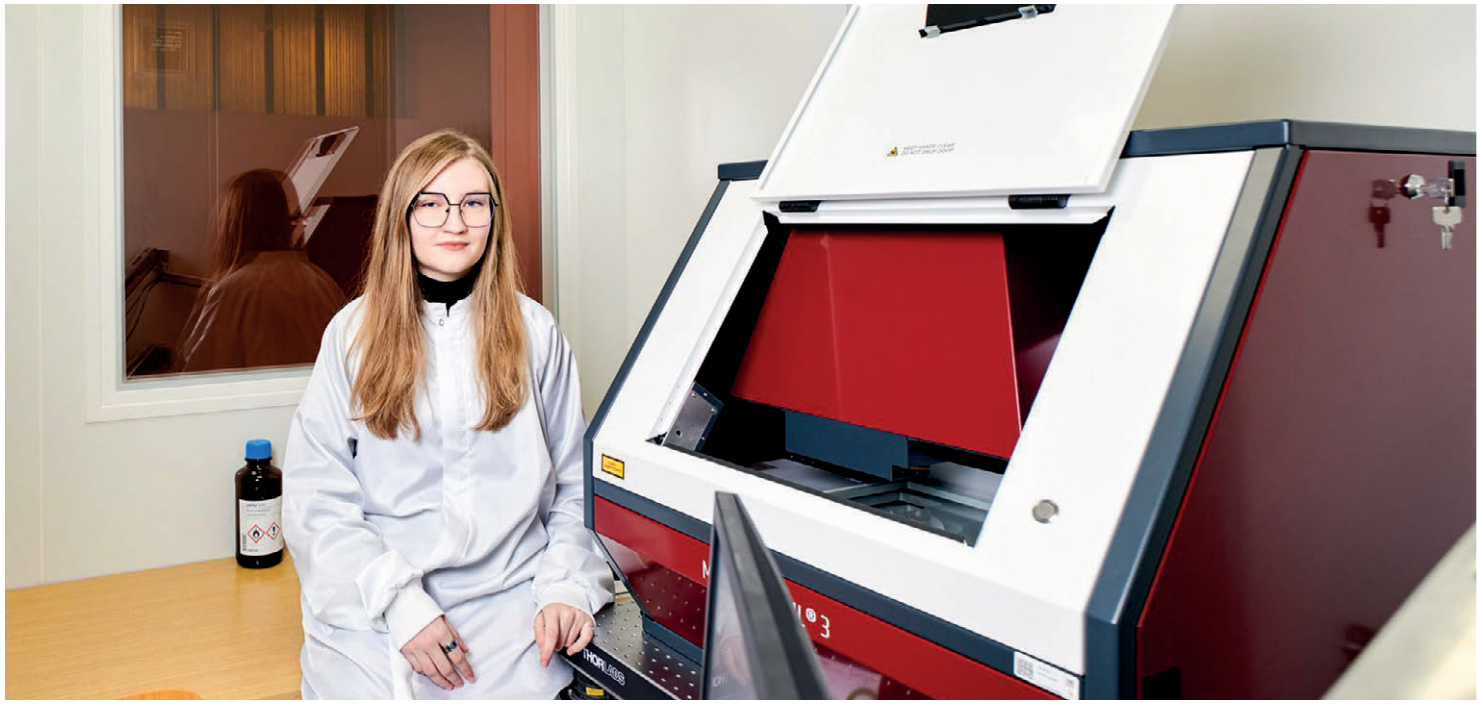
Study programs

In 2021, 2,662 students from 28 countries were enrolled for full-time study at the Faculty, with nearly 170 more studying as part of short-term study stays. We also offer the opportunity 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 enroll in the Space Master programme, on which we cooperate with the University of Lulea and Universität Würzburg.

Research activities and projects

The Multirobotic Systems (MRS) group led by doc. Martin Saska has made progress in the development of robotic drones in 2021. These can move autonomously indoors along a predetermined safe route and react to unexpected obstacles. This is a globally unique project called Dronument, where the technology records rare historical assets and assists conservationists in their restoration. MRS Group also presented what the future of firefighting in high-rise buildings will look like. A new is drone autonomously firing a firefighting capsule and is able to quickly intervene in fires in multi-storey buildings. A team of UAE roboticists has also explored the potential for using swarm of drones in humanitarian search and rescue operations.

Researchers from the Department of Economics, Management and Human Sciences presented the results of an international project to calculate the amount of investment needed, map its current status and prepare investment plans to achieve climate and energy goals by 2030. According to them, the Czech



_Nanolaboratoř Fakulty elektrotechnické ČVUT

Republic needs to sixfold its investment in renewable energy to achieve the climate goals.

The robotics team has been boosted by the SPOT robot. A four-legged autonomous walking robot from Boston Dynamics has joined the researchers to boost their chances in the final round of the DARPA Subterranean (SubT) Challenge. In addition, the robot is being used in follow-up research on autonomous movement in human-occupied environments.

In 2021, the School of Electrical Engineering opened two new laboratories. The 6G mobile research lab is a new experimental lab that will enable research and development of the next generation of 6G mobile networks in addition to 5G network communication. The lab for research and teaching of nanoelectric technologies will in turn satisfy the demand of Czech companies for experts in the design and implementation of semiconductor chips.

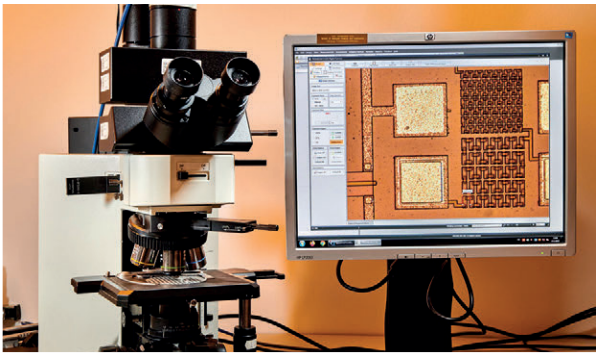
Projects in 2021 focused on problems related to covid-19 disease have enabled the rehabilitation of patients in a home environment (TERESA), remote monitoring of lung ventilators and vital signs monitors (VENTI-CONNECT) or the development of an air purifier with filter material that can be sterilised by electric current and reused.

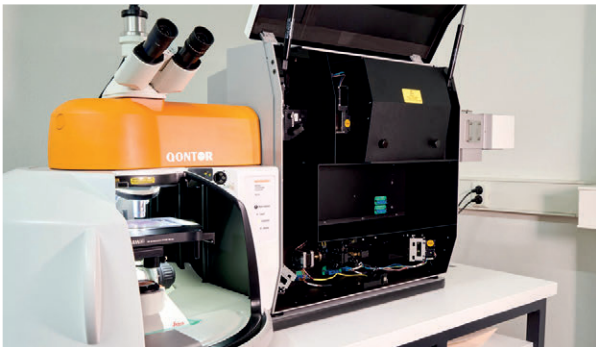
International collaboration

New projects in international consortia were launched in 2021, e.g. UNCOVER - Development of an efficient steganalysis framework for uncovering hidden data in digital media, RoboRoyale: ROBOtic Replicants for Optimizing the Yield by Augmenting Living Ecosystems and GaN4AP - GaNfor Advanced Power. Consortium projects from previous years also continued, e.g. BIOFMET - New metrological methods for biofuel materials analysis, AERIAL-CORE - AERIAL COgnitive integrated multi-task Robotic system with Extended operation range and safety and AHEAD2020 - Integrated Activities for the High Energy Astrophysics Domain. In addition, four collaborative research projects were initiated with the Taiwanese NTUST and foreign cooperation within the framework of the Czech Ministry of Foreign Affairs programme Strengthening the Capacity of Public Universities in Developing Countries, specifically in Ukraine, was continued. Within the framework of the Operational Programme Research, Development and Education (European Structural and Investment Funds), the implementation of the projects "HR Award" and CTU ESF II continued, which are aimed, among other things, at developing international cooperation and internationalization of the environment at the Faculty of Economics, including strengthening academic and research cooperation with prestigious higher education and research institutions from South Korea and Israel. As part of the Nikola Šuhaj Scholarship Program, FEL supported three applicants from abroad in 2021. The Faculty also participated in the International Visegrad Fund Scholarship Programme.

Awards

RNDr. Zuzana Kúkelová, Ph.D., with her project New Generation of Algorithms for Solving Camera Geometry Problems, received the prestigious JUNIOR STAR grant (awarded by the GA of the Czech Republic), designed to support excellence of outstanding emerging scientists.





Lukáš Janota won the Werner von Siemens Prize for the best paper on Industry 4.0. His thesis focused on the possibilities of future energy use of discarded battery cells from electric vehicles.

The IT SPY thesis competition had a female winner for the first time in 2021. Jindřiška Deckerová, a graduate of the Faculty of Electrical Engineering, designed the winning unique algorithm for autonomous drones and robots.

Our student Vojtěch Petrásek took first place in the Hack for Healthcare hackathon in a team of students from other faculties. The winning team will now work with the Geneva-based organization Doctors Without Borders.

The CTU-CRAS-NORLAB robotics team won silver in the final round of the DARPA Subterranean Challenge, organized by the U.S. Department of Defense agency, in the virtual competition and finished sixth in the real robot race.

The Department of Telecommunication Technology won 2nd place in the major eLearning 2021 competition. The team impressed with the VOVCR.CZ Open Digital Learning Resource Environment project.

From the many FEE personalities that the year 2021 has brought to the forefront, we mention only selected ones. The first of them is prof. Ing. Jiří Matas, Ph.D., who was the top-ranked computer scientist from the Czech Republic in 2021 based on the international comparison by Research.com. This ranking evaluates the success of computer scientists based on their H-index, citations and the number of documents in the DBLP database collected by 6 December 2021. Prof. Matas, Vice-Dean for FEE Development is currently 416th the best rated expert in the entire ranking globally.

Prof. Ing. Jiří Matas, Ph.D.

Another personality from our faculty is doc. Ing. Zdeněk Bečvář, Ph.D., from the Department of Telecommunication Engineering, who opened and leads a new faculty research laboratory for 6G networks. In addition to 5G network communication, this state-of-the-art independent experimental laboratory will also enable research and development of the next generation of 6G mobile networks, which are expected to be launched in the late twenties and early thirties.

doc. Ing. Zdeněk Bečvář, Ph.D.

The year 2021 was extremely challenging for the Faculty and the entire university. The pandemic of the covid-19 disease was at its peak and for almost the whole year our buildings had to be partially or completely closed, inaccessible not only for students but also for staff who could only go to work on a limited basis. This led to a reduction of laboratory and experimental work in many areas. On the other hand, there was room for the development of cooperation between departments in both scientific and pedagogical areas, resulting in a number of new interdisciplinary scientific projects and study programmes.

In addition to the impact on scientific and pedagogical activities, the epidemic has also left its mark on interpersonal relations. It was difficult to form links between first-year students and teachers. Our traditional social events could not take place and student societies had limited activity. We all had to cope with the distance learning system, which was very unusual for us at that time. I am proud of our students and teachers that in the end we managed everything together and that we will learn from the shortcomings we discovered in the years to come.

Despite all the obstacles mentioned, or perhaps because of them, the Faculty has had a successful year. Thanks to careful management work at all levels, we have a balanced economy. We have established a number of new international collaborations and have been successful in attracting new international projects. Even with limited access to the Faculty, we started partial renovations - for example, one of the tracts of the Břehová building or the large lecture hall in Trojan Street. The Faculty has shown its strength and internal cohesion. That is why I remain optimistic and convinced that we are heading for better times.

doc. Ing. Václav Čuba, Ph.D.
Dean of the Faculty of Nuclear Sciences and Physical Engineering, CTU

FACULTY OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING

Study programmes

Within the study programme Nuclear Engineering, the Faculty offered a new specialisation Radioactivity in the Environment, which focuses on dosimetry and detection of ionising radiation, radiation protection and radioactive waste. This specialisation can only be studied at the Faculty's off-site location in Decin in cooperation with Technische Universität Dresden.

A new programme called Safety and Security of Nuclear Installations and Forensic Analysis of Nuclear Materials has been opened for doctoral studies. This responds to the increasing demand for experts in the fields of fuel handling, cyber security, etc.

Projects

In 2021, the Faculty again drew heavily on the CAAS project, which involves a large number of departments across CTU. In addition, however, it was also successful in gaining other project support. For example, the new PlasmaLab@CTU, which is part of a multinational network of laboratories for thermonuclear fusion research, was successfully built. The "SpacePix2 - Advanced Monolithic Space Radiation Ddetector" project then helped to create a detector that travelled to Earth orbit in January 2022.

International cooperation

Although travel opportunities have been reduced, the Faculty has continued to maintain active international collaborations through sharing of results and contact and online meetings. For example, it has been involved in the building of the National Quantum Infrastructure, and in particular has been involved in the European QTEdu Open Master project, which it coordinates. Dozens of European universities, including CTU, will thus train experts in quantum technologies. The QTEdu programme is part of the Quantum Flagship project supported by the European Commission with €1.5 billion.

The Faculty established the new cooperation during a symposium where our experts presented in detail the methodology and results of the analysis of the Zikmund Bell from St. Vitus Cathedral. Guests were representatives of bell technicians and a group of bell ringers from Krakow, who care for a bell of the same name and almost the same size in Poland, and who expressed interest in our methodology and its application to their bells. The originally local cooperation between the Metropolitan Chapter of St. Vitus in Prague and the CTU is thus beginning to take on an international dimension.

Awards

Every year, students and faculty members collect awards and top rankings across disciplines and competitions. This was no different last year. Ondřej Ficker won the Josef Hlávka Award, Prof. Jex was elected a member of the prestigious European Academy, Prof. Exner was elected a foreign member of the Ukrainian National Academy of Sciences, and Jitka Kostkova won the Antonín Svoboda Award. We had two award winners, namely Martin Schäfer and Ondřej Novák, at the Henri Becquerel Prize for Nuclear Research. Karel Tesař received the award from Transfer Technology Day 2021 and Petr Hauschwitz made it to the prestigious Forbes magazine 30 under 30 list. The Faculty was also awarded medals for outstanding achievements of CTU experts in times of crisis, with which the Rector appreciated not only the production

_Ing. Karel Tesař, who took part in the faculty dedicated to the development of the implant, that can prevent chronic pain after heart surgery..

of disinfection at the beginning of the covid-19 pandemic, but also the establishment of the vaccination centre and others. The students received the Dean's Prizes for the best diploma thesis, while the employees were awarded by the Dean Prof. Jex with the FJFI medals of the first and second degree.

Other important events and happenings

The connection between science and art was presented by a team from our faculty and the Institute of Intermedia (IIM) at the Faculty of Electrical Engineering with a dance performance called Color Force, which was created within the framework of the Language in Communication between Science, Art and the Public sub-programme.

The school's nuclear reactor is a big attraction for foreign guests. The French Ambassador Alexis Dutertre and his nuclear advisor Thierry Salmon, as well as the Ambassador of the Republic of Korea Tae Jin Kim, tried their hand at operating it. The Faculty also prepared something unprecedented for its students. In March, the first virtual graduation ceremony in the country took place in Bethlehem Chapel. Seventy-two graduates present took their graduation vows and were declared engineers. The entire event was broadcast live by the Faculty and was also watched by family members and friends of the graduates on the faculty YT channel. The Faculty participated in the preparation of a week-long Ministry of Industry and Trade (MIT) training course called Mosaic. The course is intended primarily for employees of state and local government authorities who participate in the preparation for the construction of a new nuclear power plant in the Czech Republic. Another educational project was "Sparrow flies to schools" for secondary schools. In a 45-minute live broadcast, our scientists combined classical teaching of particle physics with practical demonstrations from the reactor. In total, over the course of several dates, the broadcast was seen by over 1700 students from all over the country.

The third mission of the faculty

The Faculty also contributed to the fight against the epidemic by offering its premises in Decin to set up a vaccination centre. From Monday 12 April 2021, up to 500 people could be vaccinated there daily. The Faculty provided its large hall for a symbolic CZK 1 per month to the Regional Health Society, which ensured the operation of the vaccination centre for the necessary time. The entire space and the facilities for the medical staff were prepared by the team of the CTU detached workplace.

_Dance performance by Color Force at the Archa Theatre

Personality of the year 2021

Ing. Jitka Kostková, Ph.D.

has been pursuing mathematics for years. After graduating from the Faculty, she works as a software engineer at PureStorage. This year, she received one of three Antonín Svoboda Awards from the Czech Society for Cybernetics and Informatics, and a year ago she received the Joseph Fourier Award for the best research work in computer science.

She is an example of linking pure mathematics with practice. In an era of austerity, her research on invariants could help body designers increase the speed and reduce the fuel consumption of vehicles. "The initial impetus came from body designers in practice," she explains why she started working on the topic. "When air blows around a car, unwanted eddies can occur - these reduce speed and increase consumption. The invariants studied can be used as a tool to automatically find these vortices in the simulation data that engineers routinely have, simulating real wind flow," she explains the use of the research.

She has now moved away from invariants to storing large volumes of data built on flash technology and moved from pure mathematics to more programming. She takes this as another challenge in life.

Last year we celebrated anniversaries of important milestones in the development of the Faculty and also held events aimed at the future. In November, we commemorated the 45th anniversary of the re-establishment of the faculties of architecture in Prague, Brno and Bratislava by re-establishing the architectural disciplines from the faculties of civil engineering in 1976. However, a separate component focused on architecture and civil engineering was established at CTU as early as 1864, so we also commemorated the 157th anniversary of this event.
Another significant milestone in our modern history was in 2011, when we moved to a new building, which opened up further opportunities for faculty development, including the accreditation of new degree programmes in Design and Landscape Architecture.
In August we hosted the annual conference of the European Association for Architectural Education (EAAE), dedicated to the theme of scaling up projects and the overlapping disciplines of architects, urban planners and landscape architects.
Despite the partial problems and the impact of the pandemic on academia and teaching, our faculty has successfully developed in recent years. We believe that even the negative impacts will be capitalized by the development of the use of distance forms and means of teaching.
We can also significantly help to further free up space for creative work of teachers and architects by limiting excessive reporting of their performance. It is time to take concrete steps to consciously defend and resist these tendencies.
Unlike during the totalitarian period, the limits of collaboration with the system are almost imperceptible today. We are no longer occupied or consciously normalized, we are just gradually adapting to the conditions set. Let us not squander and dissolve our acquired freedom by returning to the pretended world of reporting of what we are supposed to do. Let us concentrate on the essentials. On what we really have and want to do. To teach and to create and teach to create.

Prof. Ing. arch. Ladislav Lábus, Hon. FAIA,
Dean of the Faculty of Architecture, CTU
(2014-2021)

_A celebratory assembly in Bethlehem Chapel on the 45th anniversary of the re-establishment of an independent faculty

FACULTY OF ARCHITECTURE

Study programmes

In the academic year 2021/2022 the first students of the newly accredited three-year follow-up Master's degree in Architecture, Urban Planning and Landscape Architecture started their studies. It focuses on deepening the basic knowledge of the Bachelor's degree programme in Architecture and Urbanism, while expanding the basic and complementary knowledge contained in all compulsory subjects of the Bachelor's and Master's degree programmes in Landscape Architecture.

The new programme is oriented towards the shaping of the built and landscape environment, combining the education of architects, urban planners and landscape architects, reflecting the modern developments and the needs of all three professions. Their interdependence is confirmed by the fact that in the Czech Republic they are administered by one self-governing organisation - the Czech Chamber of Architects, which is also the recognition body for the exercise of these three regulated professions.

Projects

Within the framework of the cooperation between the Faculty of Architecture and the Centre for Advanced Applied Sciences (CAAS) at the Faculty of Nuclear and Physical Engineering of the Czech Technical University, we participate in the visual presentation and popularisation of their scientific research. This collaboration resulted in two artistic endeavours in 2021. The team of the Institute of Design, consisting of prof. akad. soch. Marian Karel and doc. MgA. Josef Šafařík, Ph.D., designed a glass sculpture for the Dejvice campus with an oparted graphic raster that mediates optical illusion.

Prof. akad. arch. Vladimír Soukenka and Ing. arch. Jan Tůma, Ph.D., in collaboration with the Institute of Intermedia at the Faculty of Electrical Engineering of the Czech Technical University, designed the scenography of a ballet performance for the CAAS gala assembly at the Archa Theatre on 4 November 2021. They worked with data projection generated by the direct movement of the dancers on stage.

International cooperation

After a one-year break due to the covid-19 pandemic, the November Talks lecture series, supported by the Sto Foundation, returned to the faculty in autumn 2021. The sixth series introduced successful and inspiring personalities from the world of architecture to the Prague, and in the online environment also international, audience, this time under the common theme of Courage to Take Risks: The Art of Creating the Material World.

The series was launched on 15 November by Slovenian architect Maruša Zorec. A week later, Eva Jiřičná, internationally renowned architect and designer, recipient of the Order of the British Empire, member of the Royal Academy of Arts, gave a speech. The third guest was architect and urban planner Matthew Carmon, professor at the Bartlett School of Planning at University College London. November Talks 2021 closed with Alison Brooks, award-winning British architect, winner of three of the most prestigious architectural awards - the RIBA Stirling Prize, the Manser Medal and the Stephen Lawrence Prize.

1_Christening of the book Architecture Today 1976-2021; 2_Information kiosk Piškot in Krkonoše; 3_ Eva Jiřičná at Noveber Talks; 4_Tout est connecté and its authors

Awards

Tout est connecté (Garden of Shared Consciousness) is a project by students of the Landscape Architecture program, awarded at the International Garden Festival in Chaumont-sur-Loire, France. It is the first ever Czech success in the thirty years of the festival, which is the event of the year in the field of landscape and garden architecture. Nearly 300,000 people visit the festival between May and November.

Háta Enochová, Petr Stojaník, Marek Kratochvíl and Jan Trpkoš, under the direction of Vladimír Sitta, are behind the design and implementation of the Garden of Shared Consciousness. Its central idea is that everything is connected to everything and everything communicates in some way. The inspiration came from the intricate systems that we can find, for example, at the roots of trees. The project highlights the interconnectedness in our world.

Other important events and happenings

On the occasion of the 45th anniversary of the re-establishment of an independent faculty, the academic community gathered for a festive assembly in Bethlehem Chapel on 24 November 2021.

The Felber Medal, the CTU Medal and the Medal of the Faculty of Architecture of the CTU were presented to personalities who have made significant achievements in scientific, pedagogical and artistic activities. During the ceremony, the management and staff of the Faculty of Architecture presented themselves for the first time in new gowns designed by prof. Libena Rochová.

On the occasion of the anniversary, the faculty issued two publications. The book Memories and Notes summarizes its modern history, authored by the historian of architecture and teacher of the Faculty of Architecture, Professor Vladimír Šlapeta. The publication Architecture Today 1976-2021, edited by Matúš Dulla and Jan Jakub Tesar, presents the realisations of personalities of Czech architecture who also teach at the faculty, mainly as heads of design studios. A selection of their work over the last five years was presented in an exhibition of the same name at the Jaroslav Fragner Gallery. During its opening the winners of the first year of the faculty competition for the Dean's Prize were announced.

The third mission of the faculty

The Faculty of Architecture cooperates with public and private institutions, the public and the media at local, national and international level. One example is the design-build projects of the Institute of Design II. Design-and-build projects allow students to conceive, draw and build a building with their own hands. Through this alternative to standard instruction, students experience the entire process of creating a building, teamwork and collaboration with specialists and craftsmen.

It is also a way for the Faculty to engage with the public realm. In the past, the Institute of Design II has collaborated with the Krkonoše National Park Authority, for which it built footbridges and shelters in the Krkonoše Mountains, and with the Prague 6 municipality, among others. The Oko lookout was designed and built by students of the Seho-Poláček studio as an observation platform and an unconventional swing in Nebušice. Three seats were realized by students of the Hlaváček-Čeněk studio in Libčice nad Vltavou.

Personality of the year 2021

PhDr. Benjamin Fragner

Architectural historian Benjamin Fragner received the Ministry of Culture Award for his contribution in the field of architecture, especially for initiating and conducting long-term research on industrial heritage and popularising its results. The award ceremony took place on 24 October at the New Stage of the National Theatre.
Benjamin Fragner is a Czech historian and industrial archaeologist. He specializes in the history of technology and the theory of architecture and urbanism. He is a curator, organizer and co-author of a number of publications and exhibitions. He initiated the establishment of the Research Centre of Industrial Heritage (VCPD) at the Institute of Theory and History of Architecture, at the Faculty of Architecture of the CTU, of which he has been the director since 2002. The VCPD Research Centre deals with systematic mapping of monuments of technology and industry in the Czech Republic. It focuses on alternative projects for the new use of industrial heritage, which are reflected in the teaching activities of the faculty in the master's and especially doctoral degree programmes.

For the Faculty of Transportation Sciences , the year 2021 has been a continuation of adaptation to the ongoing changes in our society, brought about by measures to reduce the risk of the spread of viral infection, and an effort to return to the familiar forms of our days, filled with the active life of a university workplace. Although we continued to be deprived of the solemn academic ceremonies, sporting competitions, trips and mobility, work, cultural and social events, in short, all the experiences of attendance during the spring months, we all hoped for the return of traditional life at least as summer and autumn approached. Fortunately, this wish was partly fulfilled and the evolution of the situation, although not fully favourable, allowed us to gradually relax restrictions to fully implement the examination period and the state examinations, and in the winter semester to hold the standard full-time classes and academic ceremonies. Among the important activities of the year 2021 in the field of pedagogy, it is worth mentioning in particular the preparation and submission of the accreditation application for the Faculty's Bachelor's degree programme with individual specialisations, as well as the finalisation and submission of the institutional accreditation of the CTU for the field of Transport education. We have continued to work on improving the quality of the Faculty's scientific and research activities, for example by using the Future Fund for foreign postdoc positions, but especially by increasing again the volume of funds drawn from public subsidy sources and in cooperation with industrial partners and public administration. Long-delayed mobility and business trips to develop existing collaborations have been partially fulfilled in the international area. I am confident that we are going to be successful in the coming period and that as one team the Faculty continues 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

The teaching activities of the Faculty in 2021 focused mainly on the implementation of existing accredited study programmes and fields of study. At the same time, teaching in the newly accredited bachelor's degree programme Professional Pilot started. In the Bachelor's degree programme Technology in Transport and Telecommunications, the existing teaching continued in six disciplines, in the follow-up Master's degree program Technology in Transportation and Telecommunications in four disciplines.

In 2021, accreditation was granted to the programmes Air Traffic Operation and Management and Air Traffic Control and Management in the follow-up Master's programme.

The Faculty of Transport was involved in the preparation of documents for the application for institutional accreditation of CTU in 2021. As part of this process, it became the sponsoring faculty for the Transport education area.

Projects

In 2021, the project "Universal Training Simulator for Public Transport Vehicles", which is funded by the Operational Programme Prague - Growth Pole of the Czech Republic, continued. This project is aimed at increasing the safety of public transport vehicles (metro, bus, tram), where a high level of responsibility still lies with the driver or the engine driver. One of its main objectives is the development and implementation of a unique prototype of a simulator for the training of drivers of public transport vehicles and a methodology for the implementation of training of these workers, where the primary and target user will be the Transport Company of the Capital City of Prague. The primary target of the project will be the Transport Authority of the Capital City of Prague. The project also includes the preparation of the production of the final product.

International cooperation

As part of our long-term cooperation with the University of Texas at El Paso, we are implementing a Dual Master Degree Program in Smart Cities valid until 2024. In 2020, in cooperation with this university, a new master's program SC - Smart Cities taught in English was launched. An agreement has also been signed with the National Taiwan University of Science and Technology (NTUST) to start cooperation in the new PhD programme S - Smart Cities.

Awards

The year 2021 was again very successful in terms of award-winning student works. Our students won a number of prizes in the prestigious Czech Transport Construction, Technology, Innovation 2020 competition. Namely, Jan Skočdopole for his work Redesign of the I/9 Svor intersection and Jan Ležák for his work Study of the revitalization of Vídeňská and U Rakovky streets. However, the Faculty of Transportation Sciences can

also boast elite athletes, in the poll for the best athlete of CTU were again Antonie Galušková, who competes in water slalom, and Tomáš Kinský, whose discipline is downhill skiing.

Other important events and happenings

The year 2021 was unfortunately a very limiting year for major events due to the global pandemic of covid-19. Nevertheless, the organizing team headed by Prof. Ondrej Pribyl and Prof. Miroslav Svítek managed to organize the 7th year of the IEEE Smart Cities Symposium Prague, which is now one of the leading conferences on this topic. This year's edition was again focused on the exchange of theoretical knowledge as well as practical experience in the field of smart cities. Experts from more than 13 countries discussed not only new trends, but above all the sustainability of urban development and the use of technology in accordance with the needs of the inhabitants of a given area. The symposium has long aimed to be a multidisciplinary platform for sharing new technologies and experiences with their practical application in everyday life. The international reach is reflected in the programme itself, which included speakers from South and North America, Asia and Europe.

Due to pandemic measures, the annual meeting of the Faculty of Transportation Sciences with its leading partners has also been postponed from December 2021 to the end of January 2022, which includes the award of a major prize - the Gerstner Medal. This highest award is presented by the Dean of the Faculty to individuals for their contributions to the development of the Faculty and for dedicated and exemplary service to the Faculty. Ten individuals from across the commercial and academic spheres were honoured at this year's award ceremony.

The third mission of the faculty

The pandemic situation presented many new and previously unimaginable challenges for the academic environment. From being involved in the development of protective equipment, to introducing new teaching methods built primarily on an online format, to dealing with crisis situations on a personal level for everyone. Thanks to the creative and, above all, solidarity-oriented environment that our faculty undoubtedly is, and our partners from industry, government and academic institutions, we have managed to deal with everything successfully. This very challenging period has paradoxically accentuated the need for professionals in the field of transport and logistics and reaffirmed the importance of the essence of the Faculty of Transportation Sciences as one of the key faculties of CTU.

Personalities of the year 2021

Prof. Ing. Ondřej Jiroušek, Ph. D.

Among the leading personalities of the Faculty of Transportation Sciences is the head of the Department of Mechanics and Materials Ondřej Jiroušek, who was appointed professor in 2014 at the age of 39. He is a successful researcher of a number of project plans, he was and is a researcher of The Czech Science Foundation (GAČR) projects projects, a member of the research teams of The Technology Agency of the Czech Republic (TAČR) projects, OPVVV operational programmes projects and European projects. Prof. Jiroušek is a supervisor of successful PhD students and creates excellent conditions for the growth of the new research generation at his research institute. He sees the essence of this stimulating environment primarily in connecting PhD students with other research institutions in the world through internships.

Ing. Tomáš Fíla, Ph.D.

In 2021, he was awarded an excellent The Czech Science Foundation project - Junior Star Project. In this call, only 16 projects out of 315 submitted were supported in the whole Czech Republic. The project is focused on the use of fast flash X-ray to describe the behaviour of materials under impact loading. The grant budget of more than 20 million CZK will enable the expansion of the research infrastructure of the DynLab laboratory and the creation of a research group dedicated to the topic of dynamic behaviour of advanced materials under impact loading and the elucidation of the principle of their failure.

The year 2021 was a successful year for the Faculty of Biomedical Engineering of CTU. In the fight against the covid-19 pandemic, the legitimacy of its origin and existence was once again proven. The result of the work of our specialists is a unique protected pulmonary ventilation solution designed for the treatment of covid-19 disease. On its basis, the CoroVent pulmonary ventilator was prepared in a very short time, saving the lives of the most severe covid patients. The UN and other partners have shown interest in this unique product, and we have also offered it to the government to save our citizens. Experts from our faculty have helped to minimize the effects of covid pneumonia using laser therapy, while others have made 3D models of hearts to increase the success rate of surgeries. Hundreds of students from our Faculty have worked on the frontline, saving lives, others have donated blood en masse, rehabilitated severely disabled patients, etc.

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

FACULTY OF BIOMEDICAL ENGINEERING

Study programmes

The Faculty has all its study programmes accredited by the National Accreditation Authority for Higher Education, so it offers only these newly accredited and upgraded study programmes to prospective students during the admission process. These are highly sought-after programmes not only in the Czech Republic but also abroad, especially by health care institutions, because their graduates acquire professional competence for the exercise of a regulated profession subject to the approval of the Ministry of Health of the Czech Republic or the Ministry of the Interior of the Czech Republic. One of the strategic plans was the accreditation of the follow-up Master's degree programme in Applied Physiotherapy, granted in 2021. This programme leads to the acquisition of specialised competence with the designation of Professional Physiotherapist according to Act No. 96/2004 Coll.

Projects

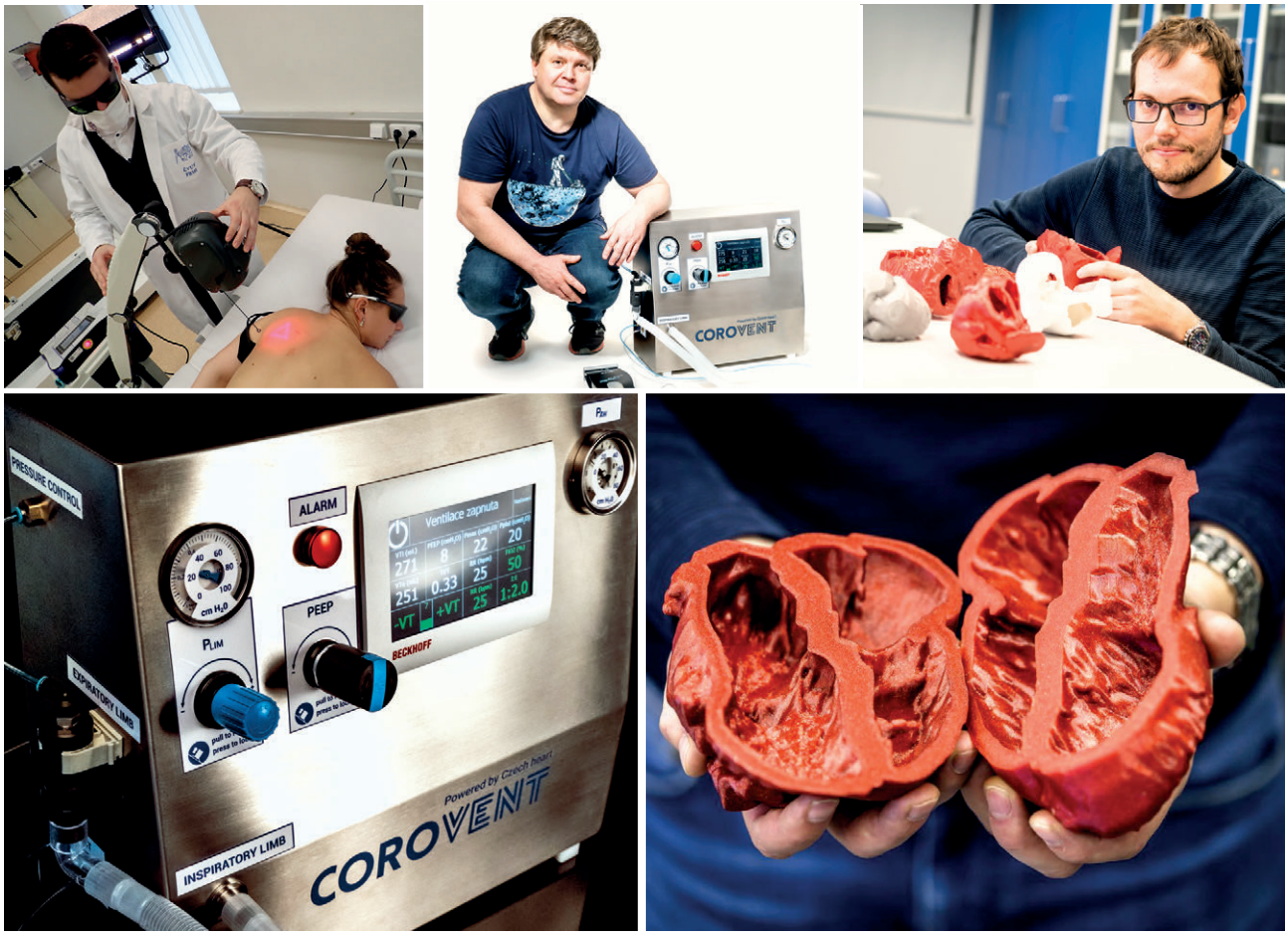
In 2021, the faculty worked on 119 interdisciplinary projects, which is 23 projects more than in 2020. Of this total, 48 were newly acquired in 2021, across many providers. Very significant projects with international overlap include the MEYS Expert Consultations to AuriGen Medical Limited project by Prof. Dr.-Ing. Jan Vrba, M.Sc., the GAČR (The Czech Science Foundation) project Multiphysics study of electromagnetic wave superposition in a human head model to verify the feasibility of microwave hyperthermia of brain tumours by doc. Ing. David Vrba, Ph.D., and last but not least two MEYS Inter-excellence projects - Development of metamaterial applicators for regional hyperthermia system and evaluation of accuracy of treatment planning algorithms by prof. Dr.-Ing. Jan Vrba, M.Sc., and Improvement of robotic physiotherapy treatment using machine learning methods by doc. Ing. Patrik Kutílek, Ph.D. A very interesting and innovative venture was also the project Master's Thesis in three minutes by Ing. Václav Petrák, Ph.D., which involved participants across the entire CTU.

International cooperation

A very important activity in 2021 was the cooperation of the scientific team of the faculty led by doc. Ing. Pavel Smrčka, Ph.D., with colleagues from Johns Hopkins University in the USA, the University of Defence, the Army of the Czech Republic, the NATO Allied Command Transformation Innovation Hub and the Def Sec Innovation Hub on a system to assist in the treatment of wounded soldiers in combat situations or in dealing with crisis situations in which the army assists the Integrated rescue system forces. The FlexiGuard prototype is currently being tested and will be expanded and deployed in field tests in cooperation with the Czech Army.
Within the framework of a two-year project, the Faculty is completing the project with the support of the Czech Development Agency and under the leadership of Prof. Ing. Karel Roubik, Ph.D., the introduction of the field of biomedical engineering at universities in Cambodia initiated by the Cambodian Ministry of Health. RNDr. Eva Feuerstein, Ph.D., leads the international project Innovative Teaching Education in Mathematics - iTEM (Erasmus+), which involves 16 partners. Furthermore, under the leadership of doc. Ing. David Vrba, Ph.D., continues cooperation with Thomas Jefferson University Hospital in the USA, represented by Prof. Paul Stauffer, Ph.D., in the field of introduction of microwave technologies into practice.

Awards

MUDr. Lenka Horáková, DESA, a student of the Ph.D. program in Biomedical Engineering, received the award of the Sci-



entific Committee of the IEEE, the largest international organization in the field of technology development, at the EHB 2021 - IEEE International Conference on e-Health and Bioengineering in Iasi, Romania.

Other important events and happenings

Prof. Miloš Nesládek and Dr. Michal Gulka are the lead authors of a paper on quantum computing published on 20 July 2021 by the prestigious scientific journal Nature Communications. Faculty graduate Jaroslav Hrubý, now at Hasselt University, was involved in the development of the diamond quantum magnetometer used on SpaceX's Dragon spacecraft, which headed from Cape Canaveral, Florida, to the International Space Station (ISS) on 29 August 2021.

The third mission of the faculty

Like the previous year, the year 2021 showed that faculty can be very useful partner. Students of the Paramedic program took up internships with the crews of the Emergency Medical Services of the Capital City of Prague in daily shifts instead of the third team member. The Faculty also established a similar form of cooperation with the Karlovy Vary Region Emergency Medical Services. Ing. Roman Říha and his team are involved in the streamlining of the use of automated external defibrillators (AEDs) and the system of first responders in the Czech Republic. The Faculty systematically organized events for both teachers and students of primary and secondary schools and multi-year gymnasiums. Students from the Emergency Planning and Management programme volunteered to help with tornado damage relief in the village of Hrušky near Breclav. The faculty, in collaboration with the Institute of Hematology and Blood Transfusion (IHBT), will be actively involved in the production of immunotherapeutic drugs in its clean rooms and it will be involved in the training of future professionals, i.e., advanced medical laboratory technicians for personalized medicine. Doc. PhDr. Barbora Vegrichtová, PhD, MBA, from the Department of Health and Population Protection at the Faculty of Biomedical Engineering, is involved as an expert consultant in the large-scale Commander project, which focuses on the topic of online radicalisation of children and young people. A team of Faculty experts led by Prof. MUDr. Leoš Navrátil, CSc., MBA, dr. h. c., began using high-power laser therapy, commonly used in musculoskeletal rehabilitation, to minimize the effects of covid pneumonias as early as spring 2021. 28 students, future paramedics, together with their teacher Mgr. Pavel Böhm, MBA, who organized the event, donated blood together at the Regional Hospital Kladno on Tuesday, December 7.

Personalities of the year 2021

We have selected three women as the Faculty Personalities of the Year 2021. Doc. Ing. Vladimíra Petráková, Ph.D., and doc. RNDr. Pavla Bojarová, Ph.D., received their habilitation decrees in Biomedical Engineering on 28 June 2021. Doc. Petráková is the first woman who studied at Faculty of Biomedical Engineering from bachelor to doctoral studies and then habilitated here. She is also a very successful promoter of science and the synergy between women-mothers and women-scientists.
Doc. Bojarová has also prepared the accreditation of the new study programme Biomedical Laboratory Methods. The last lady is doc. PhDr. Barbora Vegrichtová, Ph.D., MBA, an expert at the Czech and European level in the field of international terrorism. On 9 September 2021, she received the Czech Prison Service Plaque, an award given for exceptional and long-standing merits in the development of humanization and democratization of the Czech prison system.
We cannot leave out Matej Vopata, a student of Paramedic program, who, thanks to his knowledge and quick reaction, helped to save two human lives on holiday when he was immediately involved in providing first aid at a traffic accident he was passing. Consequently, beside the fact that his intervention was successful, he took home the lesson that you never know what you might encounter, even on holiday.

doc. RNDr. Pavla Bojarová, Ph.D., and doc. Ing. Vladimíra Petráková, Ph.D.

Faculty of Information Technology was established on 1 July 2009 as the eighth faculty of CTU. It is housed in two interconnected buildings on the CTU campus in Prague-Dejvice and currently has six departments and one research facility built from an ERC (European Research Council) grant. The Faculty of Information Technology (FIT) is a nationally and internationally recognized faculty in the field of education, science, research and innovation. Its mission is to provide quality technical education in the main fields of computer science with a focus on information and communication technologies and to carry out research and development activities. Education at Faculty of Information Technology has a balanced ratio of theoretical foundations and engineering-technical disciplines. All this allows the necessary individual profiling of students at the level of education from bachelor's to master's to doctoral studies nebo degrees. During its existence, the Faculty has educated more than 3,600 promising graduates. For quality research, the Faculty uses 19 laboratories with state-of-the-art equipment and sponsors 12 research groups. It also collaborates extensively with the IT industry, for which it has built a partnership and sponsorship programme. Thus, during their studies, students have the opportunity to participate in the implementation of research projects in more than 200 companies, thus gaining invaluable practice for their future careers. Cooperation with partner institutions allows the Faculty to monitor trends and adequately innovate the content of courses and seek new forms of student education.

Constraints within the coronavirus pandemic have been a challenge. Also due to the fact that the Faculty is focused on information and communication technologies, it was able to deal with this unexpected situation very well and quickly. Our experts and students also used their knowledge and the technical facilities of the Faculty to help people in need.

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

__ **Konsent hackaton - Entropy team**

FACULTY OF INFORMATION TECHNOLOGY

Study programmes

The Faculty of Information Technology (FIT) offers 10 bachelor and 9 master specializations of the Informatics programme, some of which can be studied in English. Bachelor studies cover all areas of computer science. It offers a choice of specialisation from the second year onwards, so students have time to think about what they really want to study. There is also the possibility of a paid internship while studying or working with many leading IT companies. The Master's programme builds on the Bachelor's programme and allows collaboration on research projects. FIT also offers a doctoral programme to study, which is aimed at developing the creative skills of PhD students across the entire spectrum of engineering informatics.

Projects

The Faculty of Information Technology participates in many projects and grants received from various providers (The Technology Agency of the Czech Republic TACR, The Czech Science Foundation GACR,, European Commission, CELSA). Among them, we can highlight the Evolving Language Ecosystems (ELE) project and the Big Code project of Prof. MSc. Jan Vitek, Ph.D., projects within the Image Processing Laboratory of doc. RNDr. Ing. Marcel Jiřina, Ph.D., or the Intelligent Embedded Systems Laboratory of Ing. Miroslav Skrbek, Ph.D. Another important project is the international project Research Center for Informatics (RCI), in which the Faculty cooperates with other faculties of CTU.

International cooperation

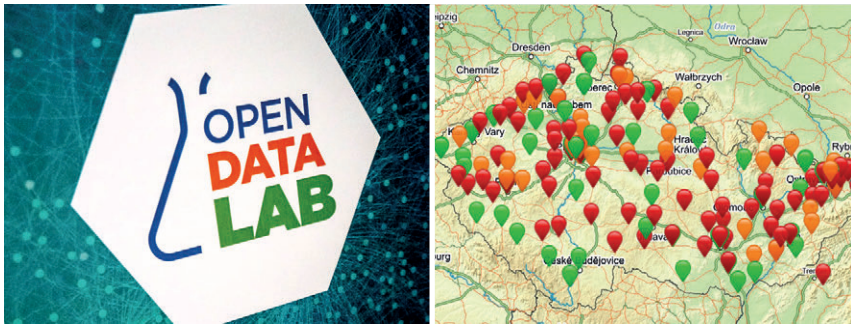
The Faculty continues to cooperate with the University of Antwerp in the framework of the Double Degree Programme. It is involved in the Erasmus programme and cooperation is also ongoing with 16 major European technical universities under the Athens study programme. For high school students, the Faculty of Information Technology runs an Introduction to Computer Science course in cooperation with Stanford University. The Faculty of Information Technology researchers have been awarded a prestigious Advanced ERC grant worth 77 million crowns for research into making updates to programming languages more efficient and cheaper.

Award with transnational reach

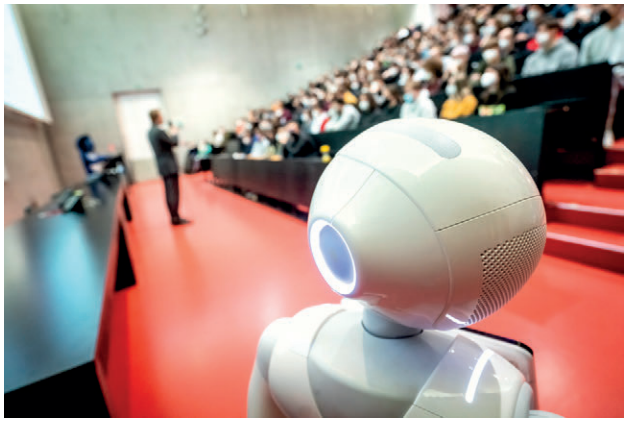
A team of Czech students, including FIT student Ľuboš Repka, took first place at the Hack for Healthcare hackathon in Switzerland and is now looking forward to working with Doctors Without Borders. Nearly 200 Czech and foreign hackers competed at the European Health Hackathon 2021 event at the IKEM in Prague. The aim of the event was to create innovations in healthcare within 48 hours. The winning project UrineMeter by students of CTU Faculty of Information Technology and ZČU enables automatic and accurate measurement of urine released by patients.

Pierre Donat-Bouillud, Ph.D., a researcher from the Laboratory for Programming Language Research at Faculty of Information Technology, applied to the Horizon 2020 Marie Skłodowska-Curie Actions - Individual Fellowships - European Fellowships call with his project DataBugs: Finding Bugs in Data Science Codes and received the Seal of Excellence award.

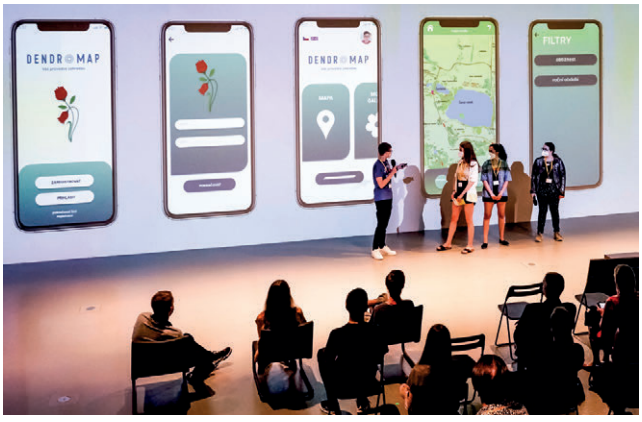
Faculty of Information Technology was the only faculty in the Czech Republic to receive an award from the American non-profit organization Czech-American TV



_OpenDataLab vaccination application



_Open Day at FIT



_Design Sprint Summer School

for its long-term promotion of the Czech Republic and its culture in the world. Our students engage with this organization with their thesis projects to raise awareness of the Czech Republic through television broadcasts.

In the Czech-Israeli online Konsent hackathon focused on the prevention of sexual violence in the academic environment and violence against children, the Entropy team of students from CTU Faculty of Information Technology and Charles University took first place with the SafeCampus app.

Significant events

The Faculty organised many events in 2021 despite the rectrictions, thanks to the possibilities of modern IT technologies. Traditionally, the most important events for applicants include the Open Days, which took place on 21 January and 13 November. The January event took place only online as the Open Windows Day, when those interested got to the faculty through the windows of their browsers. the autumn session of the Open Days was then held both in person and online in the new virtual faculty atrium. High school students were also able to participate in the FIKS programming competition, and gain admission without taking the entrance exam, in addition to gaining knowledge.

A new feature was the Design Sprint Summer School, where students learned about the principles of prototyping and testing and practically tried everything out on their own team project. For high school girls, the traditional IT Summer School was held in cooperation with Czechitas.

For its students, the Faculty of Information Technology held a career fair and the COFIT technology conference every semester. Students also participated in UniHack 2021, an international online innovation ideathon aimed at improving education, which the faculty co-organised.

Research events and conferences included the Prague Embedded Systems Workshop, aimed at presenting the results of PhD students, and the international Prague Stringology Conference. Students of the faculty were able to participate in the annual summer student research support programme - Research Summer at the Faculty of Information Technology (VýLeT).

Another significant event was the opening of the new Virtual Reality Classroom, which allowed the Faculty to expand the offer of virtual reality teaching to include the subject Virtual Reality Technologies.

The third role of the faculty

The Faculty of Information Technology provides education not only to students in full-time or combined studies, but also organises courses of lifelong learning (LLL), which serve to supplement professional knowledge, especially for the public, and supports education within the so-called University of the Third Age (U3A).

In the field of public education, the Faculty of Information Technologylaunched the "Ones and Zeros" podcast in 2021 to bring the latest information technologies to the general public, including high school students, and thus contribute to the popularisation of the field.

Within CTU, the Faculty of Information Technology participates in the prg.ai initiative, which promotes cutting-edge science and research in the field of artificial intelligence (AI).

Personalities of the Year 2021

Prof. Ing. Hana Kubátová, CSc.,

is Head of the Department of Digital Design at the Faculty of Information Technology and has been involved in testing and reliability since the beginning of her university career. “She not only has many graduates and PhD students to her credit, whom she has led to successful dissertation works useful for practice, but also valuable results in her own research. Prof. Kubátová is one of the founding members of FIT and has organized many conferences at the Faculty since the beginning and supports not only students from her department. In 2021, she was awarded a professorship by the President of the Czech Republic.

Ing. Marek Sušický

is a graduate and employee of the Faculty of Information Technology (FIT) and co-founder of OpenDataLab - a joint laboratory of the Faculty and Profinit. He was involved in the creation of the ockovani.opendatalab.cz application, which offers an overview of vaccination vacancies against covid-19. Ing. Sušický also participated in the creation of the IsirExplorer application, which offers an overview of insolvency proceedings in the Czech Republic, and the STK portal. For his achievements, he was selected as a TOP IT Personality by Computerworld magazine in 2021.

If in our last annual report we described 2020 as a year of radical transformation, 2021 is a year of restart and stabilisation. Like all higher education institutions and society as a whole, the Masaryk Institue of Advanced Studies (MIAS) has had to cope with the ongoing pandemic, although with the onset of the winter term of the new academic year, contact teaching has already been resumed, sometimes with minor disruptions or with a short-term transition to an online form in the event of isolation or quarantines of lecturers. The high professionalism of the academic staff and the administration has been demonstrated, with the uncertain and rather variable teaching conditions and the management mechanisms of the Institute being managed smoothly and without major problems by most of the staff. In fact, like other parts of the CTU, the Institute was awarded the medal for exceptional performance in times of crisis by the Rector on 30 November 2021 at a gala evening in Bethlehem Chapel. We were also looking for a way to bring the MIAS out of a certain isolation during the pandemic, which weakened the possibilities of fulfilling its social role as a university department that communicates with the wider public, opens discussions on society-wide issues and strengthens civic culture. The "Guess Who's Coming to the Discussion" series, albeit only in online form for now, has created a platform for meeting interesting personalities such as Luděk Niedermayer, Member of the European Parliament, Věra Jourová, Commissioner of the European Commission, Jan Švejnar, a world-renowned economist, and Martin Saitz, CEO of Hyundai Motor Czech, s.r.o. And already in contact form, discussion evenings and the welcoming of new publications dealing with the issue of democracy and the threat of extremism took place.

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

MASARYK INSTITUTE OF ADVANCED STUDIES

Study programs

We consider the accreditation of the study programme Teaching of Practical Training and Vocational Training for a maximum period of ten years to be a great success in 2021. Thanks to this, the teaching of this program has already started from the winter semester 2021/2022, which also created space for further development of the so-called engineering pedagogy under the guidance of the programme guarantor doc. Ing. David Vaněček, Ph.D. There is no doubt about the social necessity to prepare teachers of engineering disciplines, it is necessary to permanently strengthen pedagogical, psychological and didactic preparation in connection with professional quality, which the faculties of CTU undeniably fulfill. In this regard, the Masaryk Institute of Advanced Studies has initiated discussions with them on the preparation of a modern concept of teaching at CTU, which would include the preparation of teachers for both vocational (engineering, construction, electrical engineering) and general education programmes (computer science, mathematics, physics, chemistry). Highly skilled teachers represent the future of this country, whether by contributing to the improvement of the workforce or by strengthening the interest of secondary school students in technical fields.

The economics programs - the Bachelor of Economics and Management and the follow-up Master of Science in Innovation Project Management - remain an important part of the Institute's educational activities, but are due for reaccreditation in the coming year. These programmes prepare future managers for middle and senior positions, especially in large technology-oriented companies. After internal discussion within the Institute, a modified concept for this study has been adopted. We will build the Bachelor's degree as professionally oriented, while we will keep the follow-up Master's degree as academic. What does this mean? We will introduce a compulsory three-month internship at the bachelor's level, and more teachers from practice will also appear in the teaching. This, together with the new study concept, will enable students to quickly and successfully join the workforce without weakening the theoretical basis that will enable them to continue on to an academically oriented follow-up Master's program. But already this year, students were able to participate in a pilot "internship" project as part of their compulsory elective courses. Although the preparation of a quality internship, establishing cooperation with relevant institutions and business entities, is not easy, the first experiences of more than a dozen students have shown that it is a good way to further improve the quality of student preparation.

Internationalisation

Teaching continues to include high quality language training and a range of courses that strengthen social competences for working in an international environment. Students are prepared for this already during their studies, either by taking courses taught in English at the Institute with foreign students under the Erasmus+ programme, or more recently in classes within the EuroTeQ consortium of six technical universities, or directly by semester-long trips abroad. Although it was not easy to develop international relations during the pandemic, we managed not only to maintain them, but also to conclude new memoranda of cooperation and to implement them. Participation in conferences gradually moved from online formats to standard meetings and negotiations. The scope of international cooperation is large, but we see the way forward in further improving and deepening it. In addition to exchange visits of students and teachers to foreign universities, it is necessary to engage in international research activities, cooperate with the international business

environment and participate in the activities of international professional associations. The election of Mgr. Ing. Pavel Andres, Ph.D., ING.PAED.IGIP, LL.M. to the IGIP Executive Committee shows that we have much to offer and to contribute to international cooperation. Mr Andres has long served on the IGIP Scientific Advisory Board.

Projects

Ongoing projects continued uninterrupted during the pandemic. In spite of the difficult situation, new research activities have also been launched, with emphasis on strengthening synergies across the CTU. The established professional support is already yielding results in the search and processing of projects, and the professional language editing of texts creates room for publications in quality indexed journals. Small research projects of the our staff have also proved successful, although it is necessary to deepen the research potential and, above all, to open a discussion on the basic direction of research at the Institute. This is also related to the preparation for the recruitment of the first "postdoc" in the history of the Institute, who is expected to start at the beginning of 2022.

Awards and other major activities

The Masaryk Institute of Advanced Studies is involved in a wide variety of activities. For example, our staff participated in Science Week and Researchers' Night with expert lectures broadcast online. The Institute also lives for sport, with considerable success. Among the seventeen athletes who took part in the poll for the Best CTU Athlete for 2021, three are from the Masaryk Institute of Advanced Studies, namely Vít Přindiš, water slalom, first, Martina Satková, water slalom and wild water racing, second, and Barbora Betlachová, speed canoeing, tenth. And the our floorball team continued its winning campaign; it is a pity that the pandemic prevented the completion of the Faculty Floorball League or the international tournament in Košice. And let's also mention the Stanislav Hanzl Award for increasing student mobility and internationalization of studies, which was awarded to student Hynek Salák.

_We consider the accreditation of the study program Teacher of Practical Training and Vocational Training for a maximum period of ten years to be a great success in 2021. Thanks to this, the teaching of this program has already started from the winter semester 2021/2022, which also created space for further development of the so-called engineering pedagogy under the guidance of the program guarantor doc. Ing. David Vaněček, Ph.D.

Dear colleagues,
The year 2021 is significant in two respects. The first, less joyful, is the ongoing pandemic of covid-19, which is crippling all fields of human activity. The second significant aspect is that the Klokner Institute celebrates its 100th anniversary this year. A retrospective publication (Dvořáčková, 100 years of the Klokner Institute) mapping the development of our institution was published to mark this anniversary. However, the ongoing pandemic has brought to an end a number of events connected with the celebrations.
Despite the ongoing epidemic, the work of our staff is irreplaceable and requires frequent personal presence and meetings with each other and our partners, as well as visits to places of activity outside the Institute. Despite all the obstacles, we have continued to be continuously involved in addressing a complex set of science and research activities as well as cultivating close collaboration with industry and the commercial sector.
In 2021, we addressed grant projects announced by a number of providers, such as the projects of the Czech Science Foundation, the Czech Technology Agency, the Ministry of Transport of the Czech Republic and the Ministry of Culture. The Institute also participated in the international OPVVV operational programme of the Ministry of Education and Science for the international mobility of staff of research organizations. We have also successfully participated in a number of public tenders, based on which a number of agreements were concluded with key partners - the Road and Motorway Directorate of the Czech Republic, the Technical Administration of Roads of the Capital City of Prague. Prague, ČEZ, a. s., etc.
Similarly to previous years, in 2021 our employees managed to apply the results of research and development in major commercial contracts. In light of these positive facts, we can only hope that 2022 will be at least as productive as the previous year.

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

KLOKNER INSTITUTE

Study Programs

Graduates of the master's degree program can continue their studies at the Klokner Institute in two fields of the doctoral program in Civil Engineering: the Science of Nonmetallic Materials and Building Materials and the Theory of Structures. The aim of study in the first field is the highest university education in the field of building materials and testing of building materials and structures, i.e. the diagnosis of structures. The study includes a comprehensive scientific training, on the basis of which the graduate will master the methodology of independent scientific work and expand his knowledge in the field of his specialization under the guidance of leading experts. The graduate of the doctoral studies in the second field will apply the acquired knowledge in research activities in the verification of reliability of new and existing building structures, in the design of models of normal 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 collaborate on domestic and international collaborative research projects. Graduation from the PhD programme is a key step towards further career growth in both research and practice.

Projects

The research activities of our staff are partially funded through grant projects and operational programmes. In the past year, five scientific projects were launched - two standard projects financed by The Czech Science Foundation of the Czech Republic, one project of the Ministry of Culture of the Czech Republic (NAKI II), two projects of the Ministry of Transport of the Czech Republic (DOPRAVA 2020+) and one project of the Technology Agency of the Czech Republic (TREND 1). At the same time, we participate in the Environment for Life project.

International cooperation

In 2021, 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, Advanced Materials Research, Acta Polytechnica) and on committees of a number of international conferences.

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. The purpose of this project is to support the international cooperation and activities of universities.

Klokner Institute staff also participated in international research on materials engineering and structural reliability (RILEM, IABSE, fib, WTA, JCSS). They have 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 2021. Nevertheless, a young researcher at the Klokner Institute, Ing. Lucie Kudrnáčová, Ph.D., won the award for the best doctoral thesis in the field of remediation at the WTA conference in Prague. Her dissertation dealt with the topic of thermal and moisture processes in the lining of windows of historical buildings.

Other important events and happenings

In 2021, Klokner Institute celebrated 100 years since its foundation. To commemorate this important anniversary, a book 100 years of the Klokner Institute was released, summarising the activities of the Institute from 1921 to the present day. The author of the book is PhDr. Bc. Věra Dvořáčková, Ph.D., who is employed in the Department of Archival Activities and Scientific Research on the History of the CTU. In addition, the theme of the anniversary was also reflected in many professional articles and periodicals, and several thematic lectures were held. In September 2021, the Klokner Institute prepared a social event for its employees and organized a boat ride on the Vltava River.

The third role of the Institute

The range of activities of the Klokner Institute and its employees is very broad. In addition to scientific activities, in 2021 the staff was also engaged in expert, innovative, pedagogical, forensic and standardisation activities.

Many of the outputs of the scientific staff of the Klokner Institute find application in everyday life and are widely used by the commercial sphere. 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 2021, the Klokner Institute cooperated with a number of them (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., National Cultural Monument Vyšehrad, Directorate of Waterways of the Czech Republic and many others).

In total, the Klokner Institute holds 36 valid decisions on intellectual property protection, of which two European and 15 national patents and 19 utility patents and two industrial designs.

Klokner Institute staff have also been involved in standardisation activities within the European Committee for Standardisation (CEN) and the International Organisation for Standardisation (ISO). In addition to the above activities, the Klokner Institute has been involved in the development and updating of Czech Technical Standards (CTN).

Personalities of the Year 2021

doc. Ing. Petr Bouška, CSc.

He joined the Klokner Institute in 1967 as an assistant professor and over the years became the Head of the Experimental and Measurement Methods Department. His activities focus mainly on experimental verification, diagnostics and monitoring of building structures. He also deals with the load-bearing capacity of building structures, material research and building-technical surveys. As a young assistant professor in the 1970s, he participated in the work related to the load tests of the Nusle Bridge. In recent years, he has been involved, for example, in the passporting of the Trade Fair Palace and the implementation of load tests of the Negrelli Viaduct. He is a fully active researcher. He celebrated his 80th birthday in 2021.

Prof. Ing. Milan Holický, DrSc.

After graduating from the Faculty of Civil Engineering of the Czech Technical University, he joined the Klokner Institute in 1965 and, in addition to a two-year PhD at the University of Waterloo, Canada, he is still working there as a key researcher and head of the Structural Reliability Department. His research interests include the principles of structural design, particularly the development of theoretical methods for assessing the reliability and durability of structures, risk assessment and the development of operational methodologies for practical applications. He is also the chairman of the Technical Standardization Commission TNK 38 for Reliability and Loads of Building Structures at the Czech Agency for Standardization ČAS, since the 1970s he has also been actively involved in European and global standardisation and the introduction of Eurocodes and ISO standards into the CSN system. He is an expert witness for structural engineering of buildings.

In 2021, the constraints associated with the covid-19 pandemic continued due to international mobility, many major conferences and events had to be postponed or held virtually, and we have been working from home for several weeks.. However, the Institute was already prepared for these and other challenges, and was able to concentrate fully on building excellence in research, developing an ecosystem of collaboration with industry, high-profile publications or support in attracting high quality researchers from abroad.

The path to research excellence not only in the Czech Republic but also on a European or even global scale leads through cooperation with organisations such as CLAIRE and ELLIS, large and bold international projects, mobility of researchers and support for their expertise by creating excellent working conditions comparable to those abroad.

Our no less important goal is to continue to develop the ecosystem of collaboration with industrial practice, not least through the National Centre for Industry 4.0 and the Digital Innovation Hubs. We will also continue to support innovative start-ups and other small and medium-sized companies with a focus on a new sector of Czech industry - knowledge integration.

In 2021, we launched a major upgrade of the research infrastructure of the Testbed for Industry 4.0, which received an investment of almost CZK 1 billion from the RICAIP project. The modernisation will be completed in spring 2022 and will significantly expand the relevance and potential for collaboration with industry as well as the experiments partly mentioned above.

As the youngest of the CTU institutes, (CIIRC CTU) has already fully established itself in the scientific field and its importance continues to grow.

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

CZECH INSTITUTE OF INFORMATICS, ROBOTICS AND CYBERNETICS

Education of PhD students

In the past years, a number of CIIRC CTU employees have been involved in the education of students in PhD study programmes, supervising nearly 100 PhD students at various faculties and universities in the Czech Republic and abroad.

Projects

Czech Institute of Informatics, Robotics and Cybernetics has long been successful in attracting projects, thanks to a clear strategy and vision. The amount of funding obtained from projects - European (H2020, ERC, etc.) and national (ESIF, The Czech Science Foundation, The Technology Agency of the Czech Republic), is continuously growing. We will continue to strive to attract long-term and large-scale collaborative projects, such as RICAIP.

International cooperation

Industry 4.0 and Artificial Intelligence are very important topics for the CIIRC: in recent years, the Institute 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 Institute. An important Czech-German cooperation is the RICAIP Centre of Excellence, which includes the establishment of a European distributed infrastructure for Industry 4.0. In 2021, the Institute signed a Memorandum of Cooperation with the Korean Test Lab and subsequently with Deutsche Telekom, making it one of the first academic institutions in Europe with its own 5G SA campus network. An interesting international and interdisciplinary collaboration between the RICAIP Centre and the Goethe-Institut was an artist-in-residence project that facilitated links between scientists and European artists.

Awards with a transnational reach

Tomáš Pajdla co-authored the paper Viewing Graph Solvability via Cycle Consistency awarded with an honorable mention, the Marr Prize for Best Paper, at the ICCV - IEEE International Conference on Computer Vision, one of the most important conferences in the field of computer vision.

Professor Vladimír Kučera was the winner of the Czech Head scientific award. The most prestigious Czech scientific award for lifetime contribution to the development of automatic control theory on a global scale was awarded to him by the Government of the Czech Republic on the proposal of the Council for Research, Development and Innovation.

Chatbot Alquist, a conversational artificial intelligence, developed by students at the Czech Institute of Informatics, Robotics and Cybernetics under the guidance of Jan Šedivý, won first place in Amazon›s international competition - Alexa Prize Social Bot Grand Challenge. The student team managed to beat teams from prestigious universities such as Stanford University, Emory University and the University of California, Santa Cruz.

Important events

In 2021, significant meetings and conferences were successfully implemented, although some had to take place online. The IEEE/RSJ International Conference on Intelligent Robots and Systems is one of the most important robotics conferences and in 2021 it was held virtually from Prague. Dr. Libor Přeučil became its chairman, and Prof. Robert Babuška became the program chairman. The accompanying programme included the F1tenth Autonomous Grand Prix competition.

An important event was also the visit of the German President Frank Walter Steinmeier to the Czech-German RICAIP Centre. The President learned about the latest experiments in robotics and

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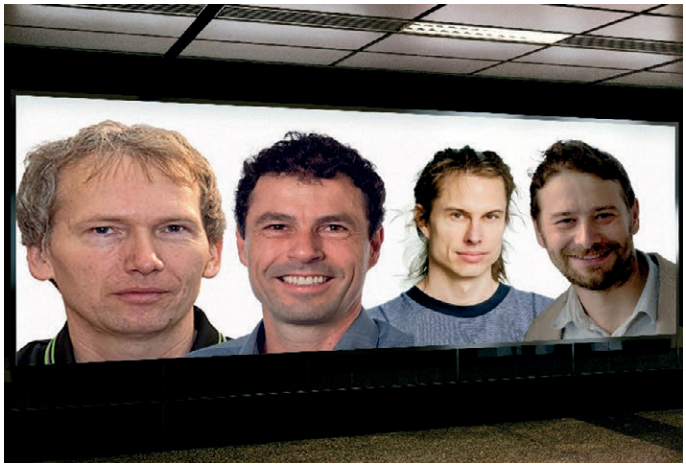
_An important event was also the visit of the German President Frank Walter Steinmeier to the Czech-German RICAIP Centre. The President got acquainted with the latest experiments on robotics and artificial intelligence at the CIIRC and the Testbed for Industry 4.0.

artificial intelligence at the CIIRC and the Testbed for Industry 4.0. The visit symbolically followed the signing of a scientific cooperation agreement with Prof. Wolfang Wahlster, the former Director of the DFKI - Deutsches Forschungszentrum für Künstliche Intelligenz - German Research Center for Artificial Intelligence, in the presence of the former German Chancellor Angela Merkel in 2016.

The third role of the Institute

In its social role, the Institute continued to be involved in the fight against covid-19. For the University Hospital Královské Vinohrady, in collaboration with other parts of the CTU, it developed a solution to enable remote monitoring of pulmonary ventilators and vital signs monitors, especially for patients with covid-19 connected to artificial lung ventilation. Vent-connect allows physicians to more accurately adjust pulmonary ventilator parameters during treatment, which naturally leads to better patient care. The solution is inexpensive and easy to deploy in other departments, covid or otherwise. The CIIRC RP95-3D protective half-mask, developed by a team of researchers over a one-week period in March 2020 in response to an urgent shortage of protective equipment at the start of the first coronavirus wave, won the European Citizen Award and the Engineering Academy Award in 2021.



_(from left) Josef Urban, Robert Babuška, Tomáš Mikolov and Mikoláš Janota

Personalities of the Year 2021

Artificial intelligence is one of the horizontal pillars that runs through all the activities of our Institute. In 2021, a new department was created with the aim of advancing research in this field.
Dr. Josef Urban, Head of the Artificial Intelligence Department, focuses his research on automatic reasoning, i.e., for example, solving mathematical problems and verifying complicated software by means of automatic proof. In 2020, he completed the prestigious ERC project AI4REASON, focusing on combining automatic reasoning and machine learning methods.
Dr. Tomáš Mikolov, Head of the Basic AI Research Group, is well known in the Czech Republic and abroad not only as a scientific capacity in the field of artificial intelligence with experience from Google, Microsoft or Facebook, but also as a popularizer of the field of artificial intelligence.
Professor Robert Babuška leads the Machine Learning group and with his team is mainly involved in research on deep learning and reinforcement learning. The team develops these machine learning methods primarily for applications in robotics. Robert Babuška is the project leader of the ERDF project Robotics Excellence Teams for Industry 4.0.
Dr. Mikoláš Janota, who came to the Czech Institute of Informatics, Robotics and Cybernetics from Instituto Superior Técnico in Lisbon, Portugal, to implement his ERC CZ grant, is also working on automatic reasoning and formal methods. In the newly established department he leads the Formal Methods group.

Our activities in 2021 continued to be significantly affected by anti-epidemic measures. Despite this, we managed to successfully launch the S.A.W.E.R. system, which formed the technological core of the Czech exposition at the EXPO 2020 World Exhibition in Dubai, on schedule. A feature-length documentary called Be Water! was also filmed about its creation, and our colleagues are performing in this movie, acting as the main characters.

We have also installed a prototype of the system on the premises of the Rochester Institute of Technology in Dubai, where together with experts and students of this Dubai university we are further testing its features and capabilities.

We have obtained patent protection in the Czech Republic and throughout the European Union and the United States of America for our Hydronics 4.0 single-pipe heating system, which is suitable for office buildings and heat exchangers for air handling units or convectors. It allows us to save up to 20% of the energy spent on heating while maintaining the same thermal comfort in the rooms.

We have prepared a methodology for rainwater management for municipal representatives together with Jan Evangelista Purkyně University in Ústí nad Labem, which can be downloaded free of charge from the Internet. We were pleased that several thousand users have already done so.

We have noticed an increased interest in our expertise from foreign partners, who are increasingly requesting our participation in international research projects. In a tough competition of 115 applicants from all over Europe, the highest ranked project was ARV, which with an amount exceeding 20 million euros will support research on climate-neutral circular communities in Europe.

Ing. Robert Jára, Ph.D.,
Director of the University Centre for Energy Efficient Buildings, CTU

_Green roof of the University Centre building in Buštěhrad

UNIVERSITY CENTRE FOR ENERGY EFFICIENT BUILDINGS

Study programmes

University Centre for Energy Efficient Buildings (UCEEB) does not offer any study programmes of its own within the CTU, but colleagues participate in teaching at individual faculties of the CTU, which enables the transfer of knowledge from applied research into their study programmes.

Projects

In 2021, we handled more than 88 grant projects and over 153 contract research contracts. Our most significant completed projects include the publication Water in the City: A Methodology for Rainwater Management in Relation to Green Infrastructure, which guides city leaders through the preparation, planning, implementation, and maintenance of rainwater management measures in relation to blue and green infrastructure.

We have completed the development of a mobile autonomous device for extracting water from humidity in the air that fits in the back of a conventional van and will act as an emergency water source in a desert environment. Its working sample has successfully passed tests in the laboratory and has been awarded two Czech national patents with a view to their extension abroad.

Within the project "Monitoring the technical condition of bridge structures using FBG sensor technology", in cooperation with Safibra s.r.o., we developed sensors for monitoring the technical condition of critical points of bridge and footbridge structures.

All projects were co-funded with state support from the Czech Technology Agency.

An interesting contract research assignment was consulting and expert services in the process of preparation and implementation of the concept of energy plus district (PED) for the city of Karviná.

International cooperation

In 2021, we worked on 12 major international projects. Let's take a look at two of the most successful.

Our centre, the city of Karviná and the joint-stock company Nano Power are participating in the four-year international ARV project for the Czech Republic. The other 33 partners come from Belgium, Denmark, Spain, Italy and the Netherlands. The aim is to contribute to a significant acceleration in the implementation of energy and climate measures in the building and energy industry through the creation and rapid development of so-called Climate Positive Circular Communities (CPCCs).

Together with the Association of Energy Service Providers and the Ostbayerische Technische Hoschule Amberg-Weiden, UCEEB has joined an international

**_Team of scientists,
From left: Ing. Nikola Pokorný, Ph.D.,
Ing. Viacheslav Shemelin, Ph.D.,
and Ing. Jiří Novotný.**

knowledge exchange project in the field of energy reduction. The aim is to create a network or several networks in the Czech Republic, following the German model, of entities cooperating in the field of energy efficiency improvement, which will share information and experience and support the creation of further projects focused on innovation, savings and the use of renewable energy sources.

Awards

For its technological, economic and social contribution in the fields of energy management and environmental protection, CTU UCEEB received an honourable mention from the expert jury of the Visionaries competition, which is organised by the CzechInno Association with the aim of promoting the penetration of innovative products, processes or services into practice.

The CTU UCEEB building was presented in the eighth edition of the Green Roof of the Year competition, in which it received an honorable mention for research for Metrostav, specifically for the experimental roof, which consists of 24 test areas. The findings contribute to energy-efficient cooling of buildings and their surroundings on hot days.

Jakub Maščuch, the head of the LORCA research team at the CTU UCEEB, was selected as one of the Innovators 20 in a joint project by the editors of CzechCrunch and Hospodářské noviny. Twenty award-winning personalities from business, art and academia were selected from several hundred public nominations by an expert jury, composed of prominent figures from the domestic business scene.

Three UCEEB representatives scored with their professional articles in the 19th edition of the Young Authors Competition for the Prof. Pulkrábek Award, which is announced annually by the editorial board of the magazine Heating, Ventilation, Installation. The awards went to Nikola Pokorný, Viacheslav Shemelin and Jiří Novotný.

The prize for the best student paper Energy-efficient and climate-friendly buildings to achieve the Sustainable Development Goals: an overview of EU H2020 projects went to Licia Felicioni. She was awarded at the International Conference on Green Building (ICOGB) 2021.

Rector doc. Vojtěch Petráček awarded more than a hundred selected personalities from all over the University, who have contributed to solving the pandemic situation in the Czech Republic and abroad with their innovations and personal or team involvement, with the CTU Experts Award Medal. UCEEB was awarded for the production of nanofibre textiles. The medal was received by the Director for Science and Research, Antonín Lupíšek, at a gala evening in Bethlehem Chapel.

Other significant events and happenings

In June 2021, a scientific council composed of renowned experts from foreign universities and research institutions met at our Bustehrad headquarters. The aim of the visit was an independent evaluation of the UCEEB's activities to date, coupled with a discussion on the further development of the University Centre and the possibilities for future international cooperation.

The third role of the Institute

Our primary focus is on collaboration with industry, 95% of our centre's turnover is accounted for by joint projects with industrial partners, of which 20% is contractual collaboration (more is not possible due to legal restrictions), representing over 150 individual contracts with more than 1,100 partners. In 2021, we participated in the establishment of CTU Tech s.r.o., which will provide technology transfer and the establishment of CTU spin-off companies.

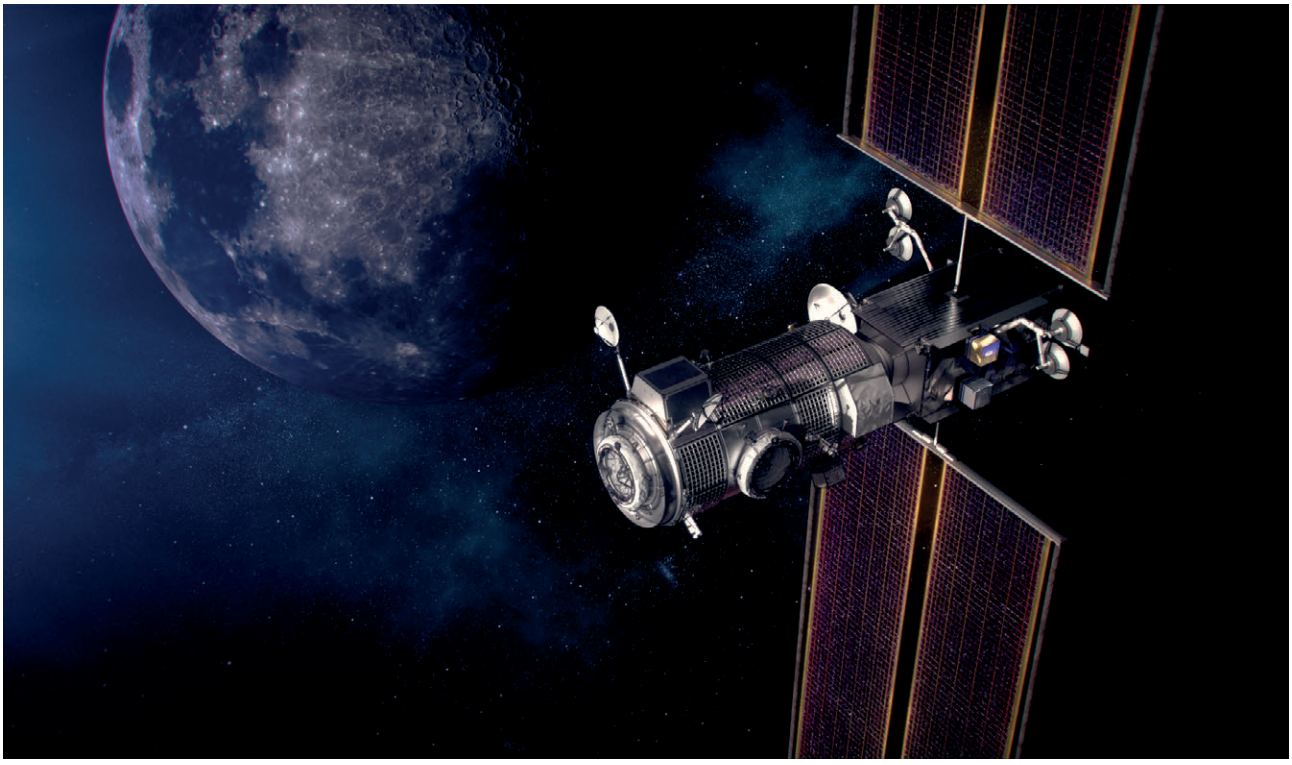
Personality of the Year 2021

Ing. arch. Martina Sýkorová

is dedicated to the improvement of public spaces, participation and nature-friendly principles of rainwater management. As an urban planner, she is particularly interested in the sustainable development of cities and their public spaces. In her projects, she mostly works with experts in sociology and participatory design, who identify the needs and opinions of residents. Together with them, she tries to find solutions that will contribute to increasing the attractiveness and quality of public spaces and thus to improving the lives of people in the city.
In 2021, she completed work on the major projects Attractive Communities: planning public spaces in the digital age and Water in the City: blue and green infrastructure in a cross-disciplinary manner. These are a guide to planning the transformation of public spaces for leaders of smaller municipalities and a methodology dedicated to sustainable rainwater management in urban environments. Both publications, which were produced in cooperation with the J. E. Purkyně University in Ústí nad Labem and with the contribution of the Czech Technology Agency, are freely available on the Internet, where several thousand experts and representatives of municipalities have already downloaded them.

The Institute of Experimental and Applied Physics acts as an experimental base of CTU for research in particle and nuclear physics. It is here that modern detector technologies and their applications in imaging in inanimate and living nature (X-ray radiography and tomography with micron-level resolution), in the measurement of mixed radiation fields and in satellite experiments (cosmic ray detection, sensors for X-ray telescopes) are developed. In the context of its involvement in experiments at the LSM underground laboratories in France and SNOLAB in Canada, the Institute is developing technologies used in low-level experiments on neutrino physics and the search for dark matter in the Universe. In connection with fundamental experiments in particle and neutrino physics, the relevant theoretical physics disciplines are also being developed at the Institute. With an attractive scientific programme, we are succeeding in attracting talented young foreign researchers to science and research in the Czech Republic (their share in the Institute exceeds one third of the scientific staff).

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



INSTITUTE OF EXPERIMENTAL AND APPLIED PHYSICS

_Visualization of the Lunar Orbital Station Gateway with the Power and Propulsion Element (PPE) and Habitation and Logistics Outpost (HALO) modules in orbit around the Moon. On the right side of the station is the European Radiation Sensors Array (ERSA) silver box with the HardPix devices developed at the ITEF.

Educational activities

Although the Institute does not have its own accredited study programme, it is active in the field of education. Last year, it focused on supervising the professional work of students from other faculties of CTU and other universities in the Czech Republic and abroad, e.g. three students from the Faculty of Mathematics and Physics of Charles University. The Institute also acted as a training centre for two foreign students sent to CTU by IAESTE. We also hosted the internship of high school students, winners of the national round of the Physics Olympiad. Two of our employees acted as lecturers in a course on the control of Medipix pixel detectors held as part of the ANIMMA conference. Within the framework of lifelong learning, a teacher training course on Progressive Detection Methods in the teaching of subatomic and particle physics at primary and secondary schools was held, and we organised courses on Secrets of the Microworld and Laws of the Microworld for the University of the Third Age.

Projects

Our largest project, already in its fifth year, is Engineering Applications of Microworld Physics, supported (in the amount of 200 million CZK) by the Excellence in Research operational programme. This project covers most of the research activities of the Institute and is carried out in collaboration with many co-investigators. One of the most successful areas of the Institute's scientific activities is the application of detection technologies in space. In 2021, the Institute of Experimental and Applied Physics was awarded a prestigious contract by the European Space Agency ESA for the delivery of two HardPix radiation detectors. These will be part of the European Radiation Sensors Array, which

will be installed on the Lunar Gateway lunar orbital space station. This is part of NASA's Artemis programme, aimed at returning humans to the surface of the Moon. The HardPix detectors will be aboard the station's first module, called the PPE (Power and Propulsion Element). This will be carried into space in 2024 by SpaceX's Falcon Heavy rocket.

International cooperation

Almost all the scientific activities of the Institute were carried out within the framework of broad international cooperation, mainly with the research institutes CERN, SÚJV (since the Institute is located in Russia, no further cooperation is possible in the current situation) and the underground laboratories LSM (France) and SNOLAB (Canada). The development and applications of semiconductor pixel detectors were carried out in the framework of the international 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).

At the invitation of the French CEA (French Alternative Energies and Atomic Energy Commission), a visit was made in October 2021 to the Cadarache research and development centre, where, among other things, the construction of the giant ITER facility for controlled thermonuclear fusion is under way. The aim was to agree on cooperation based on the use of advanced detection techniques and methodologies developed at the ITEF for the needs of the CEA. The event also included a visit to the University of Aix-Marseille to discuss the preparation of a joint teaching programme.

Awards

Maroš Petro, a student of the Faculty of Science at the University of Hradec Králové, under the supervision of the ITEP staff member Miroslav Macek, successfully completed and defended his diploma thesis "Calculation of Sensitivity to Neutrinoless Double Beta Decay for COBRA Demonstrator", which was awarded the Dean's Prize of his home faculty for the best diploma thesis in the study programme Physical Measurements and Modelling.

Other significant events and happenings

ITEP, the French CEA, INSTN, the University of Aix-Marseille, the Belgian SCK CEN, the Slovenian Institute of Jozef Stefan and the IEEE NPSS jointly organized the major international conference "Advancements in Nuclear Instrumentation Measurement Methods and their Applications (ANIMMA 2021)".

Another event organized was the EuCAPT Astroneutrino Theory Workshop. This was part of the activities of the European Consortium for Astroparticle Theory (EuCAPT), which aims to bring together the European theoretical astroparticle physicists and cosmologists.

The H2020 project Penetrating Particle ANalyser (PAN), which aims to develop a particle detector for space missions, is now in its third year at the ITEP. The University of Geneva (Switzerland) and the Istituto Nazionale Di Fisica Nucleare (Italy) are also involved in the project. A meeting of this research collaboration was organised in Prague in 2021.

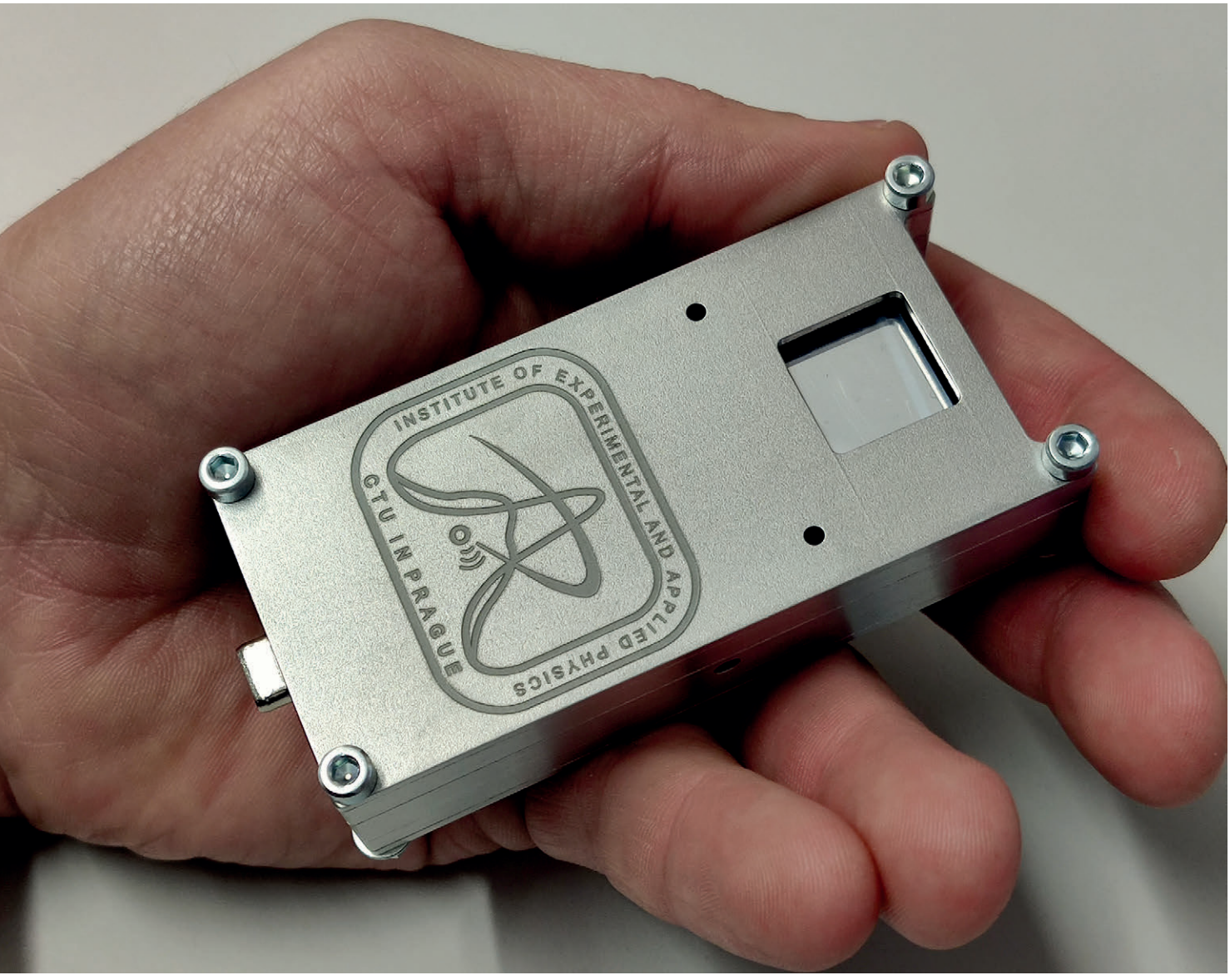
The Institute is one of the founding institutions of the CERN-based Medipix Advanced Semiconductor Pixel Detector Development Consortium. In the past year, the Institute organised a Medipix collaboration meeting in Prague.

In collaboration with painter Kateřina Smetanova, we launched a new public project called Science and Art in August 2021. It is a series of guided tours of the exhibition of paintings and tapestries on two floors of Bethlehem Palace, combined with a lecture on the scientific programme of the Institute and a tour of the laboratories.

The third role of the Institute

The Institute of Experimental and Applied Physics collaborates with a number of private companies in the development of advanced detector and low-emission technologies. Examples include technologies for the extremely efficient removal of radon from air and other gases (leading to orders from ATEKO a.s. for more than EUR 5 million).

A spin-off company ADVACAM s.r.o. was established several years ago to implement commercial applications of the detector technologies developed at the Institute, with which the Institute then cooperated in a number of projects (e.g. development of equipment for satellites). Last year, Jan Jakůbek and Jan Sohar, the founders of ADVACAM, received the Technology Entrepreneur award from Ernst & Young. The former is a former employee of our Institute.



_HardPix equipment that will be placed on the Lunar Gateway Lunar Orbital Space Station.

In spite of the very difficult period that the society was going through in 2021, our effort was to provide the students and employees of the CTU with conditions for full-fledged sporting activities within the framework of physical education classes or in the form of other leisure-time physical activities.
In the first half of the year, when physical education classes were cancelled and sports activities were very limited, we focused on the creation of various videos that could be used for individual exercise in leisure time. This not only allowed us to broaden our knowledge, but also contributed to maintaining physical and mental balance at a time when social contacts were significantly lacking.
With hopes and fears, we prepared summer training courses, which normally complemented the content and scope of physical education classes. We opened registration in the summer semester 2020/2021. It turned out that our efforts to modernise the teaching, focusing primarily on the experience associated with physical activities and on explaining their importance for a healthy lifestyle, were correct. Physical education teaching returned in the winter term 2021/22 to its full pre-covid period, and there was also interest in other sporting activities. CTU teams took part in traditional competitions within the framework of university championships, sports life was also renewed by our university physical education clubs.
The period of unoccupied CTU sports grounds in 2021 was used to modernize them, the surface in the multi-purpose field at Kotlářka was replaced, the lights on the climbing wall were replaced and many more.
The great interest in physical education and sport after a period of restrictions has confirmed that they continue to be an important part of the life of our university.

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

_Motto of the Institute: "Study sportingly."







INSTITUTE OF PHYSICAL EDUCATION AND SPORT

Physical education teaching and the ongoing pandemic

In 2021, due to the epidemic, we unfortunately had to gradually cancel the winter courses, which we regularly use to start the new year. We found ourselves in a similar situation with the preparation and implementation of physical education in the summer semester. In this period, we have been teaching remotely and in parallel we have been creating new exercise and methodological videos for home sports, which students and staff can watch on the Institute's website. These videos aimed at supporting and extending the teaching are produced as part of the internal IP 2021 competition and have recently been extended to include yoga, pilates, artificial wall climbing and self-defence.

The launch in the winter term was managed despite initial confusion with the arrangements and teaching proceeded as usual. Our fears of less student interest in the sport due to the long break proved to be false and interest was on the contrary huge. This was reflected in the enrolments in the winter term when we had 7000 students registered. We followed up on the semester teaching by organising summer training courses, of which the Institute organised 39 for a total of 700 participants. The range of these activities, which we update every year, was very varied, as in previous years.

The familiarisation courses that we organise in cooperation with the faculties are a great asset. The students have the opportunity to play sports and get to know their future classmates better, to get acquainted with the options that the school offers in the field of sports and physical activities, but also to get the necessary information from the faculty management and senior colleagues for a successful entry to study at the CTU. The courses have been given a positive feedback by students for a long time.

"Amateur" sports

Physical Education teaching is complemented by a wide range of one-off sporting events, such as the Rector's Sports Day or cycling trips, and by the organisation of academic championships, Cross Campus and smaller tournaments and matches. The sports offer at CTU is significantly expanded by the activities of the university physical education units VSK CTU and VŠTJ Technika Praha. They offer a very varied mosaic of leisure activities in their clubs and cooperate with the Institute in organising large sporting events, such as the 17 November Run. The Institute's regular annual activity also includes semester teaching of seniors within the University of the Third Age in two groups of thirty people each.

Representation

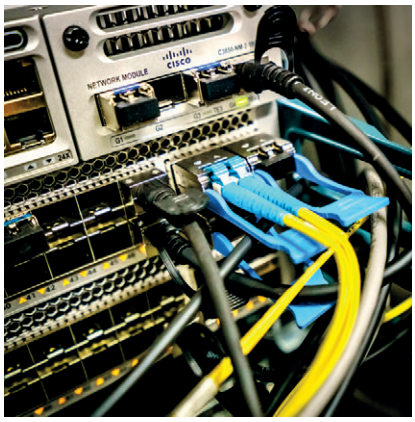
In cooperation with the faculties, the Institute also provides sports representation of the school at university championships in the Czech Republic and at international sports events. In the past year, despite their frequent cancellations, CTU students were successful not only in competitions within the Czech Republic, but also gained significant sporting successes abroad. The most important domestic ones included the victory at the Czech Academic Championships in indoor athletics and excellent results of our athletes at the Czech Academic Games held in Olomouc. CTU took fourth place there and won a total of 40 medals, nine of them gold.

Last year's sporting achievements were crowned in November by participation in the VI World Interuniversity Games in Rome, where the CTU team took 2nd place in a competition of 39 universities from 13 countries. In individual sports our swimmers and badminton players won gold medals, basketball, futsal, football and tennis players were silver and the volleyball team won bronze medals.

Proof of CTU's appreciation of outstanding student representatives are the extraordinary scholarships for successful representation of the school, which are regularly awarded by the deans of individual faculties on the proposal of the Institute's management. The highlight is the annual competition for the best CTU athlete under the auspices of the Rector. In 2021 the first place was taken by Ing. Vít Přindiš, a water slalom racer,

who is studying for a 2nd year at Masaryk Institute of Advanced Studies. Last year he was tremendously successful at 22. European Water Slalom Championships in Italy, where he became a triple champion. Under the auspices of the Ministry of Education, Youth and Sports and in cooperation with the VSC Victoria we are working on a UNIS project aiming at creating conditions for combining sports and student careers of representatives and top athletes studying at the CTU. In 2021 we took care of 31 such students.

COMPUTER AND INFORMATION CENTRE



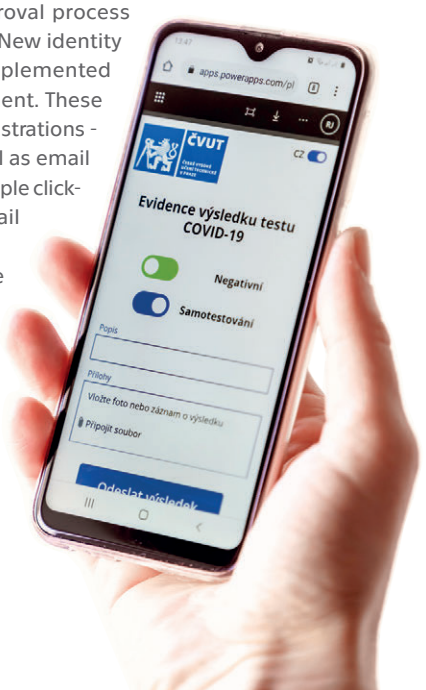
_Within the framework of electronic exchanges we cooperate with workplaces in the Czech Republic and Europe. An example is the eSign project, which has just started in 2021 and is intended to ensure the exchange of electronically signed documents between universities within the EU with the support of Mobility.

As a central IT operator, we provide a wide range of ICT services to faculties, institutes and other parts of CTU and their students and employees. Also in 2021, we hold ISO 9001 (quality management - QMS), 20,000 (service management) and 27,001 (information security management) certificates for the management, operation and development of information systems. The VIC service catalogue alone contains almost sixty operational and defined tasks, which are handled by a total of 72 employees. The sometimes popular Czech expression, "Soldier in the field alone", is reduced to some tenths of a man for some topics... Often, only specific applications and functionalities associated with the studies, science and research, the provision of licences and the support of daily administration in the form of economic and personnel systems are visible for the users. However, much of the infrastructure is hidden in the background, yet is actually used all the time. Backbone networks, identity services (authentication, authorization), ID card and badge issuance, access and access control. This is only part of the services implemented by Computer and Information Centre and the demands for development and complexity are increasing. Due to changes in laws related to "going digital" we have devoted a lot of effort to the preparation and architecture of systems using electronic signatures, validation and long-term storage. In the framework of electronic exchanges we cooperate with sites in the Czech Republic and Europe. An example is the eSign project, which has just started in 2021 and is intended to ensure the exchange of electronically signed documents between universities within the EU with the support of Mobility.

In 2021, IP2021 projects were the main source of funding for development activities and deliverables. Thanks to them, a number of new functionalities and changes could be implemented. A completely redesigned version of the New Web KOS (NWK) was launched, bringing a technological replacement, fully documented and introducing new principles for software development at the Computer and Information Centre. This opened the way for efficient development of other planned applications. The current large Mobility project also started in 2021. It is this project as a large-scale SW project that will benefit from the newly established internal procedures and rules of the Development Department verified on the NWK project. Within the study agendas, the application support for study fees in English was launched in KOS, the automation of the process for the payment of social and accommodation scholarships was also introduced, including the functionalities implemented in NWK, and the implementation of the student type file and the admission procedure was extended. A separate chapter is the digitization of processes including the signing module built on the basis of Obelisk.

Examples are the services of issuing e-certificates of study and issuing e-certificates of grade transcripts. In the area of R&D, the linking of EZOP and V3S with the FIS application for the subsequent automation of contract creation directly in the EZOP application has been implemented, and the document approval process for projects in all states has been newly enabled. New identity and email management functionalities were implemented within the Integration and Coordination department. These allow the use of a wide range of email address registrations - personal, shared, technology, conferencing, as well as email management in UserMap from mailbox creation, simple click-to-click user selection of email addresses to email migrations.

Among the visible ones, relatively small in scope of work but large in impact on all staff, was the launch of the Test Evidence COVID-19. This mobile application was developed in ten days thanks to a ready infrastructure based on MS PowerApps. There are many more deliverables and if anyone is interested in more information or collaboration, we are ready to communicate and very happy to collaborate.



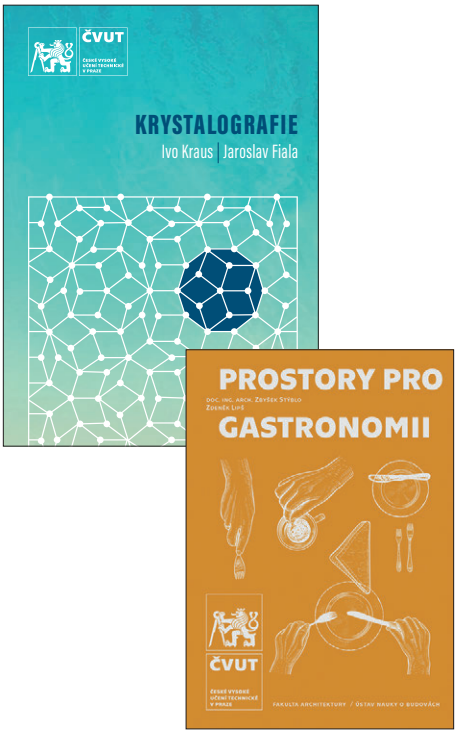
CTU PUBLISHING HOUSE

Although for most of 2021, the second year in a row, the life of the university was marked by the coronavirus pandemic and measures to protect against the spread of the disease and other constraints (including increasing problems for printers with paper supply), the publishing house managed to meet all its objectives. The negative impact of the crisis situation for the publishing house was mainly lower sales - a decrease of about one million crowns compared to 2020, influenced by the covid, the availability of digitized scripts and books and other parameters, which were partly reflected in the number of published titles, the completion of which some authors postponed to the next period.

The difficult year 2021 was also reflected in a decline in the number of titles published at CTU, both in print and electronically, with the number of ISBNs assigned to the university series slightly down on previous years, but a big drop in the number of copies of individual publications (while five years ago the volume of publications with CTU ISBNs was almost 30,000, last year it was just under 10,000 copies). This decline is due, among other things, to the shift of publishing to the online space.

The publishing house's output is also of interest to the wider public, and selected titles have also impressed as quality PR for the university. In addition to the scripts, technical books and textbooks of the CTU edition, the publishing house processed other orders for the university and its units in 2021, preparing the magazines Pražská technika and TecniCall, among others.

Two titles by authors from the Faculty of Architecture are clearly among the significant publishing ventures that demanded greater attention and involvement of the editorial staff, both in terms of scope and quality of editorial and graphic and printing workmanship. The first one is a comprehensive publication by the internationally renowned specialist Prof. Václav Girsa entitled Memory of Stones / A Pictorial Handbook for Sustainable Care of Torsal Monuments. This professional-methodical and popularization publication focused on the topic of torsional buildings care is based on the author's fifty years of work in the field and his experience with the restoration and maintenance of building monuments. The second author's challenging title was Spaces for Gastronomy by doc. Zbyšek Stýbl and prof. Vladimír Soukenka and other personalities of the Faculty of Architecture of the Czech Technical University.



SERVICE FACILITIES ADMINISTRATION

The Service Facilities Administration (SFA) as a service facility of CTU provides accommodation and catering for students, employees and commercial clients. It provides full catering and congress services in its own facilities, operates the outdoor sports facilities of individual dormitories and manages and leases non-residential premises to business persons.

The CTU dormitories are among the largest in the Czech Republic and are located in several locations in Prague: the Hlávkova campus in Prague 2, the Podolí campus in Prague 4, the Strahov campus and the Orlík, Bubenečská, Sinkuleho, Dejvická and Masarykova dormitories in Prague 6. Our dormitories have a capacity of nearly 7,700 beds and offer accommodation in single, double, triple and quadruple rooms. Some of these have en-suite facilities and kitchenettes. They accommodate not only students, graduates and applicants from CTU, but in case of free capacity they are also able to satisfy applicants for accommodation from other universities. Thanks to the long-standing cooperation with student representatives, they are involved in creating leisure facilities (hobby rooms, sports activities, support for social events).

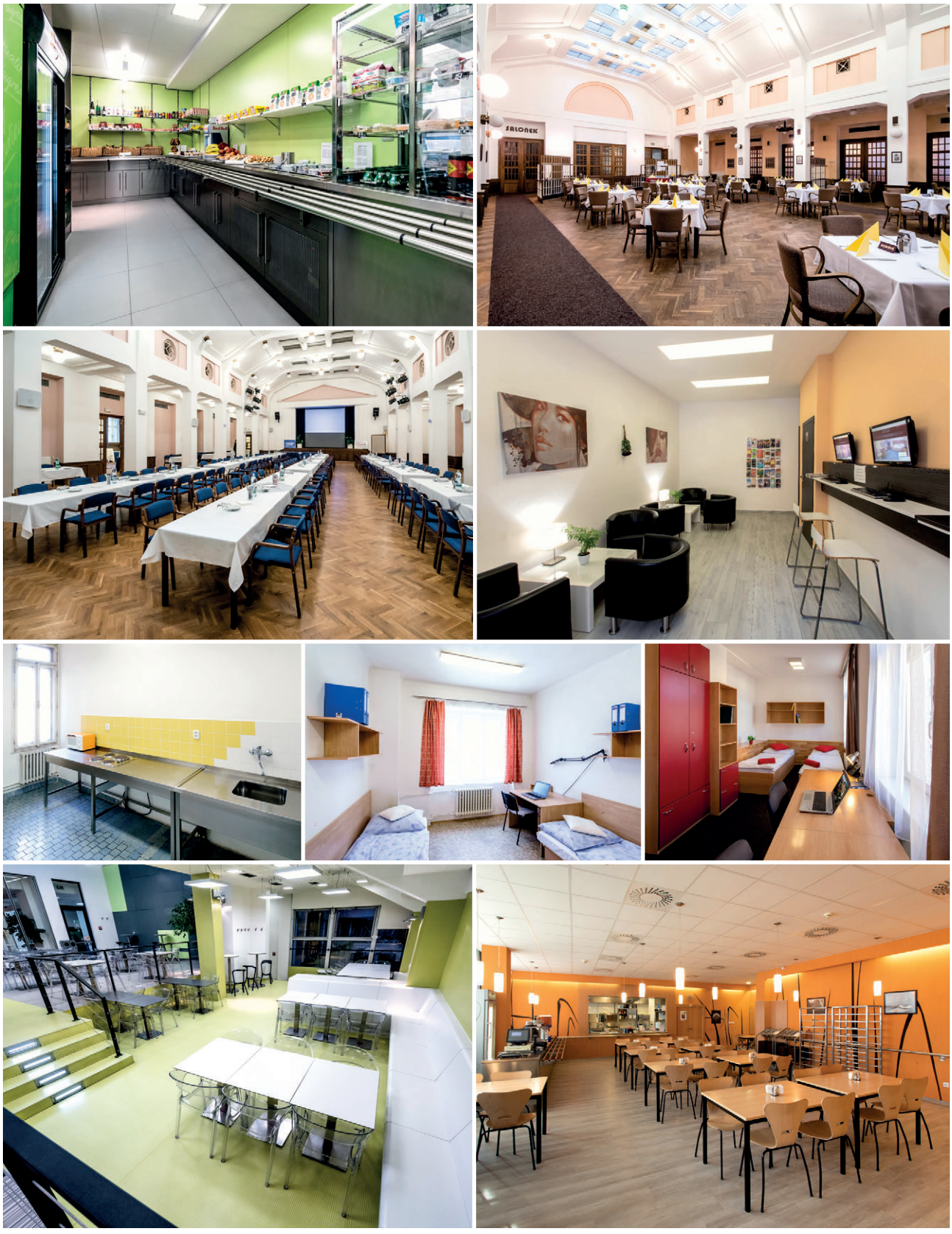
An additional accommodation activity of the dormitories is the sale of vacant capacity in the form of hostels to the general public. In addition to student accommodation, SFA also offers commercial accommodation. Its capacity is around 220 beds - Novoměstský hotel***, Masaryk Dormitory Hotel*** and Strahov Hostel.

Catering is provided in the canteens of the CTU, which are located near the dormitories and classrooms. SFA operates four canteens in Prague - Strahov, Student House, Technicka and Podolí, two food counters - Horská and Karlovo náměstí, Mega Buf Fat, MIAS bistro, Academic Restaurant and Archicafe café. Another canteen is located in the Kokos building in Kladno. Catering is provided to students and employees of the CTU as well as to the public.

Our aim is to continuously improve the quality standard of accommodation and catering facilities. According to the financial possibilities, we are focusing on the reconstruction of sanitary facilities, regular renewal of furniture, replacement of textiles, purchase of new electrical appliances and technological equipment for food preparation in canteens, etc.

In addition to regular repairs of the dormitory and canteen buildings, planned investment projects are also being implemented.

In 2021, the reconstruction of the Bubeneč dormitory started, which will ensure an increased quality of accommodation and facilities for students. A new layout of cellular accommodation will be created - two adjacent rooms will form a double cell. The rooms will be separated from the corridor by a hallway, which will contain the necessary facilities. Each double room will have its own bathroom, toilet and a 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 enabled by chip or personal card. There will also be a new gym and two study rooms. The student club will move to new premises. The anticipated date of opening of the reconstructed college is the end of 2022.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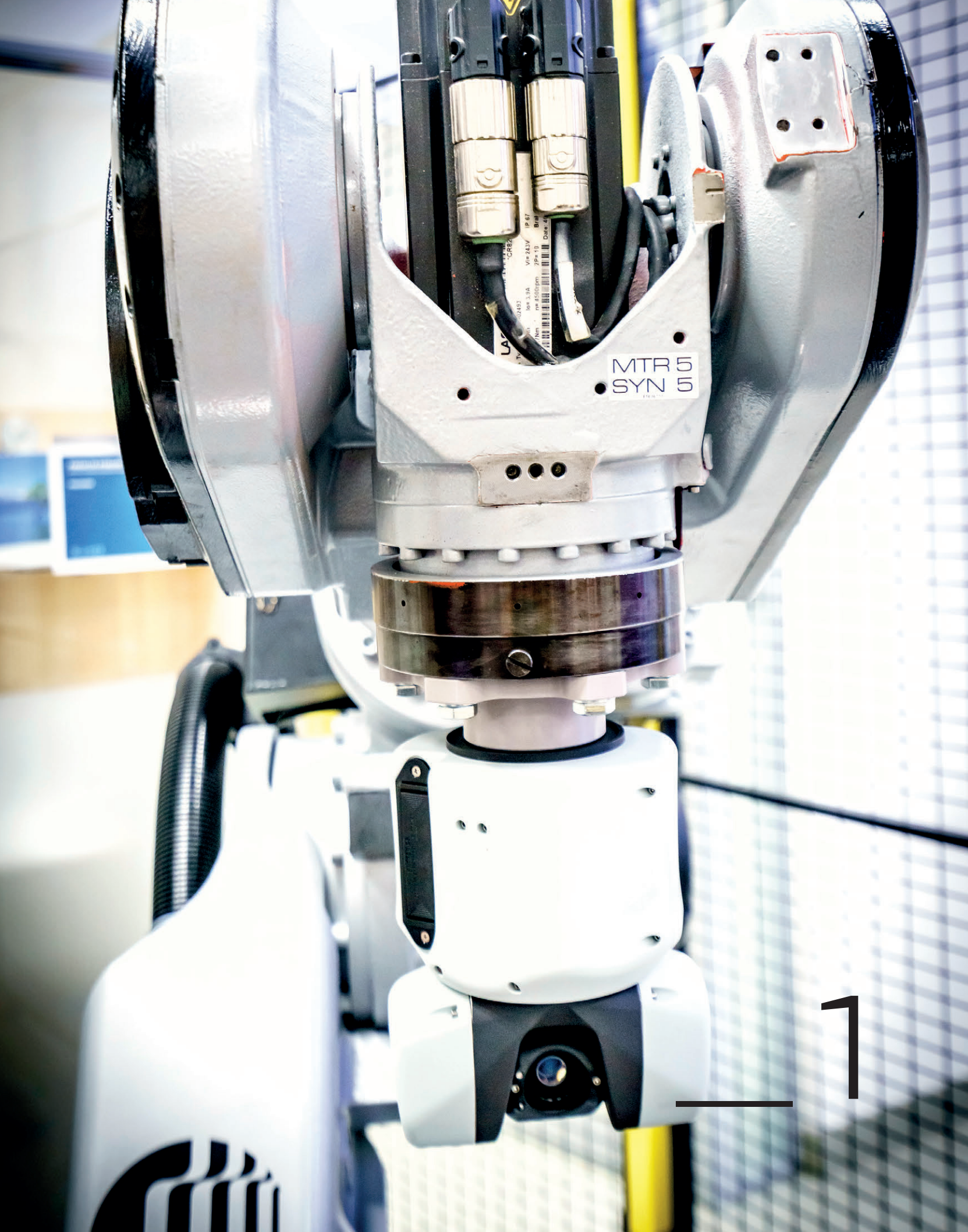

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1 _ BASIC INFORMATION ABOUT THE UNIVERSITY

CZECH TECHNICAL UNIVERSITY IN PRAGUE
Registered address:
Jugoslávských partyzánů 1580/3
160 00 Praha 6 - Dejvice

The Czech Technical University in Prague (hereinafter referred to as CTU) is a public university-type higher education institution established under Act No. 111/1998 Coll., on Higher Education. The function of the statutory body is performed by law by the Rector of the CTU, doc. RNDr. Vojtěch Petráček, CSc. The CTU is composed of eight faculties, six university institutes and special-purpose facilities, including the CTU Rectorate, and other units. The organisational chart, the composition of the decision-making bodies, the representation of the University in the representation of Czech universities and other data about the University are presented in the **Table Appendix to the Annual Report, Section 1.**

Mission

The long-term maintenance of internationally recognised and competitive excellence in education, science, technology, innovation and application contributing to the improvement of the quality of social life.

Vision

CTU strives to maintain and develop its leading position as a research university with the title of an international centre of excellence in science, creative activity and education. It contributes to increasing technological literacy, advancing technical knowledge, promoting digital skills and innovation, and engaging in societal challenges, thus striving to become one of the world's leading institutions in education, science and research.

Strategic objectives

Despite the ongoing SARS-CoV-2 coronavirus pandemic in 2021, CTU continued to fulfil its mission, vision and strategic goals through participation in major international projects, cooperation with renowned Czech and foreign scientific teams and external partners, including industrial partners, as well as through the implementation of development projects within the institutional plan, the centralised development programme or within the fund of school-wide activities in accordance with relevant government strategies. Emphasis was placed on the transfer of knowledge from the scientific environment to the application sphere. The coherence of these activities in relation to addressing the needs of society in view of the ongoing crisis was very important. CTU confirmed its excellence not only on a national but also on an international scale, interdisciplinary with the participation of all faculties, university institutes and units. It has proven that its mission, vision and strategic goals are in line with the requirements of the dynamically changing needs of a global society. It has clearly confirmed its ability to compete, to offer unique solutions and to respond without hesitation to change in both the approach to education and the use of science, technology and innovation to improve the quality of social life.

CHANGES TO INTERNAL REGULATIONS

In 2021, CTU made several changes to the University's internal regulations. The changes made were of an organisational and financial nature and are quoted below in chronological order.

With effect from 7 January 2021, the CTU Accreditation Regulations were adopted, which was reflected in changes to the CTU Statutes, specifically Article 5 in relation to accreditation, Article 21, paragraph 5 concerning the competence of the Scientific Council and Article 22 for the Internal Evaluation

Council, and the list of CTU internal regulations in Article 46 was supplemented by the Accreditation Regulations.

On the same date, the Rules of Procedure of the CTU Scientific Council were amended to include convening and voting by electronic means. The internal wage regulations of the CTU were adopted and took effect on the same day the same date.

Effective from 1 April, the CTU Career Regulations were adopted and the Scholarship Regulations were amended to include the Extraordinary Scholarship of Professor Miroslav Vlček.

On 15 May, the Organisational Regulations came into force and the competences between the Science and Research, Technology Transfer, Development and Structural Funds Departments were transferred and adjusted.

On 24 August 2021, the Ministry of Education and Science registered the new Statute of the CTU Internal Evaluation Council. It became effective on 8 September 2021.

The Study and Examination Regulations for CTU students have been updated with effect from 20 September 2021.


_2

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

_"The past year was not only a year of continued measures related to the SARS-CoV-2 coronavirus pandemic, but also a gradual return to normalcy in the winter semester. Teachers, students, as well as individual faculties and university institutes of the CTU continued seamlessly with distance learning, which was constantly improved.
CTU held the first ever contactless graduation ceremony in the Czech Republic, organized by the Faculty of Nuclear and Physical Engineering in March in the traditional Bethlehem Chapel.
The Computing and Information Centre provided support in the operation of subject MS Teams and application interfacing to support study agendas. An extraordinary university-wide electronic survey of CTU provided valuable feedback on the degree of flexibility and adaptation to the new conditions.
The experience of education, especially distance education, quality assurance and standards development was the focus of one of the central development projects.
For the first time, a scholarship was distributed for „talented students" for representing CTU at a conference, co-authoring a professional article or placing in national and international professional or architectural competitions.
Together, the pandemic has taught us all a lot of new things, and the much-discussed digitalization of activities has become an everyday reality tested in practice. From February 2021, students can, for example, download an electronic certificate of study bearing an electronic seal and a qualified time stamp from the CTU information system."

2_Degree programmes, other educational activities

ACCREDITED STUDY PROGRAMMES

In 2021, the CTU will offer accredited bachelor's, master's and doctoral study programmes in accordance with the study plans mainly in the Czech language and selected programmes in English for both domestic and foreign students. Within the double degree programmes, specialisations in French or German are also offered. An overview of accredited study programmes is published on the CTU website. Faculties and institutes of higher education present their study programmes at open days, which were held virtually during the pandemic. This year, most of the faculties have already switched to the full-time mode or to a combination of virtual and full-time visits. To promote internationalisation, the emphasis on bilingualism is increasingly emphasised, and it has been possible to provide a quality service for international students as well. Bilingualism is provided, for example, through the website, but also through dedicated Study at CTU or Study in Prague projects. The needs of students with disabilities are also taken into account. An important role at CTU is also played by the support of young girls, future students of technical fields. The Girls, Beware! project is designed to encourage young women to take an interest in technical education. The admission procedure for all types of studies is conducted online via the „Application" application, and to increase the success rate, the faculties offer various types of preparatory courses to applicants. The study programmes are designed in such a way that students in their first year are already involved in research projects and cooperation with industry, and have the opportunity to gain their first experience with international partners. CTU students use the technology and technical equipment of top laboratories and testing rooms, so they have the opportunity to orient themselves to the application sphere very early and some achieve awards already during their bachelor studies.

The monitored data show that in 2021 CTU implemented a total of 315 accredited study programmes, including 79 bachelor's, 101 follow-up master's and 135 doctoral programmes, both full-time and part-time. Compared to 2020, the number of accredited study programmes increased from 271 to 315, of which 76 were foreign-language programmes. In 2021, a total of 17 550 students studied at CTU, of which 5 411 were women and 3 152 were foreigners, which is not a significant change compared to 2020, so it seems that CTU has maintained the interest of students despite the obstacles caused by the pandemic. Detailed statistics from faculties and institutes of higher education are presented in the **Table Annex, Section 2**. An overview of the current accredited study programmes of individual faculties and university institutes is provided on the CTU website.

COOPERATION WITH THE APPLICATION SPHERE

With its study programmes, CTU responds promptly to the development of social challenges in all areas of its activities.

In order to support cooperation with the application sphere, individual faculties and university institutes nominate external workers from practice to committees assessing bachelor's or master's theses and involve them in teaching. In specific examples, the application sphere participates in the design and implementation of study programmes, assists in the assignment of thesis topics or engages in consultancy activities in project management. The interconnection of teaching and practice is a very important evaluation criterion when studying at the CTU; the requirements of practice are transferred into the topics of qualification papers in accordance with the trend in the given field. Individual faculties and university institutes approach the involvement of practice in teaching individually and on the basis of subject specifics.

LIFELONG LEARNING, UNIVERSITY OF THE THIRD AGE, FURTHER EDUCATION

CTU also offers a wide range of educational activities within the framework of lifelong learning, LLP, and the University of the Third Age, U3A. In this case, too, given the focus of the university, attention is paid to technical disciplines, which are increasingly interdisciplinary in the social sciences. Further education is also aimed at the staff themselves in the context of qualification upgrading in vocationally oriented and preparatory courses, and the public is also included. Courses for the public are designed either to develop knowledge and skills essential for the exercise of a particular profession or as preparatory courses for study at the CTU. The offer of LLP courses provided by faculties and higher education institutes is published on the CTU website (since 2021, the new czv.cvut.cz portal has been fully used to make the offer more transparent, facilitate registration and administration of courses).

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 the acquisition of a university degree, and is intended for those who are entitled to a retirement pension and have reached the age of 60. A list of U3V courses is also published on the CTU website. As part of the professional development of its staff, the University focuses mainly on training programmes that address real-life situations in order to improve the qualifications of its staff. Last but not least, further education also focuses on the young generation, within the University Primary School and the Lvíčata Kindergarten. In view of the uniqueness of this education system, it is given additional space in the Third Role chapter. The faculties and institutes of higher education are involved in LLP according to their subject specialisation.

In view of the pandemic, the Faculty of Civil Engineering, like other units, organised lectures by experts from practice and other professional departments, conferences, exhibitions, workshops, seminars and student competitions, mainly in on-line mode. Noteworthy events include the first annual Concrete Week or the Ignition 2021 conference, Microplastics in Soil, Nano and Macro Mechanics, GisDay and Passive as a Sustainable Standard. The faculty actively participated in the events Lesamáj, Open House Prague, Olympic Festival in Prague, ScienceFest, Night of Scientists and Summer School of Department of Indoor Environmental and Building Services Engineering. The faculty also organized two exhibitions - in the Prague 6 Skleňák Gallery the exhibition Artists of the Department of Architecture of the Faculty of Civil Engineering of the CTU and in the Faculty of Civil Engineering Gallery the exhibition Jaroslav Kučera - Silent Dialogues. It also hosted the exhibition Housing Cooperatives in front of the building.

The Faculty of Transportation Sciences in 2021 successfully held the XXXIIth year of the international student transport engineering project seminar with international participation of university students with transport specialization MEPS 2021 and also two regular trainings of road safety auditors.

The Faculty of Biomedical Engineering, in cooperation with the Institute of Hematology and Blood Transfusion (IHBT), wants to actively participate in the production of immunotherapeutic drugs in its super-clean premises and in the training of future professionals, from among their students, with knowledge of demanding pharmaceutical production processes. To this end, it has introduced a specialised elective course, unique in its focus, which is designed especially for students studying the Laboratory Diagnostics in Healthcare programme. Students of the faculty, future paramedics, had the opportunity to acquire additional skills on the polygon as ambulance drivers. Students of the bachelor's degree programme in Physiotherapy and the follow-up master's degree programme in Applied Physiotherapy participated in a practically oriented seminar on palpation anatomy. In December 2021, the Faculty launched a professional C-Level course entitled EU Regulation 2017/745 Compliance Officer and their role in companies, which responds to the current situation in the field of medical device regulation within the EU.

The Faculty of Nuclear Sciences and Physical Engineering implemented on-line courses for secondary school teachers, after completion of which the participants received a FEPS (futher education of pedagogical staff) certificate. The Mathematics for Life event is organised by the faculty in cooperation with the Faculty of Education of Charles University. Chemistry at CTU is a university-wide event in which Fac. of Nuclear Sciences and Physical Engineering, Fac. of Electrical Engineering, Fac. of Civil Engineering and the Klokner Institute participated in 2021.

The Faculty of Architecture was the main organizer of the EAAE (European Association for Architectural Education) conference called New Dimensions, which took place in Prague on 25-28 August 2021. EAAE is an organization of more than 130 universities whose mission is to improve the quality of architectural education and common architectural policy in Europe and to promote discussion and exchange of information in the field of architectural education and research. After a one-year break, the Faculty again organised the November Talks lecture series in cooperation with the STO Stiftung foundation. During the series, which was also held in London, Paris, Venice, Stuttgart and Graz, successful personalities in the field of architecture presented their work in Prague on 15 November - Maruša Zorec - ARREA architektura, Slovenia, 22 November - Eva Jiřičná - AI - Design, Czech Republic, 29 November - Matthew Carmona - Bartlett School of Planning, UK, and 6 December - Alison Brooks - Alison Brooks Architects, UK. This is the 7th year of cooperation with STO Stiftung.

At the Masaryk Institute of Advanced Studies, for example, language courses for employees and the public, Czech language courses for foreign students and a specialisation course for coaches were implemented. As part of the support for the integration of foreign workers at the CTU, the Institute also implemented Czech language courses and a cultural history course Czech Culture and Civilization. The Masaryk Institute of Advanced Studies, the Faculty of Civil Engineering, The Faculty of Transportation Sciences, The Faculty of Nuclear Sciences and Physical Engineering, the Faculty of Biomedical Engineering and the Faculty of Architecture were the most involved in courses of preparation for the admission procedure. The Masaryk Institute of Advanced Studies was particularly involved in career courses. The Masaryk Institute of Advanced Studies, the Faculty

of Mechanical Engineering and Faculty of Nuclear Sciences and Physical Engineering again offered professional courses.

Most of the faculties or university institutes were involved in the U3A courses, namely the Masaryk Institute of Advanced Studies, the Faculty of Architecture, the Faculty of Biomedical Engineering, the Faculty of Civil Engineering, 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 2021, a total of 586 lifelong learning courses were implemented at CTU with a total of 2,691 enrolled participants.

CTU has also fulfilled its role in education in dedicated LLP courses. Most of the courses were oriented towards the professions, with 200 courses in arts and humanities, 67 in natural sciences, mathematics and statistics, and 196 in information and communication technologies. A total of 70 courses were held in the field of technology, manufacturing and construction, while other fields had numbers in the order of tens or less. The largest number of participants took courses in arts and humanities, with a total of 1,094 participants. 353 participants took part in the natural sciences, mathematics and statistics and information and communication technologies, while 466 participants took part in technology, manufacturing and construction. There were also large numbers in information and communication technology, with a total of 392 participants. Other courses had around a hundred applicants.

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3_STUDENTS

MEASURES TO REDUCE ACADEMIC FAILURE

The issue of academic failure received considerable attention in 2021. Consequently, CTU coped with this challenge successfully and this fact is further underlined, by the results of the university-wide student survey. The overall student failure rate has slightly increased from 29.6% to 30.6% compared to 2020. The Faculty of Biomedical Engineering and the all-campus departments saw a significant decrease, with an 8.7% drop in student failure. The Faculty of Architecture also achieved a significant reduction, with a 6.1% decrease. On the contrary, at the Faculties of Civil Engineering, Mechanical Engineering, Electrical Engineering, Nuclear Engineering, Physical Engineering and Information Technology, student failure rates increased. The Faculty of Transportation Sciences has kept its academic failure rate approximately at the same level. A detailed analysis of the data and information on the structure of students in each field and degree, together with the scholarships distributed, is provided in the **Table Appendix, Section 3.**

As it is already known, students come out of secondary school every year with different levels of mathematical knowledge, and there is a need to compensate for the huge difference and prepare them for the demanding study that is primarily based on mathematical sciences. Various forms of preparatory courses, such as the regular summer Introduction to Computer Science course organized by the Faculty of Information Technology in cooperation with Stanford University, have already proved successful in past years for individual units, enabling candidates to gain the additional knowledge needed for successful study. The Faculty of Civil Engineering offers online intensive leveling courses and preparation courses for the written mathematics entrance exam, as well as mock entrance exams.

In 2021, the Faculty of Biomedical Engineering organised a week-long course for prospective first-year undergraduate students of „BioŠrot 2021», which included an introduction to mathematics, biology, physics and chemistry. An educational course «FyzioTmel 2021» was prepared for Physiotherapy students aimed at presenting anatomy teaching and improving physical fitness. In addition to these two courses, a regular introductory course was also implemented for the students of the Paramedic Rescue programme, which introduced them to their studies at the Faculty, the content of their future work and the work of the Integrated Rescue System (IRS) units. The week-long stay also allowed the students to get to know each other and lay the foundations for building a solid team. The Faculty of Transportation Sciences prepared courses aimed at reviewing high school mathematics and physics, preparing for university teaching and getting to know the teachers.

In order to minimise academic failure, faculties and units try to eliminate it during the first months of study. For example, elective courses are offered, so-called repetitions, designed for the repetition of the studied material or individual consultations with teachers and study advisors. Refresher courses in other vocational subjects are also available as a matter of course. A teaching evaluation survey is used to obtain feedback from students and to identify problem areas. Various forms of online mentoring, already in place or newly applied, have proved to be significantly successful, involving both teachers and more experienced students.

The Faculty of Mechanical Engineering has a two-track approach to reducing student failure. It has spread the undergraduate studies over four years and based on examinations at two alpha/beta levels. A student who passes the exams at the alpha level, the higher one, gets the Bachelor›s degree after three years and is also exempted from the entrance exam for the follow-up Master›s degree. Conversely, a student who passes the exams at the beta level, the lower level, will receive a practice-oriented bachelor›s degree after four years and will be admitted to the follow-up master›s degree only after passing an entrance examination focusing on the difference in knowledge between the alpha and beta levels. This approach reduces academic failure after the first year of the Bachelor›s degree by 15%. The second method, which has proven successful even in times of pandemic, is the use of artificial intelligence. Using machine learning methods, the Faculty of Mechanical Engineering creates «tailor-made» models of successful and

unsuccessful student behaviour. The aim of this method is to predict the risk of failure in studies and to inform the at-risk student in time to offer advice and help (without lowering the level) when it is not too late. The result is a relatively high student success rate even in forced distance learning situations. Without the procedures described above, the failure rate of students in the first year would have increased significantly, resulting in approximately 120 fewer engineers graduating in 4 to 5 years.

In order to reduce academic failure, the Faculties of Architecture, Transportation Sciences and Civil Engineering have introduced online compensatory courses that offer students the opportunity to make up for missing knowledge in order to pass compulsory subjects or to practice a topic more thoroughly.

The Masaryk Institute of Advanced Studies uses the LMS Moodle application, in which electronic courses are available, including a variety of study guides, texts, worksheets, didactic tests, discussions, methodological guides, instructional videos, etc. The KOS information system is used to monitor the level of academic failure in individual years, semesters and courses, which is evaluated throughout the course of studies, including indicators relating to the percentage of successful completion of studies. These statistical summaries are used in particular by programme guarantors and study coordinators, who regularly evaluate the failure rate and propose measures, for example, in the form of the introduction of elective courses or specific adjustments to teaching methods.

FINAL DECISIONS ON ANNULMENT

During the year 2021, no final decision was issued at the CTU in Prague on the invalidation of the state examination, its components or the defence of the dissertation, or the appointment as associate professor pursuant to § 47c, § 47f and § 47g, or pursuant to § 74a, § 74d and § 74e of Act No. 111/1998 Coll., on Higher Education.

MEASURES TO LIMIT THE PROLONGATION OF STUDIES

In 2021, the focus was on preventing prolongation of studies caused by a pandemic situation. The key issues for faculties and units were the continuation of online instruction in the first half of 2021 and a partial return to full-time instruction in the fall. In addition to the tools available, students were offered the option of repeating a failed course the following semester. Typical exam examples were available on the course website and were addressed in lectures and exercises. Some specific topics were supplemented by lectures by practitioners. The maximum capacity for practicals was reduced to allow practitioners to give more individual attention to students. A „Citation Thursday" was also implemented, especially for final year students, which offered consultations on citations, citation management and copyright.

The Masaryk Institute of Advanced Studies has focused on recommending model curricula.

The Faculty of Biomedical Engineering, within the framework of the international project ITEM, Innovative Teaching Education in Mathematics, according to the method of RNDr. Eva Feuerstein, Ph.D., prepared real examples from the practice of biomedical technicians and engineers and verified, so far only on a pilot basis, the use of interactive visualization of mathematical solutions. These examples with visualizations will then be used in the next semesters in regular teaching. It has been statistically proven that the new approach to teaching, i.e. the use of paired problem solving with the constant possibility of teacher assistance and at their own pace, is beneficial for the students, who achieve better results than before the introduction of the new system. In addition to learning outcomes, motivation to get a better result has also increased.

Another motivational tool to limit the extension of studies is the assessment of study-related fees for exceeding the standard study period increased by one year in accordance with the CTU Statute.

FOUNDATIONS, GRANTS, SCHOLARSHIP PROGRAMMES

A scholarship is a motivational element that supports particularly talented or otherwise outstanding students at CTU. The support is directed towards participation in study stays abroad and at faculty events, as well as as a reward for an excellent bachelor's or master's thesis. The best studio projects are also rewarded in this way. The scholarship can also be used in case of a difficult social situation to enable the recipient to successfully complete his/her studies. Each faculty approaches the use of scholarship programs differently, but always in accordance with the CTU Scholarship Regulations. In addition to the traditional awards mentioned above, many faculties have also taken the approach of supporting successful high school students or the best first-year students for excellent presentation of their field or faculty, which contributes to the overall reputation of CTU. The „Talented Students" scholarship was also introduced, which targets bachelor and master students who are involved in research projects and co-author research publications or participate in (inter)national competitions.

INFORMATION AND GUIDANCE SERVICES FOR STUDENTS

The aim of the Information and Counselling Service is to act as a low-threshold facility for CTU students, applicants and the general public. To be a friendly place, open to all, helping, with an emphasis on the individuals and their special needs in order. To foster a quality relationship between the student and the university and to co-create the conditions for successful studies and professional and personal life. Information and counselling services are provided through the Centre for Information and Counselling Services of CTU, the CTU Career Centre and the ELSA Centre for Supporting Students with Special Needs. All of these centres are used by all faculties with an emphasis on continuous improvement of professional qualifications of the staff of these centres and the quality of services provided in accordance with the individual needs of students.

Centre for Information and Counselling Services of CTU (CIPS)

Centre for Information and Counselling Services of the CTU supports students to be successful in their studies and in their professional and personal life. It focuses on first-year students already at the enrolment stage, when individual care is provided to anyone who has any problems entering the university. All of the students will be informed that the centre offers support and help in dealing with problems that arise not only in the academic and social adaptation to the new environment, but also in the course of further studies.

CTU students have the opportunity to take advantage of individual academic, psychological, socio-legal and spiritual counselling with special emphasis on dealing with situations of academic risk. Throughout the academic year, the Centre organises events with the intention of providing students with the opportunity to acquire the necessary competences for their academic, professional and personal life. During the semester, seminars, lectures and workshops are organised for students to promote study skills and creativity, and for personal development.

Within the institutional project, other forms of counselling are offered to students: coaching, speech counselling, financial counselling, psychological counselling for international students, support for female students at CTU, group work and seminars for doctoral students.

The Centre's efforts are aimed primarily at creating an environment for CTU students that minimizes the obstacles they encounter during their studies and that affect the number of students who drop out of their studies prematurely and unnecessarily. CIPS has a particular focus on working with students who have problems with procrastination and computer dependency. The Centre cooperates intensively with the Centre for the Support of Students with Specific Needs - ELSA and with the study departments of individual faculties and higher education institutes.

The Centre provides its services in both face-to-face and on-line form.

CTU Career Centre

Thanks to its unique position and perception by companies and therefore also by future employers, CTU in Prague provides support for its graduates in terms of future employment. All faculties or university institutes cooperate with the private sector to the best of their abilities, and therefore students have the opportunity to join the workforce immediately after graduation. At the same time, the CTU, through its Career Centre, provides services for the personal development of students and their preparation for future professional success. In this respect, there is a personal counselling centre where it is possible to prepare for a job interview using video interview as one of the modern interview methods, with psychological diagnostics.

Of course, the services provided include advice on how to prepare a quality CV together with a cover letter. An important service is career counselling, which recommends a direction and an analysis of weaknesses and strengths, together with the appropriate working style and its effectiveness.

In general, the centre helps students to know themselves and to be able to apply their strengths in what they do. It introduces them to the workings of the labour market and helps them to increase their attractiveness to employers, whether by improving their self-presentation or by gaining work experience. It complements industry knowledge with today's much-needed soft skills, i.e. communication skills and other abilities that are needed in life. It also helps to find solutions when faced with career, study or personal problems, passes on the right contacts and motivates students to resolve the situation. The services of the Career Centre can be used not only by CTU students, but also by graduates up to three years after graduation, and now also by CTU employees. The centre uses various methods of coaching, mentoring and personal testing. Last but not least, the centre participates in fairs and student events, manages Facebook and a website where it advertises job positions and informs about its services. For its successful functioning, cooperation with companies and maintaining awareness of the development and needs of the labour market is essential.

SUPPORTING STUDENTS WITH SPECIFIC NEEDS

Students with physical, visual and hearing impairments, specific learning disabilities including ADHD (attention deficit hyperactivity disorder), autism spectrum disorder and other difficulties (chronic illness, psychological disorder or disease, impaired speech and other communication skills, etc.) are served by the ELSA Centre for Support of Students with Specific Needs as the Department of Studies and Student Affairs of the Rector's Office of the CTU. The service of the Centre, which by its nature goes beyond the scope of professional counselling, was provided in accordance with the valid document of the Ministry of Education and Science, which defines the general conditions for the provision of studies for students with specific needs and contains a methodological standard for their implementation. A complementary document was the Methodological Instruction of the Vice-Rector for Studies on the Support of Students with Specific Needs at CTU. Modifications of study conditions are carried out in close cooperation with faculties and institutes of CTU mainly through direct work of lecturers, contact persons and clerks of study departments. Through the ELSA Centre for the Support of Students with Specific Needs, cooperation is already implemented during the entrance examinations. When filling in the electronic application form, applicants with special needs have the opportunity to request adjustments to the entrance examinations and study conditions due to their disability. Teachers at faculties and institutes of higher education are regularly informed about students with special needs who are registered at the ELSA Centre and are provided with instructions from the Centre's experts on how to communicate and work with such students.

In 2021, 114 students with special needs were registered at CTU. These students are offered the possibility of providing study literature in an accessible form, using the digital and library services of the ELSA Centre, visualisation and note-taking services as well as sign language interpretation including

simultaneous transcription. Personal and study assistance also plays a very important role, together with technical services consisting of the loan of assistive technology and aids. The ATELION Assistive Technology Studio was established as an extension of the range of assistive technologies for students with specific needs and for the professional public.

The services offered by the centre include functional diagnostics, diagnosis of specific learning disabilities and related regimes such as modification of the course of teaching and examinations, together with individual teaching and time compensation. The Centre's staff also attended to students who, as a result of pandemic measures, required the implementation of support measures related to their impaired health and psychological state.

The staff of the Centre implemented a series of online seminars designed to support learning strategies and motivation for studying. The Centre's service offer is also aimed at incoming international students.

SUPPORT FOR EXCEPTIONALLY GIFTED STUDENTS

Excellence is one of the goals that move the entire university to a high level in the perception of society. CTU in Prague is aware of the necessity to support exceptionally talented students who in the future may be part of excellent scientific teams not only in the Czech Republic but also internationally. The actual support and search for such students begins in secondary schools, in the form of excursions, visits and discussions with students of secondary vocational schools. Internships of secondary school students at specific faculties are also successful projects for finding and establishing contacts. The Faculty of Architecture, for example, contacts talented secondary school students in the form of educational workshops on architecture and its study.

Due to pandemic restrictions, most of the events could not take place. Despite this, the Faculty of Transportation Sciences managed to organize the 13th annual „Dean's Award" competition for individuals and teams of students from secondary vocational schools and high schools. Those who took part in the competition and applied to study in the academic year 2021/2022 were admitted to study at CTU without taking the entrance examination. The Faculty of Biomedical Engineering held open days both online and in person. The Masaryk Institute of Advanced Studies cooperates with secondary schools in the form of student internships within the framework of the study programme Specialisation in Pedagogy, where projects whose outputs increase the attractiveness, competitiveness, or material and technical equipment of secondary technical schools are also solved. Several invited lectures were also given in secondary schools, both in person and online. At the Faculty of Civil Engineering, selected students are enrolled in a „selective study parallel", where there is the possibility of an extended offer of elective courses. Gifted students are worked with from the first year of study in the form of motivational scholarships. They also have the opportunity to participate, for example, in the research activities of individual departments as student researchers, they are supported in domestic and international competitions or are sent on foreign stays, such as students of the Faculty of Architecture, which has long-term cooperation with major foreign architectural offices and prestigious European studios. The Faculty of Nuclear and Physical Engineering has been a long-standing partner of high school competitions and Olympiads and supports successful students who graduate in the first semester and meet the rules for the award of an extraordinary scholarship with a one-off payment of 10 000-15 000 CZK - depending on the type of secondary school competition attended.

SUPPORTING STUDENTS IN DIFFICULT LIFE SITUATIONS

CTU in Prague is attended by over 17,000 students who go through several life situations during the course of their studies and need help. The faculties take an individual approach to dealing with each student's situation. At the same time, it is possible to use the services of the CIPS and ELSA centres, offered to students of all CTU units. The year 2021 was associated with the ongoing coronavirus pandemic, which significantly affected the lives of all of us, and with a gradual return to at least partly „normal". A consequence of this pandemic is the deepening of social disparities in society. The faculties and institutes of the CTU have individually addressed the situation of each student who requested assistance. The CIPS and ELSA Centres, with which the units actively cooperate, also offered assistance as part of their services. To overcome socio-economic disadvantages, social or special-purpose scholarships are awarded on the basis of an application and the provision of appropriate documents proving a difficult living situation. Students with socio-economic disadvantages are also identified on the basis of individual work by study officers or coordinators with whom they address their specific needs. In addition to financial assistance, for example, curriculum modifications or other forms of benefits are used.

SUPPORTING STUDENTS IN THE ROLE OF PARENT

The role of a parent is no doubt very important and needs to be taken care of. The role of the studying parent is multiplied and it is also up to the university to determine what conditions it prepares for those who have entered the university during their studies or who have already entered the school as parents. Already in previous years, a modification of the Study and Examination Regulations has been applied in practice, under which the maximum duration of studies has been extended and the time limit for fulfilling study obligations for student-parents has been extended. Other measures are also being taken by CTU units, such as modification of studies, counselling in the area of individual study plan development, taking into account interruptions of studies in terms of adjustments or deduction of the recognised period of parenthood from the total period of studies. The CTU in Prague is the founder of the University Primary School and Kindergarten Lvíčata, where CTU students and employees can place their children. They are educated in these facilities with a focus on promoting technical and scientific talents. They are part of the university, involved in its life.

4

4_GRADUATES

COOPERATION WITH GRADUATES

The Association of Alumni and Friends of CTU (www.absolventicvut.cz) has been operating for seven years. Several social and educational events were planned during 2021, but most of them were held online due to the ongoing pandemic measures.

This was the case, for example, at a meeting with army general Petr Pavel or with two hydrogen experts, Prof. RNDr. Vladimír Matolín and independent consultant Max Wandler.

In September, when the epidemiological situation was more favourable, a lecture by the director of the Klokner Institute, doc. Jiří Kolíšek took place. It concerned diagnostic surveys of Prague bridges and footbridges, at which he explained the reasons for the collapse of the Troja footbridge. The lecture was followed by an excursion to the testing room for building materials and structures.

In October, a meeting of the CTU Alumni Business Club was held again in on-line mode.

It is customary for individual faculties and institutes to hold social and professional events to maintain relationships with alumni. The Klokner Institute holds an annual Christmas concert. The Faculty of Information Technology and the Faculty of Biomedical Engineering regularly organise meetings in February and November for alumni, who are very happy to get together informally and share their work experiences. Unfortunately, due to the pandemic, these social events did not take place this year either, and have largely been replaced by non-contact platforms in the form of online exhibitions, webinars and professional lectures. The units continued to maintain regular communication with their graduates, e.g. the Faculty of Architecture sends out an electronic newsletter and systematically strives to present its graduates, and thus the CTU brand, in the media. The Faculty of Civil Engineering communicates with its graduates via social networks, and other units use similar tools. The Faculty of Transportation Sciences and the Klokner Institute, for example, use direct involvement of graduates, who maintain contacts by, among other things, serving on state final examination committees. Graduates become opponents of final theses, evaluators and supervisors of student projects or lecturers in professional courses and practical exercises.

Thanks to communication with its graduates, the Faculty of Biomedical Engineering receives valuable comments on the content of studies, according to which it adjusts the curricula and course outlines in the framework of the newly prepared accreditations. Many graduates, especially of specific disciplines such as optics, optometry and ophthalmology, participate as experts in various professional conferences.

In 2021, the Faculty of Biomedical Engineering has prepared the Alumni Awards competition for its graduates, which will be evaluated in 2022. Anyone can nominate FBME CTU graduates for the award, nominations are then judged by a committee composed of teachers, FBME students and external experts. The competition should also be motivating for current students. Among the 2021 nominees were Dr. Anna Stejskalová, who became the youngest ever (since graduation) winner of the Emerging Alumni Leader Award 2021, and Ing. Jaroslav Hrubý, who participated in the development of the diamond quantum magnetometer as a student team leader and as a doctoral student at Hasselt University in Belgium. The magnetometer was placed on SpaceX's Dragon spacecraft, which headed from Cape Canaveral, Florida, to the International Space Station (ISS) on 29 August 2021.

On 5 November 2021, the Faculty of Biomedical Engineering organized the XIth annual student scientific conference Aspects of the Work of the Helping Professions - AWHP 2021 at the Medical House in Prague. 31 former students and practitioners attended the event. On Thursday 18 November in the early evening, an excursion for members of the Alumni Association of the Czech Technical University in Prague to the laboratories of the Department of Health Professions and Population Protection took place.

The CTU Career Centre also helps to maintain contact with graduates by promoting some of their successful projects. This cooperation is important for obtaining feedback on the success of studies, mapping employment and feedback from employers. An overview of the number of graduates is included in the **Table Annex, Section 4**.

MONITORING EMPLOYMENT AND EMPLOYABILITY OF GRADUATES

The employability of CTU students is a very important feedback for the university regarding the quality of studies and their interconnection with practice. This fact is also important for applicants who assess their interest in studying with an evaluation of their subsequent employability on the market. Employability is primarily supported by the CTU Career Centre and the database of advertised positions, temporary jobs and internships suitable for students and recent graduates, which is maintained and regularly updated is available website www.kariernicentrum.cz. The traditional Mentoring programme is another way of supporting students' employability, thanks to which they gain practical experience in their field and establish further cooperation. In this programme, we work closely with CTU graduates who act as mentors for selected students. The Centre also facilitates thesis topics commissioned by companies.

Another way to support employability is through human resources agencies, where students can get information about the labour market directly from HR specialists from technical companies.

According to the surveys of individual faculties with employers, the employment rate of graduates is high in the long term, they are satisfied mainly with their good technical knowledge. The Faculty of Information Technology regularly ranks at the top of rankings that compare the success of graduates in their transition to practice.

However, a persistent weakness across all components is the systematic solicitation of feedback from employers. A newly introduced measure is the so-called Study Programme Councils, which always include a representative from the employers of students in the given study programme.

COOPERATION WITH EMPLOYERS

CTU in Prague is closely linked to highly specialised areas, where experts from practice often work closely with faculties. Most of the graduates are employed in the field they studied and their employability is very good. Mutual recognition comes already during studies, when students and future employers have the opportunity to meet at professional seminars or in specific projects involving both academia and the private sector. External experts are members of examination and expert committees of state final exams or during the organisation of student conferences at the faculties and institutes of CTU. They also act as consultants for bachelor's, diploma and dissertation theses, or even as their direct commissioners.

The area of compulsory professional practice is also very important. Employers and professional organisations are also involved in the process of improving the content of study programmes and consultations in the preparation of study programme re-accreditations, such as at the Faculty of Biomedical Engineering. It is necessary to highlight other forms of cooperation with employers within individual faculties, e.g. the primary linking of offers of themes of bachelor, diploma, and also dissertation theses of the academic and application spheres, often accompanied by a job offer for the student/graduate. This is a well-established practice of the Faculty of Architecture or the Klokner Institute (cooperation with ČEZ, a. s., Road and Motorway Directorate of the Czech Republic, etc.). The Faculty of Civil Engineering offers companies in the field a contractual form of cooperation. A very successful activity is the so-called Technical Thursdays, focused on current topics in the field of construction, prepared in cooperation with representatives of companies and experts from the ranks of academics. These were also held online in 2021. The faculty is still involved in the Koordinuj.cz project, which organises the so-called Arenas, professional meetings of selected companies and interested students.

The Faculty of Transportation Sciences enables employers to contact students and potential employees at the Career Day. It took place on 14 April 2021, online at karierniden.fd.cvut.cz. The biggest partners presented themselves to the students in their video presentations. A total of 28 employers took part in the event and could be contacted via the online communication tool Mluvii. The Faculty of Information Technology offers employers the established FIT Partner and Sponsor Programme (FIT Partner/ FIT Sponsor), which allows them to influence the focus of students and thus directly participate in shaping graduates. This year›s COFIT, where students were able to connect with companies, browse collaboration offers and participate in workshops with sponsors, was held again in person on October 13.

At the Faculty of Mechanical Engineering, a meeting with representatives of partner companies took place within the project of the ESC student organization, Engineering Student Club. Masaryk Institute of Advanced Studies successfully cooperates with 15 faculty schools where students of teacher training programmes can work as teachers after graduation. A pilot compulsory elective internship course has been added to the Economics and Management degree programme and eleven students have taken advantage of it so far. A discussion with Hyundai CEO Martin Seitz in November 2021 has also generated interest. Students of the Faculty of Nuclear and Physical Engineering can apply for the ESCO trainee programme thanks to a long-term partnership with CEZ Group. In 2021, they will again join a two-week traineeship at the Temelín or Dukovany nuclear power plants.

5

5_INTEREST IN STUDYING

ENTRANCE EXAMS

Entrance exams at the CTU in Prague are organized annually by individual faculties, which use their pedagogical background to set up a system of verification of the candidate's knowledge and subsequent evaluation. A total of 12,792 applications were submitted for admission to the Bachelor's degree in 2021 and 9,229 applicants were admitted. 2,595 applicants were admitted to the follow-up Master's degree. The total number of students finally admitted in 2021 was 9 304, including doctoral studies, of which 8 866 for bachelor's and master's degrees. The 2021 figures show a slight increase compared to 2020. A more detailed analysis of the data is included in the **Table Appendix, Section 5.**

Entrance exams to the Bachelor's degree of most faculties are aimed at verifying the knowledge of mathematics, where the candidate demonstrates in a written test his/her ability to solve problems independently in the range of secondary school mathematics. All faculties and the Masaryk Institute of Advanced Studies prepare their own tests and their experts compile them specifically according to their own needs to test the abilities of future students in particular areas. Most of the admission tests are single-round, the exception being the Faculty of Architecture, whose two-round admission procedure consists of a talent test in the first round (art exam, spatial imagination test) and other abilities are verified by tests from the general overview and general study prerequisites.

The Faculty of Mechanical Engineering normally conducts its own mathematics exam, corresponding to the matriculation exam, called Mathematics+. At the Faculty of Transportation Sciences, candidates who have passed the common (state) part of the matriculation examination do not take a written examination. The final score is determined on the basis of the results of the matriculation examination, taking into account the pass mark in the subjects of mathematics and physics. The written examination in mathematics and English was only taken by candidates in the Professional Pilot course.

At the Faculty of Biomedical Engineering, the entrance examinations for the academic year 2021/2022 were conducted in the form of written tests, but only for the study programmes Physiotherapy and Civil Emergency Planning. They were provided by own resources, both for the Bachelor's and for the follow-up Master's programme. Admission to all other study programmes was without examinations.

The Masaryk Institute of Advanced Studies has a written entrance exam that is provided by its own resources and evaluated thanks to a license from Acrea - Remark Office OMR, which it owns.

In the case of the Master's programme, the admission examinations take place in different forms, depending on the focus of the individual faculties. Mostly, it is again a test, the form of which is individual according to the faculty. Another common form is oral interviews. At the Faculty of Architecture, for example, the admission procedure is conducted in two rounds, with a portfolio being evaluated in the first round, followed by an oral interview. The course of these examinations has also been affected by the pandemic and has been modified or waived, e.g. the Faculty of Nuclear and Physical Engineering has waived the entrance examinations for all candidates for the Bachelor's degree. In the follow-up Master's studies, the examination tests knowledge in mathematics and professional subjects according to the chosen study programme.

COOPERATION WITH SECONDARY SCHOOLS

The cooperation between CTU and secondary schools is constantly improving and expanding. In 2021, the Faculty of Civil Engineering continued with cooperation agreements with three secondary schools - the Secondary Industrial School of Civil Engineering in Dušní, the Secondary Industrial School of Civil Engineering J. Gočár and the Secondary Industrial School Duchcov. It also has a very good concept of social media presentation - it manages FB pages and several FB groups, Instagram, YouTube

and within the platform of CTU also a LinkedIn account. The website Srdcem stavaři presents, in the form of videos and podcasts, interesting moments from projects, studies, experiments, etc. and thus contributes to the popularization of professional and scientific research activities.

The Faculty also operates the portal stavarna.online, where online open days were held.

The StreTech conference, which the Faculty of Engineering organises with secondary schools, did not take place in 2020 and 2021, but existing contacts were used to inform secondary schools about the organisation of admissions and the study itself.

The Faculty of Transportation Sciences has strengthened its outreach to secondary school students through social media and the web. For this purpose, a web portal for applicants to bachelor's and master's studies has been created at uchazec.fd.cvut.cz, where comprehensive information on the rules and conditions for admission to study and on the study itself is clearly provided. Furthermore, the Faculty presented itself during its Open Days and promotional events (Festival of Science, Night of Scientists, Gaudeamus, etc.), using in particular the topics related to the MotoStudent project, the Transport Hall of the Faculty of Transportation Sciences or flight simulators. Cooperation is also active at the Děčín site, where excursions of high school students from the North Bohemia region focused on the issue of simulations and visualizations in transport were held as part of the Open Day. Secondary school students could also try out, for example, the creation of traffic models or the use of visualisation software including 3D projections in the Simulation and Visualisation Laboratory.

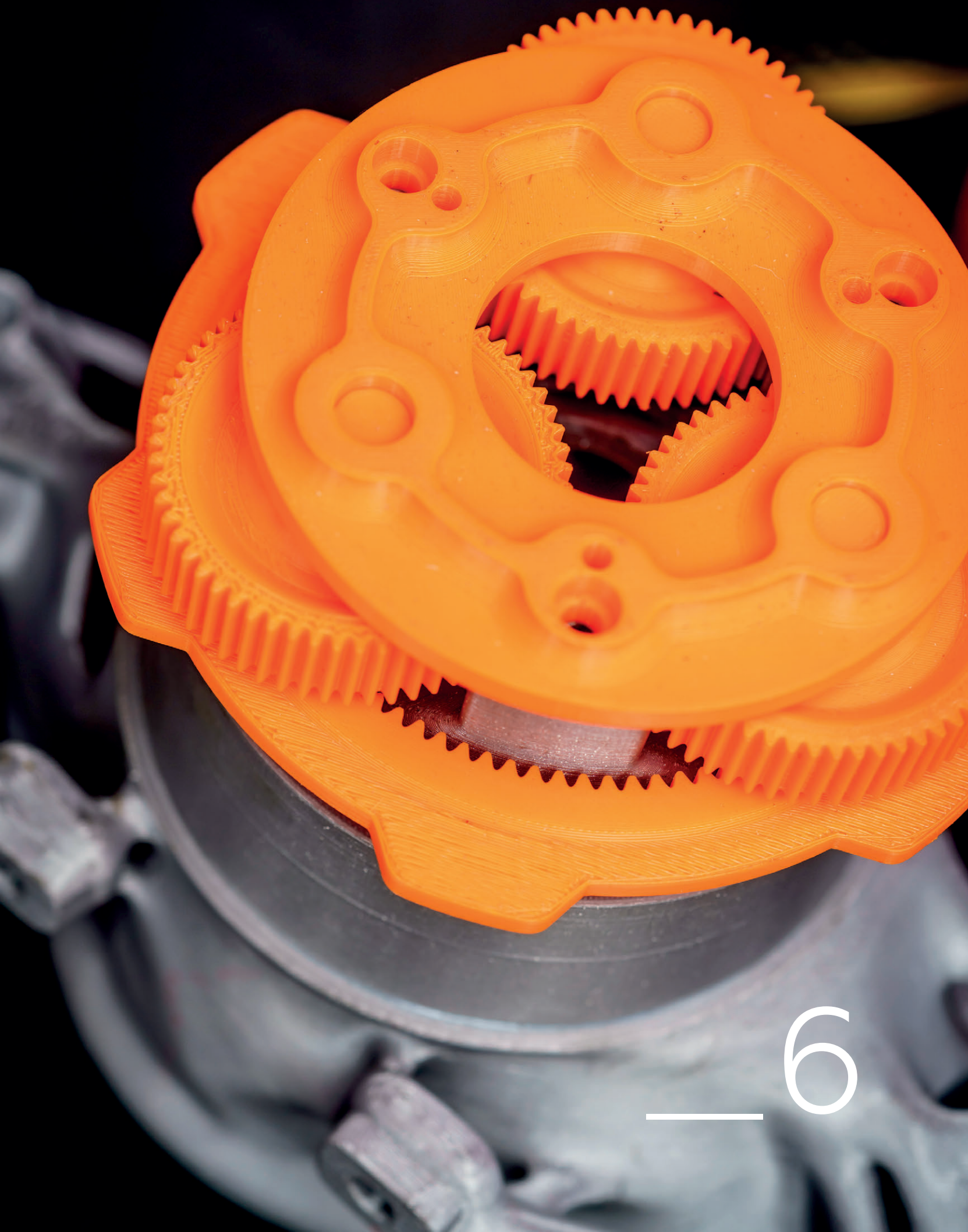
Open days were also organized by the Faculty of Biomedical Engineering. In January it was held on-line, in December it was held in contact. On 24 June 2021, a long-planned meeting with primary school teachers took place in the faculty building of the former barracks, organized by Mgr. Dubravská from the Promotion Department of the Kladno City Council and FBME. The event took place within the framework of the project Local Action Plan for the Development of Education in the Kladno Region. On the same day, students from the Sports High School in Kladno were on an excursion in our laboratories in this building. Under strict hygienic conditions, they visited the Robotic Rehabilitation Laboratory, two unique simulation workplaces for teaching safety professionals, the Anatomical Models Laboratory with plastinates and finally witnessed several biochemical experiments in the Biochemistry Laboratory. On November 5, 2021, the Faculty of Biomedical Engineering hosted a field trip for the students of the Unhošt Primary School. On November 25 and 26, the students of the 8th and 9th grades of this school tried some experiments at FBME and visited the laboratories of the technical study programs. On November 16 Ing. Václav Ort from the Faculty of Biomedical Engineering participated as one of the speakers in the 24th annual Jan Kepler Gymnasium Symposium, an event where blocks of various lectures are held at the Gymnasium over three days, accompanied by, for example, a concert by student bands, exhibitions, film screenings and theatre. Ing. Ort, who is also part of the Unconventional Artificial Lung Ventilation team, prepared a lecture for the students on „Helping to survive the mess in the lungs".

The Faculty of Information Technology hosted the Design Sprint summer school, which was attended by 24 secondary school students. The IT Czechitas Summer School offered girls aged 14-19 the opportunity to learn the basics of IT technology and visit the Faculty's laboratories. The open days were held virtually, and the students were able to tour the faculty's teaching spaces, specialist classrooms and laboratories and navigate very well thanks to QR codes and a narrated 360° video. We also managed to organize the 8th edition of the FICS competition - the Faculty of Informatics Correspondence Seminar, whose successful solvers were admitted to the Faculty without entrance exams. There is a long-term cooperation with the Arabská Gymnasium, which is one of the first secondary schools in the Czech Republic to offer the field of programming/informatics.

The Masaryk Institute of Advanced Studies continued its cooperation with secondary schools, especially in the study programme Specialization in Pedagogy, and projects were solved within the framework of qualification works, which increase the attractiveness, competitiveness, or material and technical equipment of secondary technical schools. Furthermore, the Institute invites students and guidance counsellors to Open Days and informs secondary schools about study programmes and admission procedures. Technical lectures are also held in secondary schools, and teachers assist in the consultation of secondary school vocational activities.

The Faculty of Nuclear Sciences and Physical Engineering has offered schools an online educational programme on radioactivity called Sparrow flies to schools. More than 160 schools participated in ten dates, and in addition to the broadcast itself, educational material and a test of acquired knowledge were created and freely available to secondary school teachers. The Technical Club, which was partly online and partly in contact form, according to the pandemic situation, was held at the detached office in Děčín, as well as lectures at secondary schools, which were mainly online.

Participation of CTU units in national and international trade fairs and the use of various communication platforms, including new media, is a matter of course.



Ing. Jiří Boháček / Bursar

„The basic driving force of CTU, ensuring long-term development and quality, is undoubtedly the academic staff and employees. Without their erudition, the university would be an empty vessel and could not function. It is therefore essential to create appropriate conditions and motivation in the field of human resources. In February 2021, a document entitled „Recommended Procedures for the Recruitment of Academic and Scientific Staff and for the Organisation of Selection Procedures for Senior Staff at CTU" came into force, supplementing the Career Regulations approved at the end of 2020, which became effective in April 2021. This document fulfils one of the commitments arising from the HR Award. In the coming period, the aim will be to ensure that these documents are consistently respected and implemented. Emphasis will continue to be placed on competence, personal research potential and the ability to participate in innovative solutions."

6_EMPLOYEES

CAREER REGULATIONS AND MOTIVATIONAL TOOLS FOR ACADEMIC STAFF

The Career Regulations continuously improve the quality of teaching and creative activities and their evaluation according to European standards with an emphasis on the requirement of excellence and international competitiveness. The Career Code regulates the relationship of employees to CTU, defines the content of job positions, qualification requirements of academic staff and the framework of professional career, including expected milestones for staff and job applicants at CTU in terms of their expected career growth and motivation. It defines the principles of equal access, transparency and reviewability of major employment decisions in relation to the career progression of staff and sets out the basic principles enabling successful reconciliation of professional and personal life. The Career Code was supplemented by the Code of Ethics, approved by the Academic Senate of CTU.

The structure of academic, scientific and other staff, including the distribution among the individual units of CTU, can be read from the data in the **Table Appendix, Section 6**.

DEVELOPING THE PEDAGOGICAL SKILLS OF ACADEMIC STAFF

Pedagogical skills are an integral part of the development of the whole university. At present, support is mainly given to young and beginning teachers who need to acquire the basic knowledge, pillars and practices to transfer knowledge towards students. The Masaryk Institute of Advanced Studies is a key provider of courses and offerings for all parts of CTU. Some faculties themselves recommend that their staff complete a minimum of one semester of pedagogical and psychological studies. Part of the development of academic staff is also the opportunity to participate in events organised by the CTU Central Library under the auspices of the HR Award project, e.g. the semester e-course Information for Science and Research, the series of thematic lectures Doctoral Days (not only for doctoral students), seminars on industrial law, etc., or courses on scientific writing and publishing organised by the National Technical Library. Most of the faculties also maintain communication between the course supervisor and the teacher for the sake of quality and teaching methodology.

In 2021, a large part of the institutional development project funds has been earmarked for academic staff development. At the same time, a survey of staff interest in self-development courses, including online, was undertaken. University-wide assessment by (or from) students also contributes to improving the quality of teaching, providing feedback to their lecturers.

The faculties support the participation of their employees in training courses. A specific feature during the coronavirus pandemic was the need for distance learning. In the previous year, materials for online teaching, the use of Moodle and MS Teams tools, and online training for teachers had already been developed. Dedicated staff then provided support to educators for these platforms.

GENDER EQUALITY PLAN, SEXUAL AND GENDER-BASED HARASSMENT

CTU is a technical university where the proportion of women is still lower than men. The number of women among employees and students is increasing, thanks to the high activity of individual faculties and the positive presentation of successful women in their respective fields. Women are represented in the leadership of departments and faculties, and are successful in habilitation and appointment procedures. Gender equality at CTU is based on the nature of ethical behaviour and adherence to the values of the University. The difference in the composition of students is not significant, the ratio of gender representation is approximately the same. The university management is also completely balanced - four of its nine members are women.

According to the Rector of CTU, this parity is also favourably reflected in the management of the University.

Gender equality in research and innovation is a priority for the European Research Area. The European Commission's Strategy for Gender Equality 2020-2025/1 sets out a vision, policy objectives and actions to make concrete progress on gender equality in Europe and to achieve the Sustainable Development Goals.

During 2021, a Gender Equality Plan 2021-2024 was developed, which includes measures, activities and policies that support the objectives in this area. The Rector of the CTU emphasises the importance of this strategy and promotes awareness in the academic environment through targeted and concrete activities.

The main methodologist not only for gender equality is the Rector's Office of the CTU, which has a specially trained person for this issue. Discrimination would be investigated directly by the senior managers of the unit concerned and, if necessary, dealt with by law enforcement authorities.

/1 https://ec.europa.eu/info/policies/justice-and-fundamental-rights/gender-equality/gender-equality-strategy_en

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

_“Internationalization is a goal whose achievement has many positive effects not only on education and science, which are the basic mission of the University, but also on the behaviour and cognition of students and academics, as well as on the position of CTU in Prague in relation to its partners both in the Czech Republic and abroad.“

7 _ INTERNATIONALIZATION

SUPPORT FOR STUDENT PARTICIPATION IN MOBILITY PROGRAMMES ABROAD

Support for students in this area is based on the CTU Strategic Plan 2021+, specifically on the priority „Increasing the quality and success rate of studies", has the character of financial support and is implemented in several ways, primarily through Erasmus+ programmes, the school-wide project „Student Mobility", the ATHENS programme and several others, also focused on student mobility.

Erasmus+ programme

The most important programme of international cooperation and a tool to support the mobility of CTU students and employees in 2021 was again Erasmus+. This programme of the European Union enables institutions to exchange students of all levels of study for the purpose of study or work placement and staff members to stay abroad for the purpose of teaching on the basis of mutually concluded agreements. Non-academic staff have the opportunity to broaden their knowledge within their fields of study through training abroad, shadowing colleagues at foreign institutions or participating in workshops. Within the Erasmus+ programme, CTU has 632 valid inter-institutional agreements with 325 European universities with a total capacity of 1,402 places for outgoing students and 1,404 places for incoming students.

In the academic year 2020/2021, CTU sent students and staff abroad under all types of Erasmus+ mobility, 702 applications were submitted and a total of 244 students were nominated. 163 students at all levels of study of individual faculties and the Masaryk Institute of Advanced Studies gained experience in preparation for studying abroad. The number of students was lower than last year travel restrictions.

Most of the trips were to Germany (22), Spain (16), Belgium (16) and Finland (15). The Faculty of Electrical Engineering (36), the Faculty of Mechanical Engineering (28) and the Faculty of Architecture (28) sent the highest number of students on study stays. Within the framework of staff mobility, only two physical and two virtual trips took place.

The CTU used all allocated funds from EU sources, including EUR 355 567 for student mobility, EUR 755 for staff mobility and EUR 57 000 for mobility organisation. The state budget contribution amounted to EUR 83 542. The total amount of funds for student scholarships and staff mobility contributions was EUR 496 864. In 2020/2021, 386 students were admitted to the CTU under the Erasmus+ programme, mostly from France (160), Spain (55) and Germany (39). The largest number of incoming students was registered at the Faculty of Engineering (97), Faculty of Civil Engineering (80), Faculty of Electrical Engineering (68), Faculty of Information Technology (50) and Faculty of Architecture (41).

After significant declines in mobility in all categories in the academic years 2019/2020 and 2020/2021, this trend will reverse by the end of 2021, especially in the incoming student category. According to the data available so far, mobility numbers for outgoing students are at 61.0 per cent and for incoming students at 71.2 per cent, compared to the 2019/2020 academic year. However, the final data will only be included in the 2021/2022 statistics.

Institutional Student Mobility Programme Project

This project builds on the long-established model of sending students to foreign partner universities in accordance with bilateral agreements on student exchanges, mostly with non-European institutions. The scope of the project is the selection of students across the CTU, including language tests, for one and two-semester study stays at foreign universities, the allocation of scholarships, the organization of their stay and the final evaluation of the obtained study results. It applies to students of all faculties, including those going on a double degree programme. The project is formally school-wide,

coordinated by the Department of Foreign Relations of the Rector's Office of the CTU, however, the benefits are transferred to students of all participating faculties and departments of the CTU.

In 2021, 89 students travelled within the project for a total of 422 student-months and 129 students arrived for a total of 660 student-months. The most interesting countries for outgoing students are the United States (7 universities, 23 students), South Korea (5 universities, 16 students) and Taiwan (3 universities, 14 students). The other countries are Canada (6), Costa Rica (2), Hong Kong (1) and Thailand (1). A total of 10 students went to study for double degrees at partner universities in Germany, France, the USA and Taiwan. The largest number of students on exchange programmes came from the USA (31), Taiwan (19), South Korea (17), Argentina (12) and Canada (12), with smaller numbers from Russia (6), Singapore (6), Mexico (5), India (4), Australia (4), Thailand (4), Chile (4), Peru (2), Brazil (1), Panama (1) and China (1).

Overall, the lower numbers of outgoing and incoming students compared to 2019 (the last year with standard conditions) were due to restrictions as a result of the COVID-19 pandemic (foreign universities cancelled full-time classes, repeatedly postponed the start of the semester, restricted entry to the country). The allocated funds, which totalled EUR 7 million in 2021,were limited to the following. CZK 7 million were used for scholarships for outgoing students and extra costs related to pandemic restrictions. In the first half of 2021, unused funds from 2020 were also drawn down. Therefore, the same amount of funds were drawn down for study tours as in 2019.

ATHENS programme

The epidemiological situation in Europe was not favourable even during 2021, so the ATHENS partner network cancelled the March courses at all participating universities, only the November course was held.

During the week of 13-20 November 2021, CTU organised eleven intensive week-long courses within the ATHENS programme, attended by 206 international students from leading European technical universities. 75% of the participants came from France, 13% from Belgium, 9% from Poland, as well as students from Italy, Germany, Portugal, Spain, Romania and Norway. Around 4 000 students participate in the programme each year. Despite the continuing restrictions on the free movement of people, this was the largest ATHENS event to date. Of course, CTU students also have the opportunity to participate in the ATHENS programme and travel to partner universities.

SUPPORT FOR THE INTERNATIONAL MOBILITY OF ACADEMIC AND NON-ACADEMIC STAFF

Foreign trips of academic and administrative staff have been a common part of the life of departments, faculties and other workplaces for at least two decades. These usually include participation in scientific conferences, various internships, research stays or work in international project teams and associations. The vast majority of these international mobilities are covered by decentralised project or regular operating funds of individual CTU units.

At the central level, mobility of academic and administrative staff for lecturing activities is mainly offered under the Erasmus+ programme. The number of teaching staff visits is not very high, as young university teachers in particular are busy with lectures in their departments and research work. Limited travel opportunities for most of 2021 have also had a negative impact on the number of teacher visits.

CTU supports short-term trips of students, doctoral students and postdocs abroad, especially participation in selected international scientific conferences. The prerequisite is an active contribution to the event and other activities in the interest of CTU, especially the preparation of new projects or future contractual bilateral cooperation, presentation of the University, etc. This category also includes trips of successful scientific and sports teams.

In 2021, a total of 57 student mobilities were financially supported in this area, including participants in a number of international sports games and professional competitions, with a total financial volume of CZK 280 million. The supported mobility also includes study stays within joint study programmes. The most used agreements include those with RWTH Aachen, TPU Tomsk and several French universities.

Another tool to support teacher visits is the school-wide IP project „Staff Mobility", which aims to send selected young teachers and researchers, especially from the Ph.D. and „postdoc" categories, to partner universities, especially those outside Europe, who can have a significant positive impact on further deepening cooperation with these institutions. Limited financial resources prevent more such mobilities.

The year 2021 was again significantly negatively affected by limited travel opportunities, which was reflected in the mobility of all types of academic and non-academic staff. The decline in their outward and inward travel was much more pronounced in absolute terms and percentage terms than for students.

Table 7.2 and a comparison with the corresponding data from 2020 or 2019 shows that there was a slight increase in all monitored types of mobility compared to the critical year 2020, both in the categories of outgoing students and teachers (overall for CTU). However, the numbers for 2019 could still not be reached. For outgoing students, an increase was recorded compared to 2020, with a positive impact from the number of virtual mobilities, which are slowly becoming part of students' daily lives. The number of international students as of 31 December 2021 decreased by only 1.8 per cent to 3,643. In 2021, travel restrictions were still in place in many months in which international events of all types take place in particular, which was reflected in the relatively low numbers of international trips by teaching, research and administrative staff (compared to 2019!). On a positive note, the fact that thanks to the possibilities of online communication, work on international projects did not stop and the significant reduction in mutual visits did not have a negative impact on their ongoing solutions.

INTEGRATION OF FOREIGN MEMBERS OF THE ACADEMIC COMMUNITY INTO THE LIFE OF THE UNIVERSITY

The deepening 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. On the basis of existing cooperation agreements with foreign partner institutions and according to the requirements of the faculties, foreign teachers are continuously approached and invited to lecture stays within the standard teaching at CTU for bachelor, master and doctoral study programmes. Financial support for these lecture stays is provided through the IP project „Staff Mobility", which has been a standard part of the activities for further deepening the internationalisation of life at CTU for eight years. The project is based on the priority of the CTU's long-term plan - „Increasing the number of foreign teachers", the main part of which is focused on the organisation of the arrival of foreign teachers, their stay at CTU and the payment of reasonable living expenses.

This project represents the beginning of permanent presence of foreign teachers in teaching in selected disciplines of the educational process at CTU. This will increase the attractiveness of teaching at CTU and may also mean increased interest of self-paying students in studying at individual faculties and thus obtain 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 STRENGTHENING INTERNATIONALISATION, INVOLVEMENT IN INTERNATIONAL PROJECTS

All activities in the area of internationalisation are based on the priorities of the Strategic Plan 2021+. The following overview summarises the implementation of the individual tasks. The network of international partners with whom CTU has concluded bilateral cooperation agreements continues to expand. Currently, cooperation in the area of student exchanges is underway with 115 universities from the top five hundred of the world's top-ranked universities according to the QS World University Rankings 2021. For cooperation in science and research, agreements have been concluded with 59 universities of this recognised quality ranking of higher education institutions. In 2021, CTU concluded four new agreements with foreign universities, two of which are again among the top 500 in the world according to the QS World University Rankings 2021. With another thirteen, extensions of existing cooperation agreements were signed, usually for another five years.

As a result of travel restrictions throughout most of 2021, the number of international students at individual faculties of CTU has decreased from 3,710 in 2020 to 3,643 in 2021, a year-on-year decrease of 1.8 percent. The share of foreign students, in 2021 from 94 countries from all continents, in the total number of CTU students is 20.73 percent.

However, the surprisingly low decline in the number of foreign students can also be seen from another angle. The decline in the number of incoming Erasmus+ students, the decrease in the number of exchange students from partner universities and the decline in the group of self-payers was offset by an increase in foreign students in Czech study programmes, especially citizens of the large countries of the former Soviet Union, Vietnam and Slovakia. These students mostly attended various Czech language courses starting in 2020, successfully completed them in May and June 2021, and subsequently passed the entrance exams to the CTU. Their total number in 2021 was 2,645, which represents 72.6 per cent of the total number of foreign students.

The best international students of all types of study programmes can be supported by an exceptional scholarship from extra-budgetary sources. In 2021, 39 students received this scholarship with a total amount of CZK 627 thousand. CTU as an active member of the T.I.M.E. association of prestigious universities signed the „International Doctorate Charter" in 2012, under which joint doctoral study programmes are continuously being prepared, especially between the member institutions of this association. Joint degree programmes (mostly for Master's degree programmes) have already been completed with the Technical University of Munich (FSv), École Centrale de Nantes (FSv), KTH-Royal Institute of Technology (Fac.of Civil Eng.), RWTH Aachen (Fac.of Civil Eng., Fac.of El. Eng. and FBME), Aalto University (Fac.of El. Eng.) and TPU Tomsk (Fac.of El. Eng.). CTU faculties have a total of 25 valid contracts for double degree programmes. In 2021, 381 self-funded students were studying at CTU, a decrease from the 440 at the end of 2020. This is clearly due to the continued deterioration in travel conditions in 2021, along with the lengthy visa process. For applicants from non-European countries in particular, this has meant considerable obstacles and many students have aborted their applications. It is to be hoped that the hint of improvement in travel from early 2022 will also be reflected in the influx of international student applicants, of which there were 621 in 2019.

The regular participation of CTU representatives in the three largest annual international education fairs - NAFSA in the USA, APAIE in Asia and EAIE in Europe - contributes to deepening existing inter-university cooperation and establishing new contacts. However, in 2021, as well as in 2020, these fairs have been cancelled. The staff of the Department of International Relations participated in the most important conferences at least through online presentations. Also in 2021, two „Orientation Weeks" were held for incoming international students, organized by members of the International Student Club with the organizational and financial support of the Department of International Relations of the Rector's Office. The „Orientation Week" is an important tool to help the school for newly arriving international students and is already taken for granted at CTU. Fortunately, it was possible to organize both events in the standard attendance form, which is much more effective than the online version. This has also had a positive impact on the overall number of international students at CTU. Most of the admitted applicants (mostly European and from former USSR countries) were able to arrive safely in Prague and adapt to the new conditions in time.

In cooperation with the International Student Club, two dozen language courses and several dozen extracurricular cultural, social and educational events were offered to international students. International students have the opportunity to participate in at least one student event per week each year, which significantly contributes to the popularization of the CTU campus as a pleasant place for study and extracurricular activities. Thanks to these activities, Prague has long been one of the world's top „international student-friendly" cities. Unfortunately, the year 2021 was again unfavourable in this area. The number of events dropped to about 40% of the usual number, many of them only taking place online. The International Student Club volunteers deserve a huge amount of credit for managing to maintain a positive mood in the international community on campus even in difficult conditions.

Project Study in Prague and Study at CTU - recruitment of foreign students

In 2014, on the initiative and under the leadership of the CTU, a joint project Study in Prague was prepared by five Prague public universities (Charles University, Czech Technical University in Prague CTU, Prague University of Economics and Business VŠE, University of Chemistry and Technology - UCT Prague, Czech University of Life Sciences CZU, joined in 2019 by the Academy of Performing Arts in Prague AMU and the Academy of Arts, Architecture and Design in Prague UMPRUM), aimed at promoting studies at these universities and attracting self-taught students from promising target areas of the world. It is aimed at promoting Prague as an ideal place to study. The promotional activities and those for current international students have not benefited from the unfavourable situation with regard to the global pandemic in the world, so they were still mostly held in a virtual environment or hybrid, such as the traditional Orientation Week, which took place both physically and online.

In terms of promotional events, CTU participated in online fairs and webinars across Latin America (Chile, Colombia, Peru, Mexico), Western Europe and an online fair in Japan. The English self-paced programmes were physically promoted at the Autumn Fair in Turkey and several weeks of intensive promotion of CTU was physically promoted at the world exhibition EXPO 2020 in Dubai, United Arab Emirates.

A new section on the Study in Prague website has been created to support the promotion of science and research, with examples of research projects. Clear information about creative activities is now available in one place.

The interest in doctoral programmes in English was supported by the reduction of fees for foreign students, which is based on the CTU Statute.

An important and significant step for the Study in Prague consortium was the creation of the special scholarship of Professor Miroslav Vlček and its subsequent inclusion in the Scholarship Regulations of the CTU in Prague. It is awarded across the universities involved in the project and is intended for a foreign student - self-funded students who, beyond their study obligations, contribute to spreading the reputation of the Czech Technical University in Prague, both in the Czech Republic and abroad, with the aim of greater internationalization of the university environment of public universities in Prague. The first joint ceremony for the awarding of the Professor Miroslav Vlček Scholarship took place on 3 December 2021 at the Prague Mayor's Residence. The awarded student from CTU was Kamila Babayeva from the Faculty of Electrical Engineering, now a graduate of the English program Electrical Engineering and Computer Science. She not only promoted her program at the Faculty of Electrical Engineering and CTU abroad, but was also selected for the scholarship for her research activities, which she presented abroad at scientific conferences, thus presenting Prague as a great city for study and CTU as an ideal university for applicants with a focus on research. She was also appreciated for the help she gave to other international students at CTU during difficult situations during their studies. Other universities involved in the Study in Prague consortium also selected active students.

Together, the concept of promotion through counsellors in international secondary schools was also set up. Traditionally, the presentation on social networks, YouTube platform or expats.cz portal is already a tradition.

Another equally important part of the strategy for recruiting foreign students is another project - Study at CTU, which is primarily dedicated to promoting study programmes at CTU through various tools. Another important element is the long-standing tradition of study ambassadors who share their experience with study applicants and actively participate in strengthening internationalisation, e.g. by participating in recruitment fairs in both face-to-face and virtual form.

The faculties use both the projects led by the Rectorate and their own projects for internationalisation. Strengthening the internationalisation of creative activities at the Faculty of Biomedical Engineering is addressed by the so-called Dean's Motivational Directive, which introduces a system of rewarding academic staff for submitting significant international projects, and also helps individual membership in the editorial boards of recognised international scientific journals and in major international professional and scientific societies. A good example with significant added value is the project of assistance to Cambodia in the field of neonatology within the framework of cooperation between the Czech Development Agency, General University Hospital in Prague and the Faculty of Biomedical Engineering.

The Klokner Institute is involved in international standardization (CEN and ISO) and in international research on materials engineering and structural reliability (RILEM, IABSE, FIB, WTA, JCSS). Experts from the Institute serve as members of editorial boards of prestigious international journals and on committees of international conferences. They participate in international projects and cooperate with prestigious research institutions and major industry partners. Together with the University of Stellenbosch (South Africa), they have started to prepare the International Probabilistic Workshop IPW conference in 2021, which has been postponed to September 2022 (Stellenbosch) due to the pandemic.

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

_“Involvement of CTU researchers in international cooperation with institutions of top reputation is becoming a common phenomenon. The interest of the commercial sector in cooperation is growing. CTU is increasingly taking the role of a research leader and innovator. This model is already quite common in the world, therefore it can be said that our university is gradually becoming an equal player in the international field.“

8_RESEARCH, DEVELOPMENT, ARTISTIC AND OTHER CREATIVE ACTIVITIES

MEASURES TO STRENGTHEN THE INTEGRATION OF CREATIVE AND EDUCATIONAL ACTIVITIES

The vision of CTU in Prague is to strengthen not only its place among the „top" technical universities in the Czech Republic, but also its position in the international field as a recognized research institution that supports and develops the talents and abilities of students and academic and other staff.
Therefore, the area of research, development, artistic and other creative activities is the basis for all faculties and higher education institutes of CTU and the results of mutual cooperation directly affect educational activities. The interconnection of scientific and educational activities occurs already at the level of undergraduate studies, and significantly at the level of doctoral or master's studies. Students are regularly involved in research at the CTU and are guided so that new personalities are continuously developed in the field of science. Most study programmes include courses focusing on scientific and creative activities. The professional growth of the scientific and teaching staff and supervisors is also supported. The prerequisite for doctoral studies is involvement in successful prestigious project teams, as well as opportunities for foreign stays in the context of scientific activities. Part-time employment in scientific projects or the acquisition of a special-purpose scholarship provide financial motivation. Analytical data on research, development, artistic and other creative activities are presented in the **Table Annex, Section 8**.

For the implementation of theoretical and experimental research, the Student Grant Competition (SGS), which is announced once a year in two areas, is an important support tool for doctoral students' research. The first 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 and technology in transport and communications, 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. In 2021, the support of 366 projects amounted to CZK 112 039 000. The second area are projects aimed at organising student scientific conferences, of which 104 were held in 2021, 48 of which were international. In 49 cases, the participants met in person. Participation in conferences is one of the incentives that the faculties apply in support of students in doctoral programmes.

INVOLVEMENT OF STUDENTS OF BACHELOR, MASTER AND FURTHER STUDY PROGRAMMES IN CREATIVE ACTIVITIES

Faculties and institutes of higher education approach the creative activity of students individually, based on their specific needs. Feedback, not only from students but also from external partners, is also an important element. Students use the results of their creative activities in their seminar, bachelor, diploma and dissertation works. The themes of the qualification theses are related to current issues in the field and reflect contemporary important social issues and needs. Students also participate in faculty research teams to solve partial tasks in the projects of the Student Grant Competition, Security Research, The Czech Science Foundation GA CR, the Technology Agency of the Czech Republic TA CR and other international programmes. An interesting feature of 2021 was the involvement of students of the Masaryk Institute of Advanced Studies 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 doctoral students, as well as master and bachelor students, is very beneficial for research. Industry internships are also encouraged as part of compulsory student projects, for example at the Faculty of Civil Engineering as part of the two-year international Master of Automotive Engineering programme, which is popular with both students and future employers. Students have the opportunity to split their studies between two European technical universities.

A significant achievement of the Faculty of Civil Engineering is the participation of the CTU CarTech team in international competitions in student formulas, where the latest technical solutions in this field are presented. Similarly, eForce FEE Prague Formula, a team of students from the Faculty of Electrical Engineering, participated in the international Formula Student competition. However, the Faculty of Civil Engineering also has other competitive student teams - for building rockets, aircraft and a virtual nuclear power plant. From the second semester onwards, the best students can participate in projects announced and supported by individual institutes, which aim to include interested students in their scientific research activities. For the topics of these projects, a separate portal has been set up on the faculty's website to facilitate orientation in this offer.

The Faculty of Architecture has a successful „learning by doing" teaching method, which primarily strengthens the connection between creative and educational activities. Some of the bachelor and diploma theses are commissioned as variant solutions of real public buildings, the design of which was originally created in the studios of the lecturers. This approach appreciated by the students, as a realistic result is evident, which increases overall motivation. Collaboration with the public and private sector is also ongoing. Students not only gain new knowledge, but also become familiar with the latest methods and technologies in the implementation of their own designs. Semester and final theses in the Design study programme are based on specific assignments from such renowned companies as RWE, Sapeli, Technistone, Galavito, Tesla, Meva, Meopta, Viadrus or Lasvit, as well as state institutions such as the Krkonoše National Park Administration.

The Faculty of Electrical Engineering and the Faculty of Nuclear and Physical Engineering provide first-class education within their study programmes, which are closely linked to research activities. Semester projects and theses are usually part of a specific research or development project in which students and academic staff collaborate. The thesis topics, not only at these faculties, are formulated with regard to current problems in the field and thus reflect issues addressed in the research and development activities of academic staff. Students are also involved in custom research projects, measurements, testing and expert consultations, especially for medical institutions and for companies producing and distributing medical technology.

The Faculty of Transportation Sciences has long been applying project-oriented teaching, 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. Talented students are involved in professional and scientific research activities, either as auxiliary researchers or through their direct participation in projects, grants and experiments. Through such oriented teaching, student projects lead to cooperation with a number of employers such as PUDIS a. s., the Railway Administration, the coordinator of public transport in the Liberec Region KORID LK, spol. s r.o., ROPID or the Institute of Planning and Development of the Capital City of Prague.

The team of Bachelor 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. This year's 32nd edition, held in Tatabánya, Hungary, was attended by 12 of our students.

Students are also involved in applied research through laboratories and specialized teams. They can also meet, for example, in the Faculty of Information Technology's Research Summer programme, where they work with their mentors on joint projects that result in scientific papers. A very important tool is the faculty portal Cooperation with Industry, through which students have the opportunity to get involved in solving specific problems assigned by partners from practice, both within the framework of regular educational activities (e.g. in the form of term papers) and outside of it.

The university institutes of CTU, such as the Klokner Institute, involve the 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. In 2021, its staff, including the students who carry out the professional part of their studies at the Institute of Experimental and Applied Physics, participated in particular in challenging 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 the detection of neutrinos - a possible carrier of dark matter in the Universe (the PICO experiment at the SNOLAB underground laboratory in Canada). They also worked on projects in nuclear physics (monitoring exotic nuclei in collaboration with ILL Grenoble and SÚJV Dubna) and space research (collaboration with ESA and NASA - pixel detectors on the PROBA-V satellite and on the International Space Station ISS, collaboration with the Japanese space agency JAXA - pixel detectors on the RIS-ESAT satellite, GROND experiment).

DEDICATED FUNDING FOR RESEARCH, DEVELOPMENT AND INNOVATION

In 2021, CTU had a total amount of special-purpose funds obtained from the state budget for research, development and innovation of CZK 1,725,588,491. Of this, CZK 1,524,621,715 was fully utilised to address grants and projects directly. The remaining part was transferred to co-researchers or contractors in accordance with the conditions of the projects and the relevant contracts. The share of projects implemented directly at CTU exceeded 88 percent. This is a slight increase compared to 2020, which confirms that CTU is able to implement many projects both independently and in cooperation with other expert teams.

SUPPORT FOR DOCTORAL STUDENTS AND WORKERS ON POST-DOCTORAL POSITIONS

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

The quality of the working environment was enhanced by the European Commission's HR Excellence in Research Award, which is associated with the commitment to adopt the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. In February 2021, the Rector's Order No. 2/2021 Recommended Practices for the Recruitment of Academic and Scientific Staff and in the Organisation of Selection Procedures for Senior Staff of the CTU came into force, which aims to reflect best practice recommendations in transparent procedures for the recruitment of academic and scientific staff. In the context of this order, a new RJOBS application is being developed to enable the publication of advertisements on Euraxess and on the CTU's official notice board, both in Czech and English. In this way too, CTU is targeting top quality researchers and scientists. In addition, the HR Award project prepared the Methodology for the Evaluation of Creative Workers, updated the Action Plan, the OTMR Strategy and the GEP Gender Equality Plan. A number of webinars, trainings and seminars were organised for doctoral students on the above-mentioned documents. Interim assessment was successfully conducted and CTU has defended the HR Award until 2024.

One of the important strategic goals of CTU is to support internationalisation in the field of science, which is implemented for example by obtaining individual grants such as ERC or Marie Skłodowska-Curie Actions of the European Commission. The selection of foreign partners and the way of cooperation with them usually grows directly from the activities, professional needs and interests of specific departments and staff. Taking into account the size and heterogeneity of CTU, it is planned to support and strengthen strategic areas corresponding to upcoming large projects from structural funds in the future, both at central and faculty level. These include, for example, the strategic projects Industrial Technology Centre, Innovative Centre for Transport Technologies, Aerospace Technologies in the Czech Republic, Light Technologies for 21st Century Energetics - LIGHTEN, UCEEB 20+, Research Centre for Artificial Intelligence and Machine Learning - AIML or AI European Centre of Excellence. CTU's participation in the European Universities Initiative network is also key. To ensure foreign stays of doctoral students, primarily special-purpose support programmes from external sources such as Erasmus+ are used. Funds are also obtained from EU operational programmes, programmes to support international cooperation and the Czech Republic's participation in international organisations, and from grant projects, including the popular and widely used internal Student Grant Competition. At the same time, the establishment and development of joint doctoral study programmes in the form of joint/double/multiple degrees with professionally close international institutions is also supported.

In 2021, emphasis was also placed on supporting the university's information infrastructure, e.g. the use of the Anlupa.cz application, which helps all those seeking funding for their research, experimental development and innovation projects, including international ones. In its digital development plans, CTU supports the principle of Open Access publishing of preprints, e.g. by using the university's D-Space repository or departmental repositories within arXiv.org.

The individual faculties and institutes of CTU strive to create suitable conditions for promising young pedagogical and scientific workers in postdoc positions. One of the most common forms is their direct involvement in scientific research projects in a number of national and international programmes, as well as in the already mentioned Student Grant Competition and mobility programmes. Other tools are also used to improve the conditions for postdoc positions, for example, the Faculty of Civil Engineering uses its own Initiation Fund to support and stabilize promising young researchers up to ten years after obtaining their Ph.D. degree and to encourage their activity in seeking to engage in international projects and establish international cooperation. Doctoral students also become active members of research teams and participate in domestic and international basic, applied and contract research projects. Their scientific research work is also supported by the Student Grant Competition, funded by funds earmarked for specific research. Doctoral students are also involved in contract research in cooperation with industrial partners, as is common, for example, at the Faculty of Civil Engineering. Financial resources in the form of donations from, for example, the Zvoníček Foundation are used.

At the Faculty of Information Technology, full-time doctoral students can receive direct financial support. The Dean of the Faculty of Electrical Engineering awards one-off special-purpose scholarships for exceptional results of creative or pedagogical activities or to support the study of foreigners in the Czech Republic. This faculty also cooperates very closely with institutes of the Academy of Sciences of the Czech Republic, resulting in the creation of several joint accredited courses for doctoral students. There is also active cooperation with other institutes (e.g. medical faculties and teaching hospitals) where doctoral students have the opportunity to carry out experimental activities.

Also in the Faculty of Biomedical Engineering, outstanding students have the opportunity to receive financial support from funds earmarked for specific research. In addition, the faculty's incentive guidelines were updated in 2021 to stimulate both staff, including postdocs, and doctoral students to achieve exceptional results, especially in publishing, but also in obtaining projects.

Across CTU, the activities of scientific and pedagogical staff are also supported by an internal competition of development projects.

A unique platform for the support and development of young talents is the eClub, which is led by Jan Šedivý at the Czech Institute of Informatics, Robotics and Cybernetics of the CTU (CIIRC) and from which the start-up AlquistAI emerged. The main goal is to support innovative ideas of students and help them to put their business plans into practice. Their work is supported by a scholarship from the CTU Media Lab Foundation, which involves partner industrial companies such as Certicon, Seznam.cz, Cybex, etc., sponsoring this scientific incubator. CIIRC also educates doctoral students and postdocs by organizing lectures by top experts from various fields.

Across CTU, deepening professional relations at the level of the state administration and with the industrial sector plays a very important role.

COLLABORATION WITH THE APPLICATION SPHERE IN THE CREATION AND TRANSFER OF INNOVATIONS, TECHNOLOGIES AND THEIR COMMERCIALIZATION

The study programmes at CTU in Prague are strongly focused on preparing students for their future careers in the sectors they have chosen and in which they are studying. According to their focus, the faculties are very closely linked with experts from the application sphere who participate in the formulation of interesting tasks rewarded by industrial partners. In order to cooperate with the manufacturing sector, the faculties use their own transfer departments, which are also a contact point for dealing with potential commercialisation for both students and employees. For most faculties or higher education institutes, the focus is on exploiting innovation potential for industry. The partners are involved in innovation brainstorming sessions where ideas for new products or applications are sought and defined and, ultimately, subsequent collaborations are established. The Faculties of Civil Engineering, Mechanical Engineering, Electrical Engineering, Transport and Information Technology cooperate most often with industrial partners, while the Faculty of Nuclear and Physical Engineering or Architecture cooperate most often with public administration or state enterprises, such as ČEZ, a. s. The Faculty of Biomedical Engineering involves important practitioners in the scientific council, and at the same time, compulsory professional practice of students is an important part of the cooperation. All faculties, the Masaryk Institute of Advanced Studies and the Klokner Institute invite external experts from the application sphere to their accredited study programmes and some of them take on the role of supervisors in doctoral studies. It is common across CTU to develop and deepen cooperation with industrial partners in the framework of contractual activities, testing and expert opinions.

CTU considers the protection of intellectual property and technology transfer to be very important. That is why the InQBay patent centre and incubator has been operating for many years. As part of the organisational change that took place in spring 2021, the issue of technology transfer is addressed by the Vice-Rector for Development and Strategy of CTU. Also in 2021, support for the reimbursement of the costs of intellectual property protection abroad was provided by the CTU Licensing Fund.

Total income from the transfer of knowledge and research results into practice reached CZK 333,117,866 in 2021, mainly from contract research, consulting and advisory services. This is an increase compared to last year, when the income amounted to almost 233 million CZK.

PRACTICAL EXAMPLES, PROMOTING HORIZONTAL MOBILITY

Great attention should be paid to the issue of cooperation with the application sphere in the creation and transfer of innovations and their commercialisation. Contractual arrangements for the transfer of copyright and a wide range of other professional services focused on the administration of the commercialisation of science and research results and the support of start-up companies are now handled by the Vice-Rector for Development and Strategy of CTU. For this purpose, the company CTU Tech, s.r.o. was also established in September 2021. The Patent Centre of the CTU Rectorate plays an important role in the eventual securing of patent protection in successful projects not only in Europe, but also in the countries of America, Asia and Africa.

Some faculties teach courses on fostering innovative entrepreneurship at both bachelor's and master's levels. For example, the research group Centre for Business Informatics at the Faculty of Information Technology educates students in business modeling and business time. A number of faculties benefit from long-standing contacts with partner foreign universities and research institutes, which often share the best examples for transferring science and development results into practice.

At the same time, it should be mentioned that the Faculty of Architecture, for example, is by the very nature of the architectural profession a multidisciplinary environment. Therefore, horizontal interdisciplinary mobility of students occurs both in the context of teaching and participation of students and academic staff in research, both basic (The Czech Science Foundation GA CR) and applied (The Technology Agency of the Czech Republic TA CR, the NAKI programme, contractual). This approach can be documented by research in the field of national and cultural identity (the Applied Research and Development of National and Cultural Identity Programme NAKI), in which academic staff and students of the Faculty of Architecture are also involved in cooperation with other parts of the CTU (e.g. Klokner Institute - Optimisation 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 or 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 or the aforementioned conservation. Also the UCEEB as an interdisciplinary department of CTU is a place of professional meeting and cooperation of researchers and students from different faculties, disciplines and departments. One of the main strategic goals of the Centre is to intensively deepen internal cooperation within CTU and external cooperation with domestic and foreign research institutions, academic entities and the industrial sector. UCEEB is actively creating a background for joint projects and student work, for which it has greater possibilities and prerequisites as a part of CTU without its own accredited study programmes. In 2021, the Centre handled a total of 88 grant awards and 153 contract research contracts. Another significant achievement was the permanent launch of the S.A.W.E.R. system in the Czech National Pavilion at EXPO 2020 in Dubai. The process of its technical integration and launch was completed a month before the opening of the gates of the World Expo to the public, which was postponed by a year due to the pandemic until 1 October 2021.

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

„The CTU Strategic Plan 2021+ determines the direction of all activities within the framework of individual priority objectives and measures with regard to their quality. It is important to base the development towards excellence on relevant data from all parts of the university. This data will help to ensure the correct functionality of the system for evaluating the quality of educational, creative and other related activities.“

9_QUALITY ASSURANCE AND EVALUATION OF IMPLEMENTED ACTIVITIES

The traditional values of CTU, confirmed 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 of quality achievement and control also corresponds to this.

CTU strives to meet and raise the standards of its main activities in accordance with the European concept of the level of university education and research and in accordance with its mission and set strategic goals. The system is based on the focus, medium-term orientation and the objectives of CTU and follows the development concept formulated in the CTU Strategic Plan 2021+ and annually updated CTU Strategic Development Plans.

The evaluation at CTU is based on data based on qualitative and quantitative information stored in the information system and validated by individual CTU units. An important source of data for the area of creative activity is also the application https://v3s.cvut.cz (hereinafter referred to as the „V3S application"), where, for example, the results of publishing, applied research and other activities of creative workers in the scientific community are recorded. The V3S Application is used to submit the results of the CTU to the Register of Information on Results (RIR), to experts for statistical analyses and for internal evaluations. Further information in the area of 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.

MAIN ACTIVITIES IN THE CONTEXT OF THE LONG-TERM STRATEGY

CTU provides students with quality education according to the focus of individual faculties so that they can apply 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 increase its position in international rankings.

Gradually, the individual elements of the existing System are being adjusted and codified so that the impact on the level of all activities at CTU as a whole reaches a good level. This can be proved by the position of CTU in the world university rankings, taking into account the low level of the state contribution compared to comparable world universities. In the international QS World University Ranking, CTU is consistently ranked as one of the best domestic and regional universities. In the QS 2022 World University Ranking, CTU is ranked 403rd in the world, the highest position it has ever achieved. Within the Czech Republic, CTU ranks third, after the University of Chemical Technology in Prague and Charles University. In the „Employer Reputation" indicator, CTU has the highest score in the country and is ranked 12th in the „Emerging Europe and Central Asia" region. In the QS sectoral ranking, CTU is ranked 221st in Engineering and Technology, 151st-200th in Civil Engineering and Construction, 201st-250th in Physics and Astronomy, Mechanical Engineering, Electrical and Electronic Engineering and Computer Science and Information Systems, and 254th in Natural Sciences.

One of the key activities ensuring the implementation of CTU's long-term strategy is obtaining institutional accreditation. In 2021, an application has been submitted to the National Accreditation Office for Higher Education for institutional accreditation in the following areas of education. On the basis of this agreement, CTU will be authorized to create, approve and subsequently implement study programs in all the above mentioned fields of education and all higher education levels (Bc., Eng., Ph.D.). During the preparation of the file for institutional accreditation, the established institutional environment with the whole system of quality assessment of study programmes was discussed for a very long time, new internal standards were created and existing ones were modified, which clearly define and unify the evaluation process.

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 towards the scientific council and the academic senate of the faculty as well as secondary responsibility towards 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, respectively for creative activities and doctoral studies.

The study programmes are accredited and continuously updated to meet the latest requirements for the professional profiles of technically educated university students at national and international level. There is a growing demand for CTU Prague graduates on the labour market. The vast majority of them find employment in the fields they have studied. For general programmes, employment is even broader and testifies to the quality of the education provided.

For the evaluation of the quality of educational activities, all faculties use the university-wide electronic student survey of CTU. Within this application, faculties can define their own specific requirements for the collection and evaluation of survey ballots. Students have the possibility to answer anonymously and to add verbal comments to the grade evaluation.

Continuous improvement of the quality of teaching and creative activities and their evaluation according to European standards with emphasis on the requirement of excellence to maintain and increase international competitiveness is also the aim of the new Career Regulations, which became effective on 1 April 2021 and which regulate the status and qualification procedure of academic and other staff involved in educational and creative activities.

On 15 February 2021, a new internal regulation entitled Recommended Procedures for the Recruitment of Academic and Scientific Staff and for the Organisation of Selection Procedures for Senior Staff at CTU came into force, which complemented the new Career Regulations.

An important role is also played by the gradual digitalization of activities and operations, which not only brings significant simplification of administrative processes, but also, as a result, an increase in the quality of services provided.

The mirror set by the university will fundamentally affect its perception as such, so it is necessary to focus on the CTU as a whole, not just on sub-areas, when assessing quality. Even during 2021, when distance education was not only taking place as a result of the pandemic, it was not always entirely easy to assess this trend.

DOCTORAL STUDIES

Educational and creative activities in doctoral studies are based on contemporary international knowledge. CTU prefers and supports that all outputs of creative activities of doctoral students (professional studies, publications, dissertations, etc.) are realized 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 included in the WoS or SCOPUS citation databases. Doctoral students publish significant results of their dissertations in the form of articles published in impacted journals. In the case of applied research, apart from publications, patents and their licensed use in application and commercial practice are considered the most important.

The quality and content of dissertation topic proposals are evaluated by the doctoral programme boards, which approve them. The assessment takes into account, among other things, whether the supervisor has shown quality publication results related to the topic in recent years. The supervisor is responsible for the quality of the dissertation.

CREATIVE ACTIVITY

The quality of creative activity is evaluated on the basis of key criteria, which are publications and results of applied research in granted utility models and inventions listed in the V3S database. The results of research and other creative activities, including contract research, are also presented here. The nature of the results varies according to the field of study at individual CTU units. For technically oriented faculties and higher education institutes, one of the decisive criteria for the quality of creative results is publication in impacted journals, the best in their field, i.e. in Q1 (i.e. journals belonging to the top 25 percent of the most cited in their field). The V3S application also allows analytical comparison of the performance of specific staff, departments/institutes and faculties. These analyses are used by senior managers to assess the quality of creative activity, which in turn feeds into institutional support for excellence and support for junior staff.

In the area of creative activities, the proportion of foreign dissertation opponents is also increasing and support for the involvement of high-quality foreign postdocs (with a minimum of H-2) in research teams is being provided. Academic staff are motivated to undertake at least six-month stays at major foreign institutions.

RELATED ACTIVITIES

The expert institutes of individual parts of CTU provide forensic expert activities in the fields for which they are appointed. All activities are documented in expert journals.

EVALUATION 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 and diverse focus of individual faculties and university institutes. Even while respecting this autonomy in educational and creative activities, the quality has gradually improved, even in international comparison, in which CTU has long been ranked the highest among Czech technical universities in individual technical fields. However, CTU aims to become an excellent educational and research institution and to rank among the world's top universities.

Support in the area of development of standards for quality assurance of educational activities in various forms of study is one of the important topics highlighted in the Centralised Development Programme of the Ministry of Education and Science, where the project C19-2021 Development of standards for quality assurance of educational activities for various forms of study with regard to current methods and experience with distance education has been implemented. CTU was involved in this project as a co-lead university and the output was a concrete proposal of quality standards for educational activities for different forms of study and forms of teaching, including a comparative analysis of internal regulations and methodologies of the universities involved in the project and a review of European and foreign approaches.

INTERNAL EVALUATION BOARD

The quality management system at CTU is coordinated by the Council for Internal Evaluation (CIE). This academic self-governing body manages the internal evaluation of the quality of educational, creative and related activities. The CIE approves the draft rules of the quality assurance system for all activities, prepares the internal evaluation report on these activities and its amendments and carries out other related activities leading to ensuring the quality level of all processes at CTU. The Rector is the chairman of the CIE.

At the end of March 2021, the Research, Development and Innovation Council approved the results of the so-called scaling-up of all research organisations according to the 2017+ Methodology. Research organisations were divided into four groups according to the quality of their selected R&D results on a national scale. CTU in Prague was evaluated in the group of technical universities and received the highest grade A.

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10_NATIONAL AND INTERNATIONAL EXCELLENCE OF THE UNIVERSITY

NATIONAL AND INTERNATIONAL RESEARCH, DEVELOPMENT AND CREATIVE ACTIVITIES

CTU in Prague is undoubtedly one of the universities that meet the criteria of international excellence. It continuously demonstrates its competitiveness in education, science, technology, engineering and creative activities by its results, not only on a national scale, but also abroad. It focuses on and promotes interdisciplinary internationalisation, openness and diversity of opinion. It continuously builds and develops prestigious research laboratories, testing facilities and centres of excellence in order to achieve international credibility. Research teams from CTU are increasingly becoming important and indispensable partners in projects with global participation, and their achievements have been, are and will continue to be recognised in both national and international competitions. The strategic goal of CTU for the next period is to maintain and strengthen the credit of a renowned university with the attribute of an international centre of excellence in science, creative activity and education and to contribute in the application sphere to solving the challenges of global society and improving the quality of life.

In the long term, CTU will focus on cooperation with foreign scientific and industrial partners, expand the offer of foreign language study programmes, support the international orientation of students and academic staff and expand the academic and scientific community with internationally recognised experts.

Excellence is a key concept of the CTU Strategic Plan 2021+ and is reflected in the measures set and specific tools for their implementation. Excellence is significantly influenced by direct participation in international projects and cooperation with top international experts and specialists.

In the framework of the „European Universities" project EuroTeQ Engineering University CTU successfully cooperates with five other renowned European universities. In 2021, this project is fully launched, aiming to realize the vision of the European Universities Initiative and the European Education Area in an ecosystem of leading engineering universities with the financial support of Erasmus+. The project is coordinated by the Technical University of Munich, the other partners are the Technical University of Denmark, the Technical University of Eindhoven, the École Polytechnique in Paris and the Tallinn University of Technology. EuroTeQ focuses on creating joint training programmes in response to the changing needs of society. In the winter semester 2021, our students have already enrolled in courses at the partner universities and vice versa. In addition, the EuroTeQ Course Catalogue or the EuroTeQ Teaching Fund activity was successfully implemented in 2021, where our lecturers searched for and tested new teaching methods, also in direct cooperation with the Technical University of Munich. Another important goal of the project is to connect the university environment with national and European industry. In 2021, the EuroTeQ Collider programme was created, involving a total of 50 industrial partners, including nine Czech ones - Škoda Auto, Continental Automotive, Pure Storage, CGI, NET4GAS, prg. ai, GasNet and Pražská energetika. The event will take place for the first time in the spring of 2022. Students are not only participating in the project as participants in joint courses, but are also part of the organizing team. The current theme for student-industry collaboration is „Leave no waste behind", and four areas have been selected for solution at CTU, namely Reachable charging infrastructure, Flexibility in energy networks, PV on every rooftop and Detection management of gas leakages.

In 2021, despite the difficulties associated with the ongoing pandemic, collaboration with other international universities and industrial partners continued. Relationships were maintained mainly in virtual form. The global challenges associated with the need to find quick solutions in many cases helped to make the excellence of CTU's scientific teams and its technical focus more visible. The participation of students, doctoral students and researchers in international conferences and research projects was extremely important, maintaining and improving the established cooperation. Even „thanks" to the persistent

pandemic, the teams were able to use and find new applications of the latest technologies in their work, from digitalisation to 3D printing, cybernetics, robotics, artificial intelligence, nanotechnology and so on.

In 2021, the CTU has confirmed its ability to adapt to the changed conditions and continue its projects, while at the same time significantly strengthening the fight against the SARS-CoV-S coronavirus, also on an international scale.

November 2021 marks one year since the first patient was successfully connected to the CoroVent pulmonary ventilator, which was developed by a team led by Professor Karel Roubik from the Faculty of Biomedical Engineering in March 2020 and certified by the US Food and Drug Administration (FDA EUA - Emergency Use Authorization).

Despite the pandemic situation, virtually all faculties and institutes of CTU have demonstrated their ability to continue cooperation on international projects. An example of excellent collaborative research with international overlap is the cooperation of the Faculty of Mechanical Engineering with the American GE Aviation, the world's largest manufacturer of aircraft engines.

A significant achievement is the first flight of the Catalyst engine on the Beechcraft King Air 350 test aircraft, which took off and landed again at Berlin Schönefeld Airport on 30 September 2021. Flight experiments will continue at the state-of-the-art Aerospace Research Centre at the Faculty of Mechanical Engineering of the Czech Technical University in Prague.

The award for the best paper of the 23rd edition of the prestigious Werner von Siemens Prize on Industry 4.0 went to Ing. Megi Mejdrechová from the Faculty of Mechanical Engineering, who in her master thesis described an original method of robotization of small-scale industrial painting. In the Smart Infrastructure and Energy category, the award went to Ing. Lukáš Janota from the Faculty of Electrical Engineering, who in his thesis focused on the possibilities of future energy use of discarded battery cells from electric vehicles. Dean of the Faculty of Information Technology doc. RNDr. Ing. Marcel Jiřina, Ph.D., who was part of the University's crisis management team, received a medal from the hands of the Rector of CTU for his personal work during the pandemic.

Ing. Martin Doškář, Ph.D., from the Department of Mechanics, Faculty of Civil Engineering, received the Rector's award for outstanding doctoral thesis „Wang tiling for modelling of heterogeneous materials" in February 2021.

Students of the Faculty of Information Technology Tomáš Stanovčák, Jan Šafařík and Tomáš Bašta were awarded for the chatbot on the coronavirus website www.koronavirus24.cz. Martin Půlpitel was awarded for his independent review for the mobile application eRouška. Our students Natália Bodnárová from the Faculty of Architecture, Vojtěch Petrásek from the Faculty of Electrical Engineering and Ľuboš Repka from the Faculty of Information Technology, together with Vasil Kostin, a student from the 3rd Faculty of Medicine, took the first place in the Hack for Healthcare hackathon and will be working with the Geneva-based organisation Doctors Without Borders. The competition took place from 26-28 November in Zurich, Switzerland, and saw teams of students tackle the use of 3D printing in healthcare and aid in developing countries. Among the judges were representatives from the Red Cross and Doctors Without Borders in Geneva, who set the participants the challenge of 3D printed insulin delivery units - that is, using 3D printing to solve insulin delivery in developing countries. Doctors Without Borders has been tackling this problem for several years, but the Czech team of students managed to design an innovative way to produce insulin pens cheaply within days.

Forbes magazine's prestigious 30 under 30 ranking, i.e. 30 talented, capable and successful people under the age of 30, also selected a student of the Faculty of Nuclear and Physical Engineering at the Czech Technical University in Prague. This year it is Peter Hauschwitz from the Department of Physical Electronics, who is finishing his doctoral studies and working at the HiLASE centre.

In August 2021, Amazon announced the winner of the fourth annual Alexa Prize Social Bot Grand Challenge. In a competition between leading American and international universities, the winner was Alquist, a conversational robot created by CTU students under the direction of Jan Šedivý from CTU's CIIRC. This edition was also affected by the coronavirus pandemic and was held virtually. The course of the competition and the winners were presented by Amazon at least via video.

One of the three winners of the Antonín Svoboda Awards, announced by the Czech Society for Cybernetics and Informatics (CSCI), was Jitka Kostková, a graduate of FJFE. The expert jury was impressed by her dissertation Advanced Moment Invariants for Pattern Matching, which she defended at the end of 2020 at the Department of Mathematics of the Faculty of Nuclear Sciences and Physical Engineering (FJFI).

Students of the Faculty of Civil Engineering Kristýna Klůsová and Jiří Petrželka won the international round of the Saint Gobain student competition in Paris, where they received the „student prize", awarded on the basis of a vote of fifty-eight globally best student teams, which agreed overwhelmingly on the quality of their work. Their project was the revitalisation of an industrial zone in Saint-Denis, France.

Martin Schäfer, a graduate of the Department of Physics at the FJFE and a member of the Institute of Nuclear Physics of the Czech Academy of Sciences, won the second prize of this year's Henri Becquerel Prize for Nuclear Research. Ondřej Novák from the Department of Nuclear Reactors of the Faculty of Nuclear Sciences and Physical Engineeringcame third. The prizes awarded by the French Embassy in the Czech Republic were presented by Jean-Marie Lehn, Nobel Prize winner in Chemistry, Pavel Doleček, Deputy Minister for Higher Education, Science and Research (MŠMT), and French Ambassador Alexis Dutertre.

Ing. Romana Kvasničková, a doctoral student at the Department of Mathematics of the FJFI, was awarded the Stanislav Hanzel Prize. The laureates received the award from the hands of the Rector of CTU in Prague and the Chairman of the Board of the CTU Foundation Stanislav Hanzel on 23 November 2021 in the Bethlehem Chapel. Bc. Adam Babuljak (FCE), Bc. Jan Šmaus (FME), Vojtěch Michal (FEL), Ing. Arch. Markéta Gebrian (FA), Ing. Přemysl Toman (FT), Bc. Branislav Gašpar (FBME), Ing. Marek Suchánek (FIT) and Bc. Hynek Salák from MÚVS.

Student of the Faculty of Civil Engineering Ing. Tomáš Dejmek won the Josef Hlávka Award, which is intended for

talented students up to 33 years of age who have demonstrated exceptional ability and creative thinking in their field. In addition, in November 2021, Ing. Václav Voráček, Faculty of Electrical Engineering, Ing. Ondřej Ficker, Faculty of Nuclear and Physical Engineering, Ing. arch. Jan Tomandl, Faculty of Architecture, Petr Štěpánek, Faculty of Biomedical Engineering and Ing. arch. Bc. Aneta Závodná, Masaryk Institute of Advanced Studies. Ing. Antonín Krpenský, doctoral student at the Department of Physics, Faculty of Electrical Engineering, was also awarded the Electrical Engineering Prize of Prof. Ing. Daniel Mayer, DrSc., which is awarded to the best student of the electrical engineering faculties of the Czech Republic.

Bc. Jiří Petrželka, a graduate of the Architecture and Civil Engineering program, won the Dean's Award of the Faculty of Civil Engineering of the CTU in Prague in the national competition ČEEP 2019 for his work Czech Self-Sufficient House 2019.

Despite the continuing obstacles associated with the spread of the coronavirus, our students collected sports awards - Vít Přindiš, a student of the Masaryk Institute of Advanced Studies, won the European Water Slalom Championship for the second time in his career.

Vít Hlaváč, a student of the Faculty of Biomedical Engineering, became the Czech champion in the 50 km and 20 km walk. The Czech championship in the 50 km race walk was held in March and the 20 km race walk in April 2021.

Doctoral student of Civil Emergency Preparedness Faculty of Biomedical Engineering (FBME) Ing. Karel Dušek took 3rd place at the World Cup in off-road triathlon in Belgium. On August 14, he won 2nd place at the Czech Field Triathlon Championships in Prague, and on August 21, he finished 10th at the European Field Triathlon Championships.

At the Czech Academic Games in Olomouc in September 2021, FBME students won the following medals as part of the CTU team. Silver medals: Zuzana Cymbálová - athletics, 400 m hurdles, Veronika Slavíková - athletics, shot put, Zuzana Cymbálová - relay, and Lenka Čechová - athletics 4 x 400 m. Bronze medals were then won by: Zuzana Cymbálová - athletics, high jump, and Simona Živčáková - judo, 78 kg.

On 18 September 2021, the 23rd edition of the traditional mountain bike race Author Prague Fifty, which is intended for the general public, took place, of which the CTU is a partner. FBME student Karel Dušek took 2nd place in the fifty-kilometer race in his category of men (1991-2002) with a time of 01:39:25.1. In total, out of almost 1,000 competitors, he finished in 6th place.

Aneta Pokorná, a 2nd year student of Physiotherapy at FBME, won silver in the U21 category in judo at the World Championships in Abu Dhabi in November 2021. On 5 December, the World Championship in Off-Road Triathlon was held in Hawaii, with 350 competitors, 36 in the professional category. Karel Dušek, a student of the doctoral program in Civil Emergency Preparedness, took a great 12th place.

Anežka Paloudová, a student of the Faculty of Civil Engineering, became the world vice-champion in speed canoeing under 23. Three of our students - Anežka Paloudová on the 5th place, Emma Maštalířová on the 13th place and Jan Trafina on the 17th place - were ranked the best CTU athletes in 2021.

INTERNATIONAL EVALUATION OF THE UNIVERSITY, FOREIGN ACCREDITATION

CTU in Prague has been participating in the international QS World University Ranking for several years, where it was ranked 403rd in 2021, improving its ranking by nine places compared to the previous year. This is the best ranking that CTU has ever achieved in this ranking and makes it one of the top 31 per cent of the world's top-ranked universities. The reason for the rise is mainly due to the quality work of students and academics and their increasingly active involvement in research and innovation activities, which was reflected in the strengthening of the ranking in the area of academic reputation and citation. Despite a shift from 5.6 to 7.5 (out of 100), citations per staff member remain CTU's weakest indicator and the area most in need of improvement.

The QS World University Ranking is one of the most prestigious international ranking of universities. The ranking is based on six criteria: academic reputation, reputation among employers, the ratio between the number of academic staff and students, the number of published citations by academic staff, the proportion of international academics and the proportion of international students.

High-quality basic, applied and innovative research are at the heart of CTU's shift in international reputation, along with efforts to improve the quality of studies and expand international cooperation in teaching and research and student and academic staff exchanges. The above criteria are subject to regular internal monitoring across CTU, and therefore the table part of the Annual Report is extended to include this evaluation.

Another of the respected university rankings is The Times Higher Education World University Ranking. CTU is ranked between 1 000 and 1 200 in this year's ranking. It is strongest in the „International Outlook" category, where it achieved a ranking of 57.3/100, among the top 33 percent of universities, and „Industry Income" (ranking 49.1/100). There was also a slight improvement in the „Teaching" category.

The rankings are based on 13 indicators, with two of the indicators focusing on citations and publications together accounting for 60 per cent of the overall ranking. A more detailed analysis shows that every year the position of CTU in this ranking is falling, despite the increasing values of the indicators monitored. The reason for this is slower growth compared to other universities, while at the same time there is an overall increase in the number of ranked schools. It should also be pointed out that THE weighs more the categories in which CTU performs poorly (i. e., 30 percent for citations, while in QS citations count for 20 percent), and QS weighs more the categories in which CTU performs well (i. e., 10 percent for the categories of international staff and students, while in THE these categories account for only 5 percent). In any case, the overall downward trend needs to be reversed, especially by finding an effective tool for improvement, here too especially in the area of citations.

Citations are one of the important indicators of both international rankings and a weakness of CTU, despite the fact that the absolute number of citations has been increasing over the last five years. CTU and its units are trying to continuously

reflect the suggestions of the international evaluation in their educational and creative activities. They are actively working to improve the conditions for study and research in order to subsequently consolidate and improve their positions in these evaluations and to strengthen the competitiveness of the CTU brand in both the European and international context.

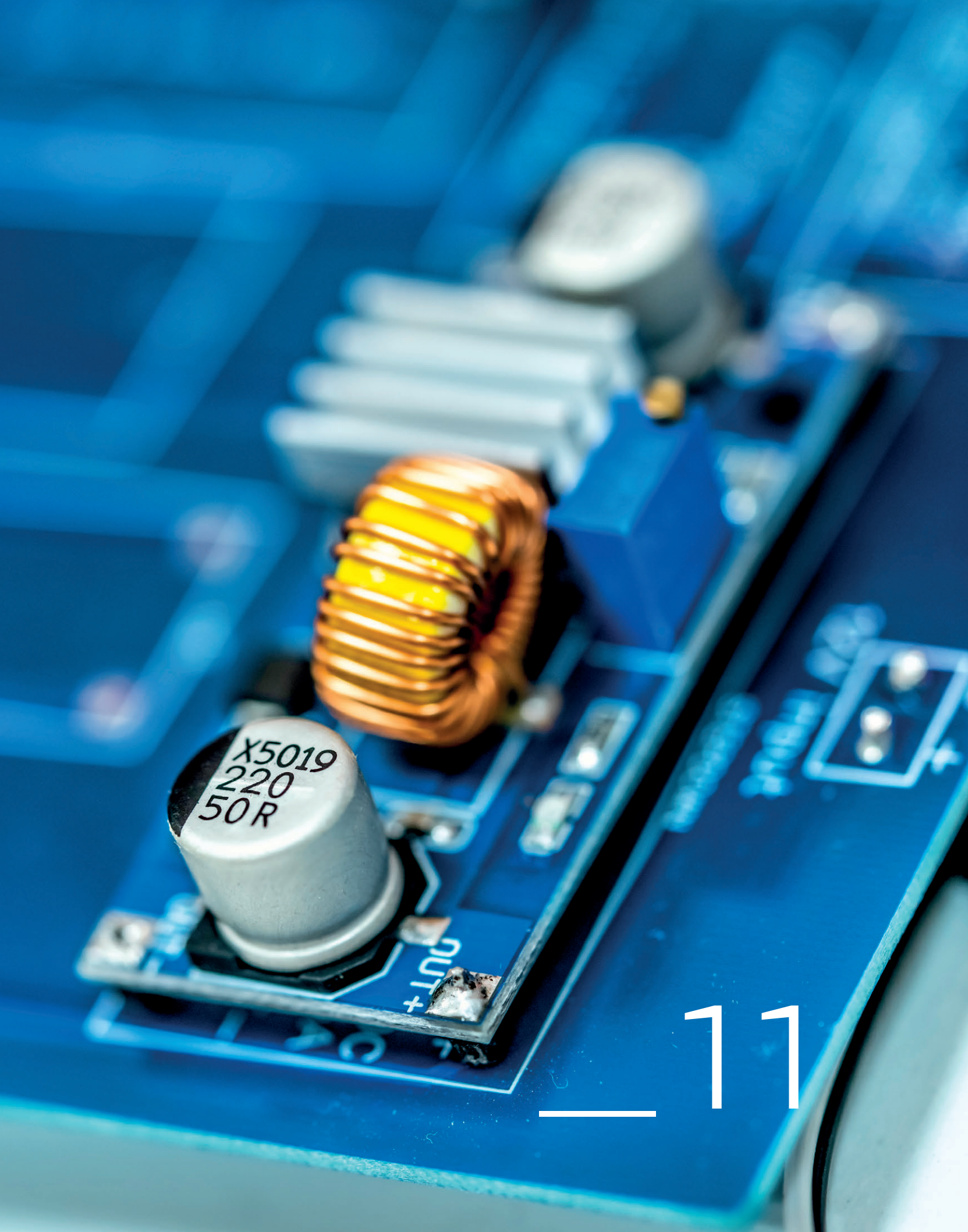
Compared to 2020, the number of publications in 2021 increased by 3.2 per cent to 3,976 publications and the number of citations increased by 6.6 per cent to 26,993 citations (including citations obtained in 2021 from publications published in the previous six years 2015-2021, according to the ranking methodology). The increase can be explained by an increase in the number of academics, researchers and students, as well as more successful publications. When weighting citations for the last five years according to the ranking methodology (weighting 30 percent for the most recent year and decreasing by 5 percent for each previous year), the average annual number of citations in 2021 is 24,245, an improvement over the same result last year, 22,177, an impressive improvement of more than 9 percent. Using a five-year weighted score to account for the QS category „Citations per Staff", which is an interesting indicator that demonstrates the performance and productivity of individual faculties/departments of CTU, we obtain a score of 9.1 citations per academic/scholar, up from 8.5 in 2020.

The Faculty of Nuclear Sciences and Physical Engineering is well above this average among faculties, with 29.4 citations per employee (again, a weighted average over the last 5 years). Among university institutes, the Institute of Experimental and Applied Physics achieved an average of 113 citations per staff member.

In 2021, CTU received 1,671 more citations than in 2020, with 50 percent of this increase coming fromInstitute of Experimental and Applied Physics, which increased the number of citations in 2021 by 849 compared to 2020. In absolute terms, the Faculty of Nuclear Sciences and Physical Engineering received the most citations in 2021 (8,497), followed by the Institute of Experimental and Applied Physics (7,070).

The Times Higher Education measures the average school-wide citation rate per publication (weighted over the last five years) at 6.0 in 2021. The Faculty of Architecture and the Klokner Institute performed best in this area, with a score of 10.8. The Institute Experimental and Applied Physics (9.1), the Faculty of Mechanical Engineering (7.2) and the Faculty of Transportation Sciences (6.3) were also above the university average. The source for the calculation of these indicators is the database of the Central Library of CTU. Furthermore, it should be noted that the evaluation of international rankings for a given year is based on data from previous years, and therefore the outputs in the table part are processed in this chosen form.

In the category of the ratio of foreign staff, there is a distinct division between faculties that are well above the average of CTU (Faculty of Electrical Engineering, Faculty of Information Technology, Faculty of Nuclear Sciences and Physical Engineering) and those that are significantly below the average (Faculty of Civil Engineering, Faculty of Mechanical Engineering, Faculty of Architecture, Faculty of Transportation Sciences, Faculty of Biomedical Engineering). There is more balance in the proportion of international students among the faculties, and in this category the Faculty of Information Technology (30%), the Faculty of Electrical Engineering (28%) and the Faculty of Architecture (27%) lead, while the Faculty of Biomedical Engineering has the lowest internationalisation of students (8%). In terms of students per academic/researcher, Faculty of Nuclear Sciences and Physical Engineering leads with 4.3 students per staff member, followed by the Faculty of Transportation Sciences (6.7), the Faculty of Electrical Engineering (6.2) and the Faculty of Mechanical Engineering (6.1). The most popular are the Faculty of Information Technology (17.6), the Faculty of Architecture (13.3) and the Faculty of Biomedical Engineering (13.1).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Ing. Lucie Orgoníková / Chancellor

_"The year 2021 was also significantly affected by the COVID-19 pandemic, and CTU has been instrumental in addressing the critical situations caused by the coronavirus throughout society with its proposals. What I am really pleased about, however, is the fact that the university has not let up in other areas. Our University Primary and Nursery School Lvíčata, has grown in space and capacity. We have held cultural events online, and all sporting activities have returned in full force in the second half of the year. Our faculties and other units were active across areas and regions. CTU students assisted in tornado-hit villages in South Moravia, students interned with the Prague Rescue Service, mapping of historic interiors with robotic drones took place in locations across the country, we validated methodologies for optimizing maintenance programs for power plant generating units... We received national and interstate recognition for many activities. But as the classic says - it is not important to win, but to participate. And there is no doubt about the active contribution of CTU to the national society. I thank all my colleagues for that."

11 _ THE THIRD ROLE OF THE UNIVERSITY

TRANSFER OF KNOWLEDGE INTO PRACTICE

The main task of CTU faculties and institutes within the third role is mainly the transfer of research results into practical life. In this area, CTU is an important and indispensable partner for society in terms of the close link between its technological focus and the application sphere. Such cooperation is mutually beneficial - the university's scientific teams are involved in industrial projects, and experts from industry help students understand the practice.

Even in 2021, CTU has demonstrated its excellence and uniqueness in many domains and by concrete steps. It continued its activities in the fight against the pandemic, but did not forget its long-term goals in areas not directly related to it.

Knowledge transfer between academia and industry has played an important role at the CIIRC for a long time, e.g. within the National Centre for Industry 4.0 or the RICAIP Centre of Excellence. Experiments take place within the unique Tesbed for Industry 4.0 with the newly implemented first 4G/5G private network combination in the Czech Republic. The CIIRC is also home to joint laboratories with Škoda Auto, Eaton or Rockwell Automation, where successful student start-ups are incubated through its own eClub accelerator. One example is the AIquistAI team, which has already won numerous awards for its chatbot, even winning the prestigious international Amazon Alexa Prize in 2021. The CIIRC is a major institution constantly developing the topics of Industry 4.0, artificial intelligence, smart cities, health and energy, with an emphasis on their rapid application in practice.

The Faculty of Information Technology (FIT) also excels in the transfer of technology 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. FIT participates in the activities of the prg.ai initiative, together with Charles University, the Czech Academy of Sciences and the City of Prague. Its main goal is to promote cutting-edge science and excellent research in the field of artificial intelligence. For example, FIT scientists are working with Meteopress on how to use AI to speed up and improve the accuracy of weather forecasts.

Thanks to its experts, CTU is an excellent and recognized workplace. In 2021, the first stage of the AI European Centre of Excellence project, which CTU initiated and in which it participates in cooperation with Charles University and Masaryk University in Brno in the role of coordinator, took place. Within this project, a platform for international cooperation is being created and a transfer policy is being set up with regard to the socio-economic impact in the field of artificial intelligence.

However, other achievements in the field of science and research were also significant. In June 2021, scientists from the Klokner Institute together with colleagues from the Technical University of Liberec presented a functional device for 3D printing from cement mixtures. The University of Liberec supplied the print head and test printing equipment for the project. It is also developing a robotic arm that will carry the next generation of print heads. Specialists from the concrete laboratory of the Klokner Institute are working on further development of cement composites ideal for printing. The Klokner Institute is also piloting the use of methodologies for optimizing maintenance programs for power plant generating units in 2021 in cooperation with ČEZ, a. s. The application of the methodologies can lead to savings of up to tens of millions of crowns per year.

The cooperation of the Faculty of Architecture with the public and private sector has long been mutually beneficial and directly transforms public space. The successful cooperation with the Krkonoše Mountains National Park Administration, which resulted in the creation of six unique shelters on the ridges of the Krkonoše Mountains, replacing the existing tourist shelters, which were often in a desolate state, was continued by the Faculty in 2021. Students of the Seho-Poláček studio designed and built an original lookout tower „Oko" above Nebušice, which serves as a viewing platform and an unconventional swing.

In spring, the Faculty of Biomedical Engineering (FBME) of CTU was approached by the Emergency Medical Service of the City of Prague with an offer of cooperation in the form of a professional internship for students of the 2nd and 3rd years of the Bachelor's degree programme in Emergency Medical Services. They became a part of the call-out group in day shifts, taking the place of the third member of the team, as it is usually the case with standard internships. The team of FBME scientists, together with colleagues from the National Centre for Tissues and Cells, IKEM, and the Institute of Physiology of the Czech Academy of Sciences (CAS), participated in the development and production of antithrombogenic biological vascular substitutes based on decellularised carriers. The Faculty has also joined the National Programme for Population Recovery of the Czech Republic, which will not only significantly help to immunise the population of the Czech Republic, but will also bring much-needed savings to the state budget, in the order of tens of billions per year. In June 2021, the first measurements of physical activity within the framework of this programme were carried out with the contribution of the Telemonitoring research team during a sports day at the Aritma complex in Prague 6. Ing. Roman Říha and the FBME team deal with streamlining the use of automated external defibrillators (AEDs) and the first responder system in the Czech Republic.

The results of this activity were discussed on 10 June 2021 by the Subcommittee on Emergency Medical Services of the Chamber of Deputies of the Parliament of the Czech Republic, which subsequently asked the Ministry of Health to promote the first responder system among the public as much as possible. FBME has agreed with Krajská zdravotní, a. s. on mutual cooperation in the field of education, professional and scientific research. This will mainly concern data collection and evaluation using ICM+ software and work with international clinical data bases, including the creation of databases of patients after intracranial trauma. At the end of June, the first three students of the Emergency Planning and Management major volunteered to help with the tornado damage relief in the village of Hrušky near Breclav.

For several years, FBME has been cooperating with the Karlovy Vary Region Emergency Medical Service, p. o., in the training of future paramedics, to whom the Emergency Medical Service provides the opportunity to practice at the call bases and the medical operations centre. In October 2021, a Memorandum of Cooperation was signed to extend the cooperation in the field of research. The Faculty also has a long-term partnership with BTL Medical Technologies, s. r. o. Dr. Ondřej Fišer, Ing. Tomáš Pokorný and doc. David Vrba from the Bioelectromagnetism research team are working together with doctors from the Cardiology Clinic of the University Hospital Královské Vinohrady and the Karlovy Vary Regional Hospital to improve the success and safety of catheterisation closure of the left atrial appendage by making a 3D model of the heart. Doc. PhDr. Barbora Vegrichtová, Ph.D., MBA, participates as an expert consultant in the large-scale Commander project, which focuses on the topic of online radicalization of children and young people. A team of experts led by Prof. MUDr. Leoš Navrátil, CSc., MBA, dr. h. c., started to use high-power laser therapy, commonly used in musculoskeletal rehabilitation, to minimize the consequences of covid pneumonia in spring 2021. This type of radiation is proving to be an effective treatment method that can transform scar tissue in the lung back into elastic, functional tissue.

FBME students and a team of like-minded people built the Next Zone coworking center in the heart of Prague, which was inaugurated on October 7, 2021. Petr Štěpánek, Patrik Seidl and Josef Hnízdo, students of the Bachelor's degree in Information and Communication Technologies in Medicine, created a space where young budding innovators can meet, discuss and create.

Experts from the Faculty of Nuclear and Physical Engineering are researching new implants. In cooperation with the Institute of Physiology of the CAS, they are trying to develop magnesium wires that gradually degrade in the body's environment without any negative effects, which may ultimately prevent the need for subsequent surgeries. With the project Pad for sensing the load and position of the patient, CTU has reached the final of the second edition of Transfer Technology Day 2021.

Unmanned helicopters with on-board intelligence or robotic drones from the Faculty of Electrical Engineering help with mapping historical objects, such as the Coronation Hall of the castle in Kroměříž, St. Moritz Church in Olomouc and St. Nicholas Church in Prague, Plumlov Castle or Vranov nad Dyjí. The drones explore the interiors, where they move autonomously along a predetermined route and can react to unexpected obstacles. This is a globally unique project called Dronument, where technology records rare historical values and assists conservationists in their restoration.

CTU also played an important and socially beneficial role during the fight against the pandemic. On 30 November 2021, the Rector of the CTU presented the Medal for Deployment in Times of Crisis - an award for outstanding performance by CTU experts - at the Bethlehem Chapel. Doc. Vojtěch Petráček awarded 106 medals to researchers and other personalities who contributed to the solution of the coronavirus pandemic situation in the Czech Republic and abroad through their innovations and personal or team involvement. The medals were designed for this special occasion by Czech medallist, sculptor and publicist Michal Vitanovský. Thus, for example, the CoroVent pulmonary ventilator team from FBME, the RP95-M protective half-mask produced by 3D printing, the „Pipetak" robot with its fine and precise pipetting of samples for the COVID-19 disease or colleagues from CIIRC were awarded, thanks to which a full-face mask was developer for frontline doctors.

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

OPERATING IN THE REGION

Outside the capital city of Prague, where a significant part of the university is located, CTU has a major position and influence in the Central Bohemia region, where the Faculty of Biomedical Engineering and the University Centre for Energy Efficient Buildings are located, and where the engine and automotive testing laboratories of the Faculty of Civil Engineering are located. The study centre of Faculty of Nuclear Sciences and

Physical Engineering and the Faculty of Transportation is located in the Ústí nad Labem region, while the turboprop engine test facilities of the Faculty of Mechanical Engineering are in Hradec Kralove. The University's position in relation to society is also determined by its other activities in the educational and cultural spheres.

Youth education at the University Primary School and Kindergarten Lvíčata

CTU is the founder of the University Primary and Kindergarten Lvíčata. The school and kindergarten is located on the Dejvice campus in Prague 6 and is mainly used for the education of children of CTU employees and students. The second branch is located in Žižkov, where children of employees and students of the VŠE also attend.

At the start of the school year in September 2021, Lvíčata received as a gift new classrooms and facilities, which were created by the construction and separation of part of the Student House. The overall increase in space has greatly helped to improve the atmosphere. This has enabled teachers to work in the school after school hours; prior to the extension of the space, it was often not possible to use the assembly room even during free periods because of the split teaching that took place there. Now each class has its own classroom, so the model of small classroom teaching has been abandoned (no need to combine several grades in one classroom).

Both the school and the kindergarten cooperate closely with the individual faculties and institutes of the CTU, for example, pupils have the opportunity to visit professional workplaces. Experts from individual faculties are involved in teaching, which is focused mainly on computer science, mathematics and science subjects.

CTU thus fulfils the need to support employee-parents and student-parents and at the same time awakens children's interest in technology, science and scientific research. Thanks to small class teams and close cooperation with parents, pupils achieve very good results in science-oriented competitions such as the Mathematical Olympiad, the Mathematical Kangaroo, the Logical Olympiad, Pangea and others.

The primary school became part of the network of schools cooperating with Mensa ČR.

The lion cubs from CTU participated in the Christmas Astro art competition organized by the Czech Academy of Sciences in cooperation with the Planetum organization within the framework of the Space for Humanity platform.

The theme for preschool children was «A Voyage to the Stars», which they could express through drawing, model, their own poem, let their imagination run wild.

To cultural life with CTU

Despite the obstacles caused by the pandemic, culture was alive at CTU. Exhibitions and concerts were held online.

At the end of 2020, the new TV „station" TV9P broadcast for the first time, and the interest of the participants allowed the programme to be extended until the end of 2021. The Rector's office on the 9th floor of the Rector's building was regularly transformed into a TV studio, from where music programmes and interviews with interesting personalities were broadcast. The faculties and units of CTU were also actively involved.

Students not only from the CTU are united by the CTU Academic Orchestra, performing in the Bethlehem Chapel, but also on Czech and foreign stages with classical and multi-genre repertoire. The theatre does not come short either, the Comica Economica theatre ensemble is active at CTU.

The Klokner Institute celebrated its 100th anniversary in 2021. Within the framework of this anniversary, a unique book entitled 100 Years of the Klokner Institute was released and solemnly presented to the CTU academic community in October (2021).

Sport at the University

After the first half of the year, still affected by anti-pandemic measures, sport and leisure sports activities returned to the CTU. Not only students, but also employees participated in regular exercise, where it is possible to choose from 49 sports.

Participation in the Czech Academic Games held in September in Olomouc was a significant success. CTU took 4th place in the competition of universities with 40 gold medals. The CTU sports team was also very successful at the IV. World Games in November in Rome, where with the participation of 39 universities from 13 countries, it finished in 2nd place overall.

CTU is an annual organizer of a number of sports competitions, the most important of which is the Academic Cross-Country Running Championship and the 17th November Run, which took place on 20 November 2021 in Prague's Obora Hvězda under the auspices of CTU Rector doc. Petráček.

Traditionally, the Rector of the CTU also awarded the ten best CTU athletes of 2021, with the first three places going to water slalom racers Vít Přindiš, Martina Satková and Antonie Galušková.

UNIVERSITY OF SUPRA-REGIONAL IMPORTANCE

CTU declares its international overlap through extensive cooperation and partnerships with foreign institutions and companies, as well as international awards. All faculties and institutes are actively involved in the international research infrastructure, participate in scientific and research programmes and organise conferences, both virtual and „live".

For example, the Faculty of Biomedical Engineering managed to implement the international project ITEM (Innovative Teaching Education in Mathematics), initiated by RNDr. Eva Feuerstein, Ph.D. Based on the experience with teaching mathematics at FBME and partners from Austria, Sweden, Israel, Denmark and Spain, new approaches stemming from the so-called good teaching practice are implemented at a total of ten foreign universities, in Israel, Uzbekistan, Macedonia, Kosovo and Greece, as well as a project to help Cambodia in the field of introducing the undergraduate field of biomedical engineering at local universities and increasing professional capacity for this purpose.

The Klokner Institute has been involved in testing 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 has collaborated with many prestigious research institutions (JRC Ispra, Politecnico di Torino, Torroja Institute, Madrid, TNO Delft, TU Ghent, EPF Lausanne, University of Stellenbosch, South Africa). The cooperation of the Faculty of Mechanical Engineering with GE Aviation, the largest American manufacturer of aircraft engines, is exceptional.

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 activities is the participation in the Czech-German RICAIP Centre of Excellence.

Another potentially important step forward is the nomination of CTU representing 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 from the perspective of an agreement between respective centers of excellence willing and able to transfer their experience in the field of artificial intelligence to industry with the aim of strengthening and improving the digital maturity of SMEs.

12

12_TAKING ACTION TO ADDRESS THE IMPACT OF THE SARS-COV-2 PANDEMIC

The Czech Technical University in Prague coped with the SARS-CoV-2 pandemic in 2021 in a very dignified manner, also in view of the experience of the previous year.

The university management reacted quickly and in a timely manner based on the regular evaluation of the development development of the pandemic and came up with an appropriate solution to the immediately, so to speak overnight.. Throughout 2021, the University's activities were restricted with the primary aim of protecting the health and lives of all staff and students, especially those at risk. On the basis of previous experience, the transition from full-time to full distance learning was admirably swift and smooth, including with regard to the operation of laboratories, testing rooms and studios. Not only practically all scientific teams of CTU, but also the students themselves were involved in solving the problems related to the pandemic.

In spring 2021, CTU joined the vaccination of academics in accordance with the approved Vaccination Strategy against COVID-19 in the Czech Republic. This was available to all academic staff (i.e. staff involved in student teaching, especially practical, laboratory, experimental, etc.) of public and private universities.

On 30 November 2021, a ceremony was held in Bethlehem Chapel to award medals to CTU experts for their exceptional performance in times of crisis. Rector of CTU doc. Vojtěch Petráček awarded 106 medals to researchers and other personalities who contributed to the solution of the coronavirus pandemic situation in the Czech Republic and abroad through their innovations and personal or team involvement. The for this special occasion were designed by Czech medallist, sculptor and publicist Michal Vitanovský.

SCIENCE, RESEARCH, CREATIVITY, INNOVATION AND TECHNOLOGY

As already mentioned, the CTU was preparing for a possible crisis by monitoring world events. A team of experts from the Faculty of Biomedical Engineering of CTU headed by Prof. MUDr. Leoš Navrátil, CSc. MBA, dr. h. c., started to use high-power laser therapy, commonly used in musculoskeletal rehabilitation, to minimize the consequences of covid pneumonias as early as spring 2021. This type of radiation is proving to be an effective treatment method that can transform scar tissue in the lung back into elastic, functional tissue. In addition to patients feeling subjectively better, the effectiveness of the therapy has also been demonstrated by spirometric examination. Significant improvement was also diagnosed on lung X-rays as early as three to four weeks after starting treatment. The effectiveness of this treatment method in the acute stage was also demonstrated in studies by MUDr. Lukáš Rokos, Chief of Medicine at the Kladno Regional Hospital, and MUDr. Lukáš Cibulka, Chief of Medicine at the Kolín Regional Hospital. With help of this method, these hospitals managed even highly serious conditions. More than three hundred patients have been cured.

Students and employees of the Faculty of Information Technology (FIT) were awarded medals for exceptional performance in times of crisis, and a total of eight projects were honoured - a chatbot at www.koronavirus24.cz, an independent assessment of the eRouška application, the Wowee application, the CloudFIT computing cloud, an innovative online hackathon, the Smart Trial application, filter adapters for CTU full-face masks and the GoDeliver web platform.

A team of FIT and University of West Bohemia students with their project UrineMeter won the European Health Hackathon, which took place at the IKEM in Prague. Marek Sušický and Jan Staněk from the Open Data Laboratory, a joint workplace of FIT and the company Profinit, created a new web application ockovani.opendatalab.cz, thanks to which it is possible to get an overview of the capacities of individual vaccination sites.

The university's Centre for Energy Efficient Buildings (UCEEB) has tested the potential of nanofibres in its laboratories to detect small foreign particles in gas, such as viruses or bacteria in human breath. The tests were commissioned by ProNanoTech, which will use the findings to develop a new product. The project was divided into two parts. The first focused on the possibility of capturing

the change in electrical quantities (capacitance and resistance) of nanofibres when they are artificially treated with cigarette smoke. The measurements showed that different samples can show a change in electrical characteristics after sputtering, especially in specific frequency ranges. In the next part of the project, the focus was on capturing the molecules that cause an eye-visible colour change in samples prepared from nylon fibres with added dye. These, according to the findings of the UCEEB experts, allow to signal and detect acidic air and water environments by causing them to turn blue. The prepared samples were able to repeatedly reversibly switch between their coloured and colourless forms, based on the presence and concentration of free H+ protons and the acidity of the environment they were in. The analysis of the presence of characteristic molecules in excess concentration should enable simple, rapid and inexpensive detection of the particles, which has great potential for practical applications. ProNanoTech implemented this project with support from the South Bohemia Business Vouchers programme, announced by the South Bohemia Science Park.

Project TERESA

Teams of experts from the CTU, Hradec Králové University Hospital, Palacký University in Olomouc and the University of Defence are collaborating on a unique project called TERESA (TEleREhabilitation Self-training Assistant), which will enable the rehabilitation of patients with persistent effects after COVID-19 disease in a home environment. At the same time, users will be able to share data on their physical activity with doctors through fitness bracelets. The system could also be used by patients with other lung diseases in the future. Experts from the Department of Physiotherapy at the Faculty of Physical Culture at Palacký University in Olomouc, the Department of Military Health Organisation and Management at the Faculty of Military Health at the University of Defence in Brno, the Department of Computers at the Faculty of Electrical Engineering at the Czech Technical University and the University Hospital Hradec Králové are collaborating on the project. „It is great that specialists from across different disciplines will be involved in the project," says the Rector of CTU, doc. Vojtěch Petráček. „I believe that the system will help as many patients as possible and that it will improve the quality and shorten the follow-up care." Initial feedback from participants involved in the pilot study has been positive. „We believe that we have found a good model that will allow us to effectively support pulmonary rehabilitation of more patients in the future, not only after a severe course of COVID-19, but also for other diseases associated with breathing difficulties and fatigue," adds Colonel Hynek Schvach from the Faculty of Military Health at University of Defence.

In response to the situation surrounding the global pandemic of COVID-19, PREVEDIG medical, a laboratory diagnostic centre, Beckman Coulter, a leading supplier of laboratory analysers and laboratory automation, and CIIRC CTU joined forces. Together, they focused on how to process more samples with the existing laboratory capacity. Scientists from the Czech Institute of Informatics, Robotics and Cybernetics have created a unique algorithm that can find the optimal setting of the laboratory system to evaluate as many samples as possible in the shortest possible time, resulting in an increase of up to tens of percent. For patients, this means not only that the lab can evaluate more samples, but also that they get test results sooner.

The VENT-CONNECT project enabling remote monitoring of pulmonary ventilators and vital signs monitors, especially in patients with COVID-19 connected to artificial pulmonary ventilation, passed the preclinical phase and received a positive opinion from the ethics committee of the Královské Vinohrady University Hospital. The technical solution, developed by a CTU team consisting of researchers from the Faculty of Electrical Engineering, the Czech Institute of Informatics, Robotics and Cybernetics and the Faculty of Biomedical Engineering in collaboration with the Department of Anaesthesiology and Resuscitation of the 3rd Faculty of Medicine of the Charles University and University Hospital Královské Vinohrady, significantly improves the control of patients' condition in the infection zone thanks to remote access to the screens of ventilators and vital signs monitors. This allows physicians to more accurately adjust ventilator parameters during treatment, which naturally leads to better patient care. The solution is inexpensive and easy to use in other departments, COVID-19 or otherwise.

Up to 500 people a day could be vaccinated with the vaccine against COVID-19 in the Vaccination Centre in Děčín, which has been operating since Monday 12 April 2021 in the building of the Faculty of Nuclear and Physical Engineering in the centre of Děčín. The faculty provided its large hall for a symbolic CZK 1 per month to the Regional Health Society, which operated the vaccination centre. It was prepared for operation by a team of employees of this detached workplace of the CTU outside Prague.

IMPACT ON STUDENTS

Despite the complicated teaching, CTU students have had many successes. For example, students Natália Bodnárová from the Faculty of Architecture, Vojtěch Petrásek from the Faculty of Electrical Engineering and Ľuboš Repka from the Faculty of Information Technology, together with Vasil Kostin, a student of the 3rd Faculty of Medicine, took first place in the Hack for Healthcare hackathon, which took place from 26th to 28th November in Zurich, Switzerland. Among the judges were representatives of the Red Cross and Doctors Without Borders from Geneva, who set the participants a challenge - 3D printed insulin delivery units - that is, using 3D printing to solve insulin delivery in developing countries. Doctors Without Borders has been solving this problem for several years, but the Czech team of students managed to design an innovative way to cheaply produce insulin pens in just a few days. „The task of designing an insulin pen was a great challenge for us. Chronic complications of diabetes are to some extent preventable, so it is important to look for ways to start treatment for everyone as soon as possible. For a patient who does not have access to pumps, insulin pens are a great choice," says Ľuboš Repka, a 6th year student at the 2nd Faculty of Medicine of Charles University and 1st year student at the Faculty of Information Technology of the Czech Technical University. The solution consists in designing a universal system

into which any insulin cartridge and insulin needle can be inserted, using 3D printing. Moreover, the pen is easily recyclable due to the possibility of using the used filament to produce a new insulin pen. „3D printing brings the possibility of inexpensive device customisation. It also eliminates large parts of the logistics chain and facilitates more frequent design updates than mass-produced products," says Natália Bodnárová, a 3rd year design student at the FA CTU.

On Tuesday 7 December, 28 students, future paramedics, including their teacher Mgr. Pavel Böhm, MBA, who organized the event, at the Regional Hospital Kladno, donated blood together. The participants of the event wanted to respond to the blood shortage and motivate not only other students but also the general public.

Ing. Roman Říha and the team of the Faculty of Biomedical Engineering won the VIZE 2050 competition in the field of Cardiopulmonary Resuscitation Outside Hospital Facilities in 2050, organized by the Czech Resuscitation Council. The winner was announced during the conclusion of the 10th professional symposium Resuscitation 2021 on 11 June 2021. On 22-24 September 2021, the 14th annual First Aid Day was held in Hradec nad Moravicí, where the competition team of the Faculty of Biomedical Engineering took the 3rd place in the composition of Samuel Klíma, Marek Ječmen and Dominik Pánek. The Association of University Educators of Non-Medical Health Professions in the Czech Republic, of which the faculty has been a member since 2016, received an award from the Minister of Health Adam Vojtěch and the Chief Nurse of the Czech Republic Alice Strnadová for extraordinary help in the fight against the SARS-CoV-2 pandemic in 2019-2021. The graduates of Optics and Optometry participated in the XII National Student Conference of Optometry and Orthoptics in Brno on 19 October 2021. The quality of our graduates is evidenced by the fact that our graduate Bc. Rédlová won the competition for the best contribution with her paper „Botanical properties of contact lenses and their measurement".

The Faculty of Nuclear and Physical Engineering became the first faculty not only at CTU, but also in the Czech Republic, which transferred graduation ceremonies to the online space. It happened on Thursday, March 4, 2021. A total of 69 graduates of bachelor and master studies graduated. Due to the ongoing epidemic, most of the graduates and their loved ones gathered at the displays instead gathering at the Bethlehem Chapel.. Graduates connected via the Microsoft Teams app, and those interested were able to watch the graduation live on the Faculty of Nuclear Science and Physical Engineering YouTube channel. The University was represented by the Rector of CTU doc. Vojtěch Petráček, the dean of the above-mentioned Faculty prof. Igor Jex, the vice-dean for pedagogical activities and also the promoter prof. Michal Beneš and the secretary of the Faculty Ing. Leopold Vrána. During the broadcast, the rector and the dean delivered their short speeches and in a short spot everyone could recall the most important events associated with the faculty during the years when the graduates studied here. There was also a montage of photographs provided by the students themselves. For time and organizational reasons, the graduating students were divided into two groups. From each group, two student representatives were present directly in the faculty building - in addition to the pledge to the scepter, one of them read the pledge, and the other one read a thank you note.

IMPACT ON THE QUALITY OF ACTIVITIES AND SERVICES

The and restrictions affected the whole spectrum of services offered by CTU, all of which approached the current problems responsibly and with some experience from the previous year. Some services could be provided continuously without major restrictions.

This applies, for example, to the library services provided by the CTU Central Library. The set up remote access allowed students to access all subscribed EIZ, Open Access resources and other information resources in trial mode. Thanks to the authorization, the entire academic community was able to work with the EIZ even outside the CTU network. The library has also transferred many others to the virtual environment. It launched online pre-registration, extended reservations and borrowing, and suspended reminders. Seminars and consultations, which the library holds annually, have moved to an online environment.

On the other hand, the restrictions associated with the pandemic have affected the accommodation sector and the aforementioned sports sector quite significantly. A similar situation also occurred in the catering sector. The colleges, canteens and sports facilities are organised under the Service Facilities Administration. Due to distance learning, the number of residents in the dormitories has fallen, resulting in a deep drop in revenue. Severe measures in the winter months meant an impact on the main revenue period of the SFA. Accommodation capacity could not be filled in the summer and the pandemic also affected the tourist season.

Despite the restrictions, CTU was looking for ways to offer services that would bring joy to its students, employees, and the public, and culture was transferred to the online environment. Most of the events were of a thank-you and supportive nature, intended to help foster togetherness and support communication in difficult times.

INTERNATIONALISATION, CONFERENCE ACTIVITIES

It is obvious that a number of planned events could not take place. However, a few of them were organised in person, while others, when possible, went virtual. Thus, for example, famous events such as the Festival of Science, the Night of Scientists, the Week of Science and Technology of the Czech Academy of Sciences and others were held.

ScienceFest (formerly Festival of Science) was held from 8 September to 31 October in a contact form. The theme of the 9th edition was „Digital World". A rich interactive programme was prepared for the participants of the event at outdoor stations, where science, technology and human sciences were presented in a popular way. An online ScienceFest was also held, which could be watched by interested people from all over the country. In the online version, successful solvers of the „Smart Head" quiz

were awarded with gifts. The festival was visited by 14,000 virtual guests, 38,000 quiz questions were answered and Vimeo recorded 35,000 views.

It is a joint project of the Czech Technical University in Prague, the University of Technology in Prague and the House of Children and Youth of the Capital City of Prague. The above-mentioned institutions organize and program the event. The Charles University and many other universities, institutes of the Academy of Sciences of the Czech Republic, the Army of the Czech Republic, the Prague Zoo and other institutions are also important exhibitors.

„Time" was the central theme of the Night of Scientists 2021. Various events were held both in person and online. Among the active participants were Czech universities, scientific institutes, observatories and other institutions. On Friday, 24 September, CTU offered its visitors interesting demonstrations at several faculties and university institutes, and the rich programme is still available also in online form. The event started with the launch of video demonstrations prepared by CTU faculties and institutes for online visitors. At the same time, the premises of Faculty of Transportation Sciences, the Faculty of Electrical Engineering and the Masaryk Institute of Higher Studies were opened. The Faculty of Biomedical Engineering, based in Kladno, came to Prague to meet the participants of the Night of Scientists and prepared a workshop and presented several exhibits in the premises of the CTU-CIIRC building. This space was also complemented by the open Testbed for Industry 4.0 and other departments from the Czech Institute of Informatics, Robotics and Cybernetics.

A few national conferences on a smaller scale were held, but it was not easy to participate in or organise international events. In spite of all the obstacles the pandemic set, something good came out of the situation, the organisers learned to adapt to the new conditions, more media were used, social networks were used, never before in a virtual environment were so many videos, podcasts and streams created as in 2021, still available today through YouTube, Vimeo and other channels, which is kind of a small bonus, a positive legacy of the pandemic.

Faculties and institutes of the Czech Technical University in Prague have prepared Open Days for those interested in studying in accordance with the current anti-epidemic measures. On 3 December, the Faculty of Electrical Engineering and the Faculty of Biomedical Engineering welcomed visitors. On the following day, i.e. on 4 December, the Faculty of Civil Engineering presented itself, and the Masaryk Institute of Advanced Studies on 10 December 2021.

The Institute of Technical and Experimental Physics of the CTU in cooperation with the painter Kateřina Smetanová organized a new project for the public called Science and Art. It is a guided tour of the exhibition on two floors of the Bethlehem Palace, where the Institute has been housed since 2019. Visitors were also introduced to the scientific research work of the specialists of this department. The first tour, held on 19 August 2021, was attended by 20 interested members of the public, and further tours were held on 22 December 2021 and 13 January 2022. Further dates will be offered gradually.

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

_“The year 2021 was a period when the CTU Strategic Plan 2021+ was successfully discussed, which determines the direction of the University for years to come. However, the weight of the document itself is mainly based on communication and strong cooperation of all faculties and university units that participated in its creation and also in the first year of implementation of its goals and measures. The joint efforts and work will surely lead to a significant move forward and progress of the CTU.“

13_FURTHER DEVELOPMENT AND STRATEGIC DIRECTION

In June 2021, the CTU Strategic Plan 2021+ was successfully discussed with the Ministry of Education and Science, which will have a major impact on the development of CTU in the near future. It is based primarily on the intersection of the needs and potential of CTU and the completely new concept of the Strategic Plan for the Development of Higher Education of the Ministry of Education, Youth and Sports, which was approved by the Government in the first half of 2020.

The CTU Strategic Plan 2021+ defines specific objectives, measures and tools for the development and support of studies, science and internationalisation, process management, quality and development of the environment in the sense of not only physical space but also virtual space.

The year 2021 was the first in the implementation of the priorities of this major strategic document. CTU aims not only to increase its reputation and further improve its position in international rankings, but especially to provide excellent scientific research and quality teaching. It also places great emphasis on close cooperation and partnership with the application sector and a strong orientation towards 21st century technologies.

At the end of June 2021, the implementation of 37 development projects from the year 2020, for which CTU received institutional support in the amount of CZK 77 376 thousand and whose implementation was extended due to the persistent pandemic restrictions, was completed. The objectives of the projects were met and the funds were exhausted, with two exceptions. These were student and staff mobility projects where the objectives were not met due to travel restrictions.

In the area of institutional support for 2021, CTU was allocated a total of CZK 100,976 thousand distributed to 34 projects, including the internal competition. The latter was implemented as part of the New Internal Competition project, which aimed, in addition to direct investment and non-investment support for distance learning, to create a new, school-wide model of this competition, created by a team of representatives of faculties and university institutes. There was also a significant change in the management of institutional projects for 2021 compared to previous years. Guarantors were responsible for the implementation of individual projects and communicated with each other. Thanks to this, the synergy of individual projects and their activities was maximised. The funds were used effectively in collaboration with the individual components, which received about 37 percent of the total financial allocation to meet the objectives of the Institutional Plan.

DEVELOPMENT OF COMPETENCES DIRECTLY RELEVANT FOR LIFE AND PRACTICE IN THE 21ST CENTURY

In 2021, a total of four projects were implemented in fulfilment of this priority objective, focusing for example on raising the level of secondary school teaching of vocational and general education subjects (mathematics and physics) and the education of secondary school teachers. The manager of this project, the Ministry of Education and Science, used the synergistic effect of the potential of individual faculties and together succeeded in proposing the concept of a modern system of secondary school teacher education at CTU and proposals for accreditation of new study programmes.

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. For talented and capable students, a project aimed at supporting them was implemented in 2021 in the form of extraordinary special-purpose scholarships to motivate them to improve their competences. All units of the CTU were involved in this project, which covered only Bachelor and postgraduate studies. Another project aimed at improving the administration of lifelong learning, taking into account the new course management methodology and the newly developed

approach to LLL. The Dejvice Campus Development project aimed at promoting and developing mutual communication between students and teachers, as well as improving the cultural and social environment, both in full-time and distance learning.

A total of CZK 3 500 thousand has been allocated to support this priority objective.

IMPROVING THE AVAILABILITY AND RELEVANCE OF FLEXIBLE FORMS OF EDUCATION

This priority objective was also fulfilled within the framework of projects implemented both at the school level and at the level of specific units, where funds were used to support and modernize distance learning, based on the needs defined already in 2020, when it was necessary to „switch" to online forms of education.

Within this priority objective, more than 20 percent of the total amount of funds earmarked to meet the objectives of the CTU Institutional Plan for 2021 has been allocated.

Within the Centralized Development Program, CTU received a subsidy in 2021 for projects focused on distance education, which has become a common part of the educational process not only at universities. CTU participated in a project aimed at using this tool for further development of universities. The quality of educational activities with regard to various forms of study, including distance learning, was the subject of another CRP project in which CTU actively participated as a co-principal investigator.

INTERNATIONALISATION

Involvement in international structures and the opportunity to gain experience from abroad is one of the most important areas of development not only for individuals but also for the whole institution. In 2021, student and staff mobility projects were again supported in order to increase internationalisation.

The aim was to build on the long-established model of sending students to foreign partner universities on the basis of bilateral agreements. The deepening 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. As a result of the persistent pandemic travel restrictions, not all planned trips of students and teachers from CTU abroad, nor the arrival of students and personalities from abroad, could take place.

Within the Mobility Applications project, the processes and documentation of the foreign relations and study agenda were gradually mapped and specific adjustments were proposed (e.g. extension of the EWP interface to support OLA (Online Learning Agreements).

Participation in the C.E.L.S.A. Programme is a regularly supported activity that aims to further develop 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 in Belgium.

In total, 13 percent of the total amount of the CTU Institutional Plan for 2021 was used to meet the priority goal of Internationalization.

Other development activities in the area of internationalisation were CRP projects aimed at defining the potential of virtual mobility and the possibilities of its application at universities and the implementation of the EC's Erasmus Without Paper initiative and the sharing of experiences from the practice of partner universities.

INCREASING THE EFFICIENCY AND QUALITY OF DOCTORAL STUDIES

The investment of CZK 1 800 thousand followed the provision of legal requirements and projects implemented in 2020. The aim of the project was to increase the quality of the results exported to the the Research, Development and Innovation Council of the Government of the Czech Republic (RVVI).. At the same time, it responded to requests for modifications of the EZOP and V3S applications from users and clerks.

CAPACITY BUILDING FOR STRATEGIC MANAGEMENT

Under this priority objective, a total of nine projects were supported with an allocation exceeding 31% of the total financial amount. All of them aimed at developing and enhancing the effectiveness of strategic management and decision-making capacities across CTU. Thus, projects aimed at creating complete data sets for the production of annual report tables and for use in international university assessments were supported. In particular, the aim was to facilitate the work of the staff of the different units, with whose close and necessary cooperation the data for both areas had been provided so far. Now the categories of data to be collected are precisely defined, as are the source and the application into which they should be/are fed. Specific adjustments to the functionality of the systems and applications in which the data are stored have also been recommended.

There are also plans to build a school-wide data warehouse. This project builds on activities from previous years and aims to store information stored in internal CTU databases and systems in a long-term and consistent manner to support analytical planning and decision-making at all levels of management.

The services were made more efficient and better thanks to the implementation of the Project Management project, which was subsidised with CZK 950,000. The main benefit was an increase in the qualification of the staff of the Structural Funds Department of the Rectorate of the CTU together with higher and better information for potential applicants for subsidies. The functioning of the Department is now set up in such a way that there is better coherence and synergy to ensure the success of submitted applications. There has been a significant change in the search for additional programme

opportunities that offer great potential for securing funding in 2021, such as the Innovation Fund, Green Deal, CeFF II or DEP and other opportunities such as Hop-on at Horizon Europe for CEE institutions.

Within the Ranking project, a solid foundation was created for a long-term and strategically effective intervention in the ranking of CTU in order to maximally strengthen the international position and reputation of the university. Targeted initiatives were designed to improve citation performance and engage international staff, such as conducting an in-depth analysis of the ranking citation methodology in collaboration with the CTU Central Library. In addition, the Times Higher Education DataPoints software platform was purchased to provide deeper insight into CTU's international reputation. A data analytics platform was also created to quickly understand trends and performance in rankings across different ranking systems and a long-term project to evaluate and improve services and support for international staff.

Other projects aimed at building and strengthening the university's strategic management capacity included activities in the area of cyber security, optimisation of internal KOS processes, electronic recording of R&D documents and development of BIM-based investment activities.

In the area of strategic management, an important role in 2021 was played not only by immediate response to current social events, but also by preparedness for operational solutions, given the experience with the pandemic situation. Crisis management has thus become another crucial issue also at the level of higher education. That is why CTU welcomed the invitation of MUNI to join the project funded under CRP 2021 aimed at cooperation in developing a comprehensive methodology for the management of the university in case of a crisis situation, taking into account also internal institutional regulations. The sharing of experiences between the project partners was an integral part of this.

REDUCING THE ADMINISTRATIVE BURDEN ON EMPLOYEES

A complete and user-friendly data infrastructure is the key to quality assurance and evaluation of proposed actions in strategic management. A complete system built on the interconnection and communication of all the parts involved requires a high investment in time, expertise and money. For this reason, more than 25 percent of the funds allocated for the Institutional Plan 2021 were devoted to this priority, which included a total of 11 sub-projects aimed at, for example, reducing the administrative burden in the student agenda, software support for institutional accreditation processes, as well as innovations in management model, registration and maintenance of CTU's immovable property. Another major area is the development of identity and email gateway management functionalities, increasing login security or optimising the operation of Cisco Unified Call Manager within the university.

In the field of optimization and automation of EIS processes in university networks, the CRP project was also successfully implemented, in which CTU participated in cooperation with 26 other universities as the main coordinator.

OTHER MEASURES

The project, which was dedicated to this priority objective, focused on the improvement and development of counselling at the CTU, implemented by the CTU Centre for Information and Counselling Services (CICS). In modern universities in the 21st century, counselling is given constant attention, especially due to the ever increasing disparities in social, intellectual, economic, national, etc. The target group of the project are students and postgraduate students, including English-speaking students, and staff of study departments. It focused on drop-out prevention and promoting success in studies and professional careers. It was subsidised with CZK 650,000.

Personalized interventions based on the analysis of study data as a tool to reduce academic failure was a project funded by the Centralized Development Programme of the Ministry of Education, Youth and Sports. CTU actively participated in it as a coordinator. The aim was to analyse the study data of all participating universities and to evaluate the success of prediction and intervention processes to reduce academic failure.

Within this priority objective, projects promoting studies at CTU and aimed at improving the quality of services and competences of CTU Career Centre staff were also supported.

In 2021, a Document on Strategic Plan Implementation was elaborated. At the same time, a new strategic document, the CTU Master Plan, was completed and approved by the CTU Academic Senate at its June meeting. Work on this document has been intensive since 2020, when comprehensive data collection on CTU assets, their review and analysis of possibilities and opportunities for future development were carried out. It is a document that was prepared in cooperation with the Faculty of Architecture and with the full involvement of all parts of CTU. Thus, after seven years, an updated basis is available on the basis of which it is possible to apply for financial support from the Ministry of Education.

As many other topics and issues that need to be addressed emerged during the preparation of the CTU Master Plan, there was a need to prepare a detailed overview and investment development plan that will enable CTU to take advantage of other investment opportunities, whether from EU operational programmes or national sources. Therefore, intensive work is being done on the preparation of another major internal strategic document, the so-called Generel+, which is scheduled for completion in 2022.

In December 2021, the Ministry of Education announced a call for universities in the National Renewal Programme, in which a total of CZK 3,000,000,000 is allocated. CTU intends to actively participate in this programme and has started to work intensively on the preparation of projects suitable for support. All units have been approached and involved. CTU will apply for a grant under this call in spring 2022. The projects will be implemented by the end of June 2024.

Technology transfer is one of the important activities to be promoted in order to motivate scientific teams to produce commercializable research results. To this end, it is necessary to set up mechanisms and rules that allow for a fast but transparent route for collaboration with the market. One of the options is the establishment of its own spin-off or start-up, in whose ownership structure the intellectual property created by the scientific team at CTU is embedded. That is why CTU Tech, a limited liability company, was established in September 2021 with CTU as its 100% owner. This is a groundbreaking step that will hopefully open the way for new possibilities in techtransfer at CTU.

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

**_"CTU presents itself as a competitive, internationally recognized, open, excellent, socially beneficial technical university.
It is therefore absolutely necessary to develop a quality environment and facilities for education, research and creative activities. It is the strategic intention of CTU to modernise and continuously improve the space and buildings, including their equipment, of the entire university campus so that it is an attractive and representative place not only for research, educational and creative activities, but also to have quality modern facilities for accommodation, catering, leisure activities and, last but not least, cultural and social events."**

14__COLLEGE FACILITIES

ACCOMMODATION AND CATERING SERVICES

Quality accommodation and meals are a matter of course for university services. However, the year 2021 was really challenging when it comes to their provision. The persistence of government restrictions on accommodation and catering has resulted in a fall in revenue and income of 150 million CZK. Despite the relaxation of measures, tourism has not recovered to its previous state. During the year, the situation and restrictions have alternately improved and worsened, resulting in restrictions on the provision of accommodation in university halls of residence. The accommodation and food services section was also one of the most affected at CTU in 2021. We believe that the situation will turn for the better in 2022.

LIBRARY SERVICES

The Central Library of CTU provides library and information support for studies, scientific, research, creative and artistic activities.It is a university-wide department consisting of the central library in Dejvice and three local libraries located at faculties outside the Dejvice campus (FBME, Faculty of Transportation Sciences, Fac. of Nuclear Scieces and and Physical Engineering).

The pandemic and related measures have also affected the operations of this university unit. New ways and means of providing library and information services have been set up. We have guided our users to available digital libraries and launched online services that have at least partially eliminated the problem of the closed library. We opened an „online library window". Courses and teaching have moved to distance learning. However, new information resources continued to be acquired. In 2021, the Central Library acquired 3,860 library items. The electronic collection (EIZ) was also developed and profiled. For example, databases of statistical information, infographics, forecasts, reports (STATISTA) and the ASTM Compass database of standards, journals and books (American Society for Testing and Materials) were added to the offer. The online service Writefull was launched, a tool for checking the spelling, grammar and stylistics of English text.

The Summon Discovery System is used to search all information resources available to CTU from one place (subscription EIZ, Open Access resources or trial resources).

Paid electronic resources are open to CTU students using IP addresses. Users who authorize themselves can access them remotely even outside the CTU network. They can use the e-Learning resources at any time and from anywhere in 24/7 mode.

In 2021, the data base of the CTU Digital Library (institutional repository) continued to grow with additional theses, dissertations, new publications by CTU authors and teaching materials. The services used include e.g. electronic publishing of books, scripts and study materials in Open Access mode. The DK platform is interconnected with the CTU IS resource subsystems (KOS, V3S) and continues to make available, in addition to the above-mentioned documents, publication outputs of other types (article, article in a collection, chapter in a book, book, proceedings, certified methodology).

Using the DOI identifier, three different metrics available in the academic version of PlumX, Altmetric and Dimensions were implemented. These are alternative metrics that address citation analysis from different perspectives. They display information on the number of citations, usage statistics, number of downloads or views, number of links to a given document, or social media responses. Each of the metrics has its own strategy for evaluation and display, providing feedback to the author and the public on the impact and use of the publication output.

In connection with the increase in activities and services in the field of information support for science, research and publishing, the library also provided in 2021 the agenda of bibliometrics, corrections of data in citation databases, including the management of the institutional profile of CTU. In cooperation with V3S and taking into account the evaluation of the Research, Development and Innovation Council of the Government of the

Czech Republic, the evaluation of CTU and individual authors, the CL together with the producers of citation databases carried out simple and more complex data corrections in records or assigned citations. She 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. It 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.

Even the pandemic did not stop the educational events and consultations carried out by the library. These were held either directly or remotely, as the situation allowed. Information on all library activities can be followed on the web and through FB.

INVESTING IN FURTHER DEVELOPMENT

CTU uses dozens of buildings in Prague and other locations for its activities, which of course require financial resources for repairs and maintenance. Efforts to gradually transform real estate into modern facilities are limited by the amount of funds available for the development of the quality of the environment for students and employees. Despite the adverse period of coronavirus constraints, the preparation and implementation of planned capital projects continued in 2021. These included the commencement of the comprehensive reconstruction of Bubeneč College with a capacity of almost 500 students. The reconstruction of two large lecture halls B 280 and 286, crucial for the Faculty of Civil Engineering, was completed, as well as some areas of Bethlehem Palace for the needs of new departments of the Institute of Theoretical and Experimental Physics. The reconstruction of the former boiler room building in Strahov, intended for the modern CTU archive, was also started, which will enable its relocation from the rented premises.

The reconstruction of the two largest lecture halls of the Faculty of Civil Engineering was the start of the overall modernization of Building B, of which the lecture halls are a part. We believe that the original architectural design by architect Vladimír Gleich will continue to form the basis for combining high-quality modern design of teaching spaces with high utility requirements of students and teachers, and that it will become a benchmark for the future quality of this building. The capacity of these lecture halls has also been increased - originally they could seat a total of 480 students, after the reconstruction it will be 540, of which 12 seats are accessible to people with reduced mobility.

The renovation of the interior of the Student House building resulted in the expansion of the Lvíčata University Primary School with new premises, which were officially opened in September 2021. The school's capacity has increased from 56 to 86 pupils and the original number of classrooms from three to five. Each class now has its own classroom, abandoning the small classroom model (no need to combine multiple grades in one classroom).

At the same time, the school's facilities have been upgraded so that it now has a decent entrance, the children have a larger cloakroom, the teaching staff have a new classroom and a dedicated IT room. There is also a spacious hall where group events are held. Pupils have the opportunity to be more active in the large hall during breaks, which has an impact on the quality of work during the following lesson.

Thanks to the structural separation of the entire school area from the rest of the Student House, students do not have to use the common staircase. The Lion Cubs also have their own canteen, which is part of the school's enclosed area.

In 2021, a technically demanding reconstruction of the listed building in Kruh u Jilemnice, which is used for sports and architects' studio in the open air, was also carried out.

The total volume of construction works for 2021 despite the aforementioned restrictions amounted to more than 120 million CZK excl.VAT

Table Annex

1.1 Basic facts

FACULTIES

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

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

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

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

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

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

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

Faculty of Technology (FIT) – Thákurova 9, Praha 6 – Dejvice, 160 00

UNIVERSITY INSTITUTES

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

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

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

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

OTHER PARTS OF CTU

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

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

PURPOSE-BUILT FACILITIES OF CTU

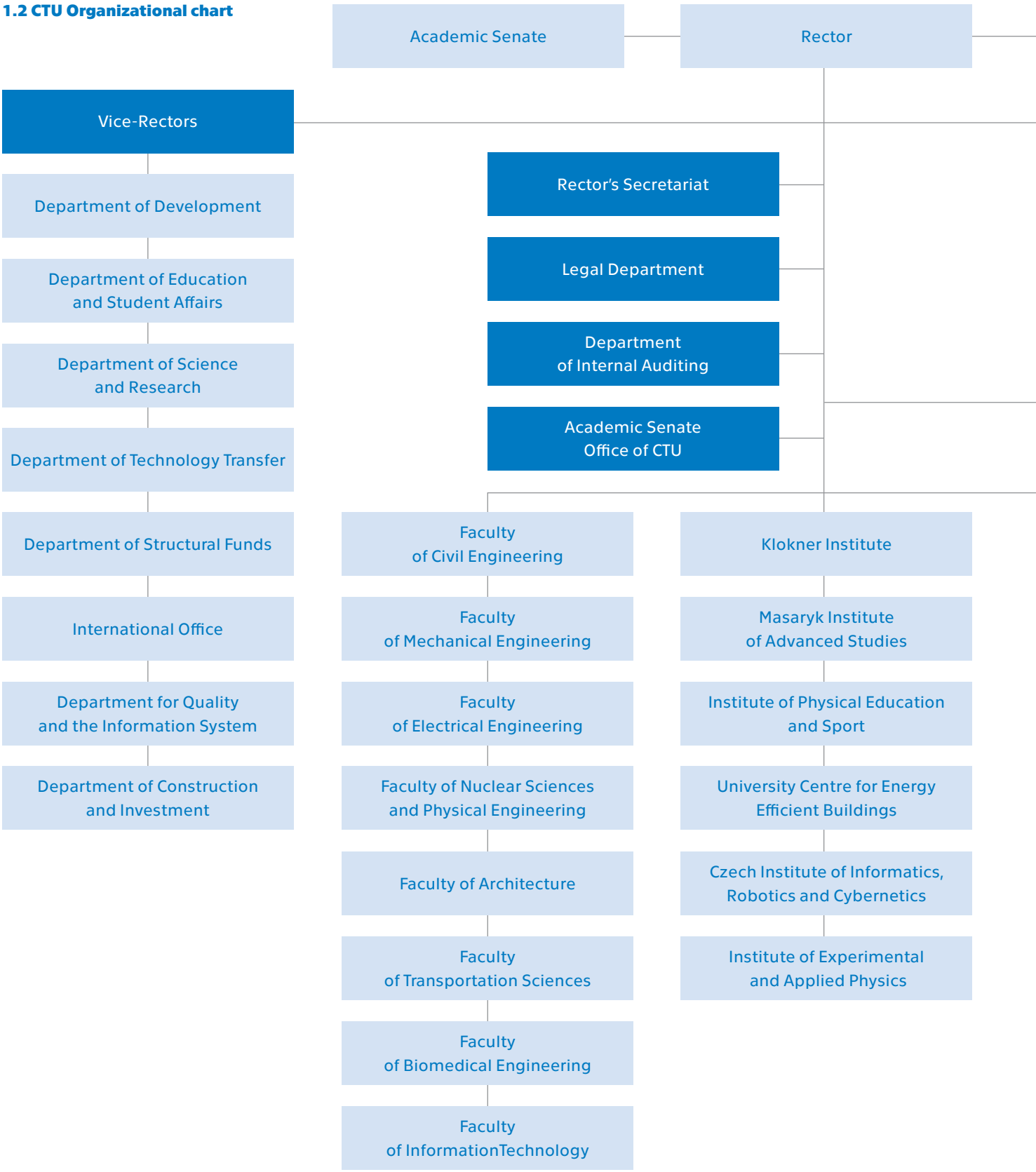
Rector's Office (R CTU) – Jugoslávských partyzánů 1580/3, Praha 6 – Dejvice, 160 00

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

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

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

1.2 CTU Organizational chart



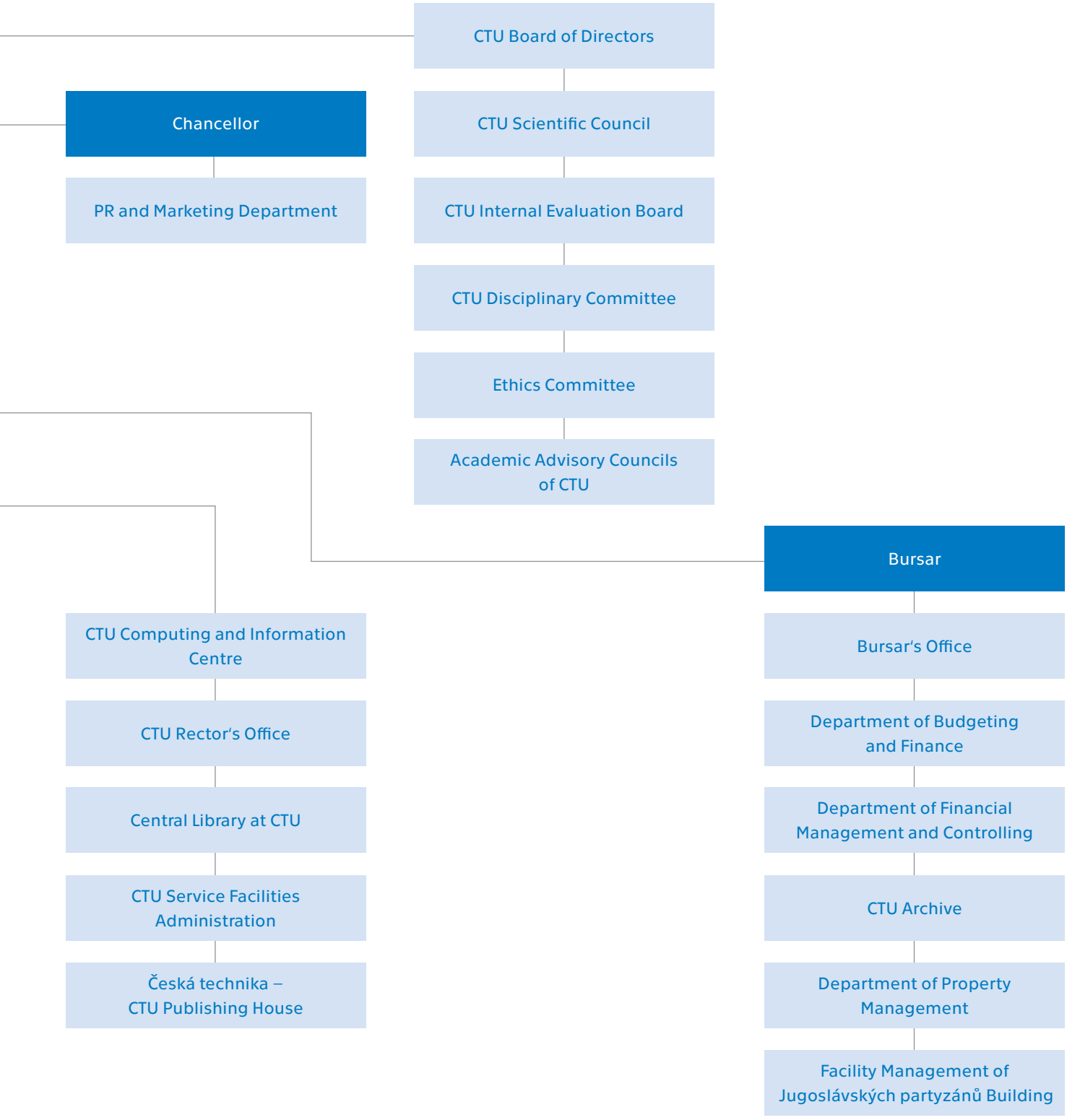

CTU Board of Directors
Chancellor
CTU Scientific Council
PR and Marketing Department
CTU Internal Evaluation Board
CTU Disciplinary Committee
Ethics Committee
Academic Advisory Councils of CTU
Bursar
CTU Computing and Information Centre
Bursar's Office
CTU Rector's Office
Department of Budgeting and 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

Table 1.3.1: Bodies of CTU	
Rector	doc. RNDr. Vojtěch PETRÁČEK, CSc.
Vice-Rectors	
For Science, Creative Activity and PhD Studies	prof. Ing. Zbyněk ŠKVOR, CSc.
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
For Construction	prof. Ing. Alena KOHOUTKOVÁ, CSc., FEng.
For International Relations	prof. Ing. Oldřich STARÝ, CSc.
Registrar	Ing. Jiří BOHÁČEK
Chancellor	Ing. Lucie ORGONÍKOVÁ
Permanent Guest of CTU Management and Chair of the CTU Academic Senate	doc. Ing. Jan JANOUŠEK, Ph.D.

Table 1.3.2: Board od 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. Martin JAHN, MBA	Member of the Board of Management for Sales and Marketing at ŠKODA AUTO a.s.
	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. 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
Internal members	prof. MUDr. Ivan DYLEVSKÝ, DrSc.	Dean of FBME
	prof. Dr. Ing. Zdeněk HANZÁLEK	CIIRC
	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.	FBME
	prof. Mgr. Petr PÁTA, Ph.D.	Dean of FEE
	doc. RNDr. Vojtěch PETRÁČEK, CSc.	Rector of CTU
	doc. Dr. Ing. Martin POSPÍŠIL, Ph.D.	FA
	prof. Ing. Pavel RIPKA, CSc.	FEE
	prof. MUDr. Jozef ROSINA, Ph.D., MBA	Dean of FBME
	prof. Ing. Zbyněk ŠKVOR, CSc.	FEE
	prof. Ing. Pavel TVRDÍK, CSc.	FIT
	prof. Ing. Michael VALÁŠEK, DrSc.	Dean of FME
	prof. Ing. František WALD, CSc.	FCE
	prof. Ing. arch. ir. Zdeněk ZAVŘEL, dr. h. c.	FA
External members	prof. Ing. Rostislav DROCHYTKA, CSs., MBA	TU Brno
	prof. RNDr. Miroslav DOUPOVEC, CSc., dr. h. c.	TU Brno
	Ing. Dana DRÁBOVÁ, Ph.D.	SONS, Chair
	prof. Ing. Jiří HOMOLA, CSc., DSc.	IFE CAS
	Ing. arch. Jan KASL	Czech Chamber of Architects, Chairman
	prof. RNDr. Jan KRATOCHVÍL, CSc.	MFF UK
	Franta KRAUS, Dr. Sc.	Wiss Adjunkt, ETH Zurich
	prof. Ing. Alois MATERNA, CSs., MBA	TU Ostrava
	prof. Ing. Petr NOSKIEVIČ, CSc.	TU Ostrava
	prof. Ing. Ivo PROVAZNÍK, Ph. D.	TU Brno
	prof. Ing. arch. Jaroslav ŠAFER	Czech Chamber of Architects
	doc. Ing. Libor ŠVADLENKA, Ph. D.	DF UPCE, Dean
	prof. Dr. Ing. Pavel ZEMČÍK	TU Brno

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Table 1.3.3: CTU Scientific Council		
Extraordinary members	prof. Dr. ir. Henri Hubertus ACHTEN	FA
	prof. Ing. Zdeněk BITTNAR, DrSc., dr. h. c.	FCE
	prof. Dr. Ing. Vladimír BLAŽEK, dr. h. c.	RWTH Aachen
	doc. PaeDr. Jiří DRNEK, CSc.	IPES Director
	prof. Ing. František HRDLIČKA, CSc.	FME
	prof. Ing. Stanislava HRONOVÁ, CSc.	University of Economics in Prague
	doc. Ing. Jiří KOLÍSKO, CSc.	Director of KI
	prof. RNDr. Bohumil KRATOCHVÍL, DSc.	UCHT
	prof. Ing. Karel MELZOCH, CSc.	UCHT
	RNDr. Michael PROUZA, Ph.D.	AS CZ
	RNDr. Karel ŠAFAŘÍK	FNSPE
	doc. Ing. Ivan ŠTEKL, CSc.	IEAP, Director
	prof. PhDr. Vladimíra DVOŘÁKOVÁ, CSc.	MIAS Director
Rectors Emeritus of CTU	doc. Ing. Antonín POKORNÝ, CSc.	Rector Emeritus
	prof. Ing. Petr ZUNA, CSc., D.Eng.h.c., FEng.	FME, Rector Emeritus
	prof. Ing. Jiří WITZANY, DrSc., dr.h.c.	FCE, Rector Emeritus
	prof. Ing. Václav HAVLÍČEK, CSc.	FEE, Rector Emeritus
	prof. Ing. Petr KONVALINKA, CSc., FEng.	FCE, 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. Jakub SLÁMA	FEE (change from November 2021)
Chairman of the Legislative Committee	Mgr. Veronika VYMĚTALOVÁ, Ph.D.	FBME
Chairman of the Economic Commission	prof. Ing. Pavel RIPKA, CSc.	FEE
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
Chairman of the Student Committee	Bc. Adolf VALÁŠEK	FME
Chairman of the Information Strategy Committee	prof. Dr. Ing. Jan KYBIC	FEE
Chairman of the Commission for Science, Creative Activity and Doctoral Studies, Assoc.	doc. Dr. Ing. Ivan RICHTER	FNSPE
Members of the Academic Senate, Assoc.	doc. Ing. Josef JETTMAR, CSc., FCE	
	prof. Ing. Jan TYWONIAK, CSc.	FCE
	prof. Ing. František WALD, CSc.	FCE
	Bc. Ondřej VÁŇA	FCE (from March 2021)
	Ing. Jakub HOLAN	FCE
	doc. Ing. Václav BAUMA, CSc.	FME
	prof. Ing. Jan HRDLIČKA, Ph.D.	FME
	Ing. Karel VÍTEK, CSc.	FME
	Bc. Jiří SVOBODA	FME (until June 2021)
	Ing. MSc. Vojtěch ŠTĚCH	FME (until October 2021)
	Bc. Adolf VALÁŠEK	FME
	RNDr. Ilona Ali BLÁHOVÁ, Ph.D.	FEE
	prof. Ing. Pavel RIPKA, CSc.	FEE
	Bc. Petra FRIDRICHOVÁ	FEE
	Bc. Jakub SLÁMA	FEE
	Ing. Petr AMBROŽ, Ph.D.	FNSPE
	doc. Mgr. Jaroslav BIELČÍK, Ph.D.	FNSPE
	doc. Dr. Ing. Ivan RICHTER	FNSPE
	Ing. Michal FARNÍK	FNSPE
	Bc. Lukáš KULIČKA	FNSPE
	doc. Ing. arch. Dalibor HLAVÁČEK, Ph.D.	FA
	Ing. arch. Dana MATĚJOVSKÁ, Ph.D.	FA, Vice-Chairman AS
	RNDr. Jiří ŠRUBAŘ, Ph.D.	FA, Chairman of the Commission for Educational Affairs AS
	Bc. Marek WAGNER	FA (from November 2021)
	Lucie KADRMASOVÁ	FA (from November 2021)
	Ing. arch. Kristýna SCHULZOVÁ	FA
	Mgr. Jitka HEŘMANOVÁ	FTS
	Ing. Tomáš DOKTOR	FTS
	Ing. Luboš NOUZOVSKÝ, Ph.D.	FTS

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Table 1.3.4: CTU Academic Senate

Members of the Academic Senate, Assoc.	Ing. Michaela NEUHÄSEROVÁ	FTS
	Ing. Petr RICHTER	FD (until December 2021)
	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
	doc. Ing. Jan JANOUŠEK, Ph.D.	FIT, Chairman AS
	Ing. Stanislav JEŘÁBEK	FIT
	Ing. Jan ŘEZNÍČEK	FIT
	prof. Ing. Václav HLAVÁČ, CSc.	CIIRC, Chairman of the AS Commission for Development and Quality
	Mgr. Libor VYKYDAL	IFES
	Ing. Bc. Pavel ANDRES, Ph.D., ING. PAED. IGIP	MIAS
	Bc. Jozef ŠEBÁK	MIAS, Member of the AS Student Committee (until July 2021)
	Mgr. Adam ZABLOUDIL	KI (from July 2021)
	Jan MIKEŠ	Member of the student committee AS MIAS

Table 1.3.5: Disciplinary Commission	
Chair Members – academics	Ing. Petr TEJ, Ph.D. (KI)
	Ing. Dagmar ČÁMSKÁ, Ph.D. (MIAS)
Chair Members – students	Ing. Petr KNĚŽ (KI)
	Daniel LAPOSA (MIAS)
Alternates – academics	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. Jan UHLÍŘ, CSc. (FEE)
Members	prof. Ing. Miloslav HAVLÍČEK, DrSc. (FNSPE)
	prof. Ing. Jan HOLUB, Ph.D. (FIT)
	doc. Ing. Jitka VAŠKOVÁ, CSc. (FCE)

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. (FEL)
	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)
	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)
doc. Dr. Ing. Ivan RICHTER (FNSPE)

Members of the Assembly
doc. Dr. Ing. Ivan RICHTER (FNSPE)
Mgr. Veronika VYMĚTALOVÁ, Ph.D. (FBME)
Ing. arch. Jana ZDRÁHALOVÁ, Ph.D. (FA)
Ing. Jan MUŽÍK, Ph.D. (FBME)
JUDr. Milena MACKOVÁ (FTS)
doc. Ing. Hana KUBÁTOVÁ, CSc. (FIT)
doc. Ing. Stanislav VÍTEK, Ph.D. (FEE)
prof. Ing. Michal POLÁK, CSc. (FME)
prof. Ing. Zbyněk ŠIKA, Ph.D. (FME)
doc. Ing. Ľubomír SKLENKA, Ph.D. (FNSPE)

Legislative Working Committee
Mgr. Veronika VYMĚTALOVÁ, Ph.D. (FBME)

Working Committee on Economics
doc. Dr. Ing. Ivan RICHTER (FNSPE)

Working Commission for Educational Activities
doc. Ing. Ľubomír SKLENKA, Ph.D. (FNSPE)

Working Committee for Scientific Activities
doc. Ing. Stanislav VÍTEK, Ph.D. (FEE)
Ing. arch. Jana ZDRÁHALOVÁ, Ph.D. (FA)
doc. Dr. Ing. Ivan RICHTER (FNSPE)
prof. Ing. Michal POLÁK, CSc. (FCE)
prof. Ing. Zbyněk ŠIKA, Ph.D. (FME)

Working Committee on Strategy and Development in Higher Education
Ing. Michal FARNÍK (FNSPE)
Ing. Jan MUŽÍK, Ph.D. (FBME)
doc. Ing. Stanislav VÍTEK, Ph.D. (FEL)

Working Commission on Quality of Higher Education Institutions and its Evaluation
Ing. Michal FARNÍK (FNSPE)
doc. Ing. Hana KUBÁTOVÁ, CSc. (FIT)

Working Committee for External and Foreign Relations
Ing. Jan MUŽÍK, Ph.D. (FBME)

Student Chamber of the Council of Universities
Ing. Michal FARNÍK, Delegate (FNSPE)
Bc. Lukáš KULIČKA, Alternate (FNSPE)

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									
Natural Sciences, Mathematics and Statistics	05							1		1
Technology, manufacturing and construction	07	11				9		21	16	57
Faculty total	X	11				9		22	16	58
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			17	8	8	6	45
Faculty total	X	3	3			18	9	8	6	47
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04							2	2	4
Natural Sciences, Mathematics and Statistics	05							4		4
Information and communication technologies	06	4				2		4	1	11
Technology, manufacturing and construction	07	9	1			13	1	9	5	38
Faculty total	X	13	1			15	1	19	8	57
Faculty of Nuclear Sciences and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	11				15		6	2	34
Information and communication technologies	06	1				2		1	1	5
Technology, manufacturing and construction	07					1		3	2	6
Health and social care, care for favourable living conditions	09	1								1
Faculty total	X	13				18		10	5	46
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Human Sciences	02	2				1		1		4
Technology, manufacturing and construction	07	3				3		2	3	11
Faculty total	X	5				4		3	3	15
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07							2	1	3
Services	10	4	2			6	2	6	4	24
Faculty total	X	4	2			6	2	8	5	27

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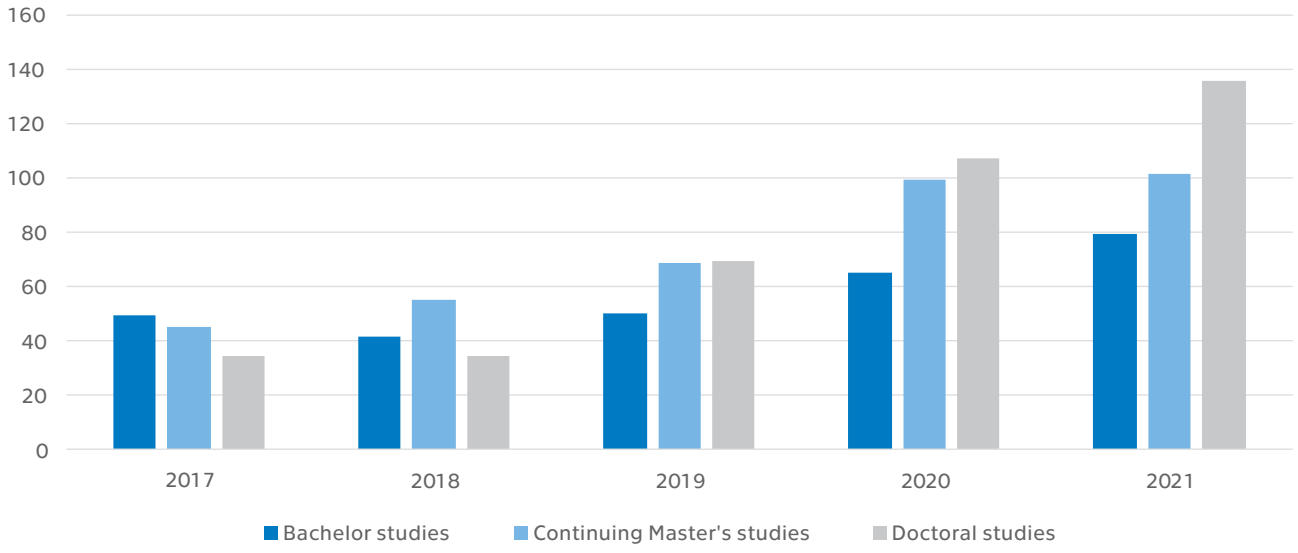
Table 2.1: Accredited study programmes (numbers)

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	8				5	1	1	2	17
Services	10	2	2			1	2	2	2	11
Faculty total	X	12	3			8	4	5	6	38
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	3	2			3		3	2	13
Faculty total	X	3	2			3		3	2	13
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		2							2
Arts and Human Sciences	02							1	1	2
Business, Administration and Law	04	2				3	1	1	1	8
Technology, manufacturing and construction	07							1	1	2
Faculty total	X	2	2			3	1	3	3	14
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		2							2
Arts and Human Sciences	02	2				1		2	1	6
Business, Administration and Law	04	2				4	2	3	3	14
Natural Sciences, Mathematics and Statistics	05	11				15		11	2	39
Information and communication technologies	06	9	2			8		9	5	33
Technology, manufacturing and construction	07	27	5			44	10	47	35	168
Health and social care, care for favourable living conditions	09	9				5	1	1	2	18
Services	10	6	4			7	4	8	6	35
UNIVERSITIES TOTAL	X	66	13			84	17	81	54	315

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)



STUDY PROGRAMMES IN A FOREIGN LANGUAGE (NUMBERS)

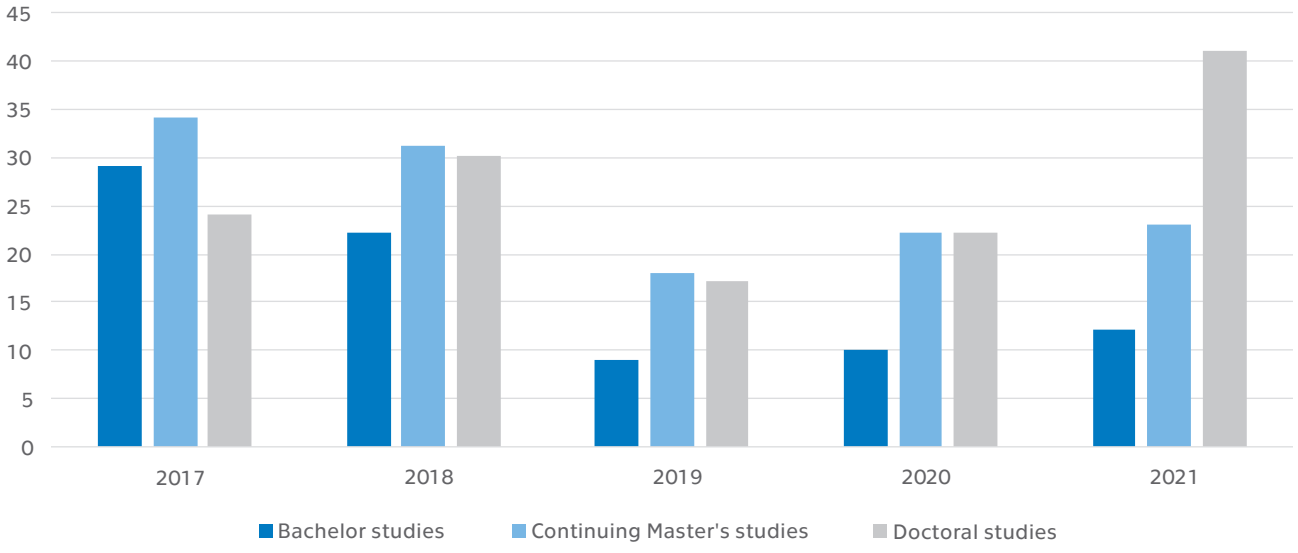


Table 2.2: Study programmes in a foreign language (numbers)

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		9	4	16
Faculty total	X	2				1		9	4	16
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	2				5		3		10
Faculty total	X	2				5		3		10
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04							1	1	2
Natural Sciences, Mathematics and Statistics	05							2		2
Information and communication technologies	06					1		2		3
Technology, manufacturing and construction	07	1				6		5	2	14
Faculty total	X	1				7		10	3	21
Faculty of Nuclear Sciences and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05					1		3	1	5
Technology, manufacturing and construction	07							2	1	3
Faculty total	X					1		5	2	8
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 Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Services	10	2				2		1		5
Faculty total	X	2				2		1		5

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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 Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	1								1
Health and social care, care for favourable living conditions	09	1				2			1	4
Faculty total	X	2				2			1	5
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	2				2		1		5
Faculty total	X	2				2		1		5
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04	1				2				3
Faculty total	X	1				2				3
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04	1				2		1	1	5
Natural Sciences, Mathematics and Statistics	05					1		5	1	7
Information and communication technologies	06	2				3		3		8
Technology, manufacturing and construction	07	6				13		20	8	47
Health and social care, care for favourable living conditions	09	1				2			1	4
Services	10	2				2		1		5
UNIVERSITIES TOTAL	X	12	0			23	0	30	11	76

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 Masters in Structural Analysis of Monuments and Historical Constructions
Partner organisations	University of Minho, Portugal
Associated organisations	Institute of Theoretical and Applied Mechanics of the CAS
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.	5
Faculty of Civil Engineering – 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	none
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.	0
Faculty of Civil Engineering – 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	none
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.	1
Faculty of Civil Engineering – Programme name 4	Study program Civil Engineering, Double Degree Master Program in Civil Engineering
Partner organisations	École Centrale de Nantes, France
Associated organisations	none
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.	0

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Faculty of Civil Engineering – 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), Rumunia 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, Russia 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
Type of programme (Joint/Double/Multiple Degree)	Multiple Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's Degree
Number of active studies as of 31. 12.	0
Faculty of Civil Engineering – Programme name 6	Stavební inženýrství, Double Degree Master Program in Civil Engineering
Partner organisations	KTH Royal Institute of Technology, Stockholm, Sweden
Associated organisations	none
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.	0
Faculty of Civil Engineering – 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	none
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.	2

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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	TU Chemnitz (D), ENSTA Bretagne (F), HAN Arnhem (NL), IT Bandung (RI)
Associated organisations	
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.	53
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
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's Degree
Počet aktivních studií k 31. 12.	13
Faculty of Electrical Engineering – Programme name 2	Power Generation and Transportation
Partner organisations	Tomsk Polytechnic University (TPU), Russian Federation
Associated organisations	none
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.	21
Faculty of Electrical Engineering – Programme name 3	
Partner organisations	Double degree programme with National Taiwan University of Science and Technology
Associated organisations	National Taiwan University of Science and Technology), DECE (Department of Electronic and Computer Engineering
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.	6

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Faculty of Electrical Engineering – Programme name 4	Double Degree with RWTH Aachen
Partner organisations	RWTH Aachen
Associated organisations	none
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.	5
Faculty of Electrical Engineering – Programme name 5	Double Degree with Kazan Federal University
Partner organisations	Kazan Federal University
Associated organisations	none
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.	12
Faculty of Electrical Engineering – Programme name 6	Double Degree programme EURECOM, France
Partner organisations	Graduate School and Research Center in Digital Sciences, BIOT, Sophia Antipolis, France
Associated organisations	Mobile Computing Systems
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.	1
Faculty of Nuclear Sciences and Physical Engineering – Programme name 1	DSP Applications of Natural Sciences, field of Nuclear Engineering
Partner organisations	University Gent, Belgium
Associated organisations	Institute of Theoretical and Applied Mechanics of the CAS
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	0
Faculty of Nuclear Sciences and Physical Engineering – Programme name 2	DSP Mathematical Engineering
Partner organisations	University of Kanazawa, Japan
Associated organisations	none
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	1
Faculty of Nuclear Sciences and Physical Engineering – Programme name 3	DSP Physical Engineering
Partner organisations	University of Kanazawa, Japan
Associated organisations	none
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
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	
Faculty of Nuclear Sciences and Physical Engineering – Programme name 4	NMSP Mathematical Engineering
Partner organisations	University of Kanazawa, Japan
Associated organisations	none
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.	0
Faculty of Nuclear Sciences and Physical Engineering – Programme name 5	NMSP Solid State Engineering
Partner organisations	University of Kanazawa, Japan
Associated organisations	none
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.	0
Faculty of Transportation Sciences – Programme name 1	Intelligent Transport Systems
Partner organisations	Linköpings universitet, Sweden UAS Fachhochschule Technikum Wien, Austria
Associated organisations	none
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.	4
Faculty of Transportation Sciences – Programme name 2	Smart Cities
Partner organisations	The University of Texas in El Paso
Associated organisations	none
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.	4
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, Unted Kingdom University of Patras, Greece Technical University of Warsaw, Poland
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.	3

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Table 2.3: Joint/Double/Multiple Degree Study Programmes with Foreign HEIs	
CTU in Prague	
Masaryk Institute of Advanced Studies – Programme name 1	Economics and Management
Partner organisations	Wuhan University of Technology (WUT)
Associated organisations	none
Type of programme (Joint/Double/Multiple Degree)	Double Degree
Type of programme (bachelor's, postgraduate, master's, doctoral)	Bachelor's
Number of active studies as of 31. 12.	0
Masaryk Institute of Advanced Studies – Programme name 2	Innovation Project Management
Partner organisations	Wuhan University of Technology (WUT)
Associated organisations	none
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.	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	1	0	20	3	24
Number of active studies in the following programmes	0	0	130	1	131

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 – programme name 1	Mechatronika
The broadly defined field of ISCED-F	714
Partner university/institution*	University of South Bohemia in České Budějovice
Type of programme (bachelor's, postgraduate, master's, doctoral)	Bachelor's
Number of active studies as of 31. 12.	2
Faculty of Electrical Engineering – programme name 1	Biomedical Engineering and Informatics
Broadly defined fields of ISCED-F	688
Partner university/institution*	Charles University – 1st Faculty of Medicine
Type of programme (bachelor's, postgraduate, master's, doctoral)	Master's degree
Number of active studies as of 31. 12.	2
Faculty of Nuclear Sciences and Physical Engineering – programme name 1	Mathematical Engineering
Broadly defined fields of ISCED-F	0541
Partner university/institution*	CAS, v.v.i.
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	41
Faculty of Nuclear Sciences and Physical Engineering – programme name 2	Physical Engineering
Broadly defined fields of ISCED-F	0533
Partner university/institution*	CAS, v.v.i.
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	91
Faculty of Nuclear Sciences and Physical Engineering – programme name 3	Nuclear Engineering
Broadly defined fields of ISCED-F	0533, 0713
Partner university/institution*	CAS, v.v.i.
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	78
Faculty of Nuclear Sciences and Physical Engineering – programme name 4	Nuclear Chemistry
Broadly defined fields of ISCED-F	0531
Partner university/institution*	CAS, v.v.i.
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	27

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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	
Faculty of Nuclear Sciences and Physical Engineering – programme name 5	Radiological physics
Broadly defined fields of ISCED-F	0533, 0914, 0915
Partner university/institution*	CAS, v.v.i.
Type of programme (bachelor's, postgraduate, master's, doctoral)	doctoral
Number of active studies as of 31. 12.	16
Faculty of Architecture – programme name 1	Landscape architecture
Broadly defined fields of ISCED-F	731
Partner university/institution*	Czech University of Life Sciences Prague
Type of programme (bachelor's, postgraduate, master's, doctoral)	Bachelor's
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	5	8
Number of active studies in the following programmes	3	0	2	253	258

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	14	6	6		1			27
Arts and Human Sciences	02	110	45	16		3		26	200
Natural Sciences, Mathematics and Statistics	05	5	25	30				7	67
Information and communication technologies	06		35	132				29	196
Technology, manufacturing and construction	07		15	36			2	17	70
Agriculture, forestry, fishing and veterinary medicine	08							2	2
Health and social care, care for favourable living conditions	09	1		10					11
Services	10							6	6
TOTAL	X	134	127	230	0	4	2	89	586

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
Broadly defined fields of ISCED-F	code			
Programmes and qualifications – general education	00	148	30	
Education and upbringing	01	4	27	10
Arts and Human Sciences	02	208	223	215
Natural Sciences, Mathematics and Statistics	05	98	61	29
Information and communication technologies	06		33	103
Technology, manufacturing and construction	07		15	63
Agriculture, forestry, fishing and veterinary medicine	08			
Health and social care, care for favourable living conditions	09	9		10
TOTAL*	X	467	389	430

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
up to 15 hod	from 16 to 100 hrs	over 100 hrs			
			21	199	
	5			46	5
	30		418	1,094	1
			165	353	3
			256	392	50
		42	346	466	41
			122	122	
				19	9
0	35	42	1,328	2,691	109

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									
Natural Sciences, Mathematics and Statistics	05							1		1
Technology, manufacturing and construction	07	2,333				778		225	162	3,498
Faculty total	**X**	**2,333**				**778**		**226**	**162**	**3,499**
Of which the number of women	X	893				320		86	46	1345
Of which the number of foreigners	X	302				105		25	11	443
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04					42	8			50
Technology, manufacturing and construction	07	1,147	76			640	37	176	137	2,213
Faculty total	**X**	**1,147**	**76**			**682**	**45**	**176**	**137**	**2,263**
Of which the number of women	X	77	8			72	7	30	17	211
Of which the number of foreigners	X	153	5			84	9	23	19	293
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04							9	3	12
Natural Sciences, Mathematics and Statistics	05							10		10
Information and communication technologies	06	682				345		93	2	1,122
Technology, manufacturing and construction	07	1,013	34			415	11	119	98	1,690
Faculty total	**X**	**1,695**	**34**			**760**	**11**	**231**	**103**	**2,834**
Of which the number of women	X	231	4			109	1	25	14	384
Of which the number of foreigners	X	400	4			173	2	77	18	674
Faculty of Nuclear Sciences and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	561				157		29	2	749
Information and communication technologies	06	101				53		2	2	158
Technology, manufacturing and construction	07					1		163	83	247
Health and social care, care for favourable living conditions	09	29								29
Faculty total	**X**	**691**				**211**		**194**	**87**	**1,183**
Of which the number of women	X	230				68		58	20	376
Of which the number of foreigners	X	159				27		49	7	242

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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 Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Humanities	02	85				44		6		135
Technology, manufacturing and construction	07	879				430		72	45	1,426
Faculty total	**X**	**964**				**474**		**78**	**45**	**1,561**
Of which the number of women	X	610				309		36	23	978
Of which the number of foreigners	X	236				125		16	6	383
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07							8	9	17
Services	10	666	31			239	61	70	47	1,114
Faculty total	**X**	**666**	**31**			**239**	**61**	**78**	**56**	**1,131**
Of which the number of women	X	114	11			67	19	19	17	247
Of which the number of foreigners	X	167	7			33	12	16	6	241
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	29				16		18	8	71
Technology, manufacturing and construction	07	116	11			3	1	12	23	166
Health and social care, care for favourable living conditions	09	886	0			139	89	25	15	1,154
Services	10	125	109			97	134	8	49	522
Faculty total	**X**	**1,156**	**120**			**255**	**224**	**63**	**95**	**1,913**
Of which the number of women	X	776	27			174	111	28	35	1,151
Of which the number of foreigners	X	91	1			19	10	6	9	136
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	1,640	123			465		41	24	2,293
Faculty total	**X**	**1,640**	**123**			**465**		**41**	**24**	**2,293**
Of which the number of women	X	218	25			48		4	2	297
Of which the number of foreigners	X	511	20			116		6	1	654
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		162							162
Arts and Human Sciences	02							1	3	4
Business, Administration and Law	04	397				146	138	1	1	683
Technology, manufacturing and construction	07							11	13	24
Faculty total	**X**	**397**	**162**			**146**	**138**	**13**	**17**	**873**
Of which the number of women	X	209	66			79	64	1	3	422
Of which the number of foreigners	X	39	4			19	23	1		86

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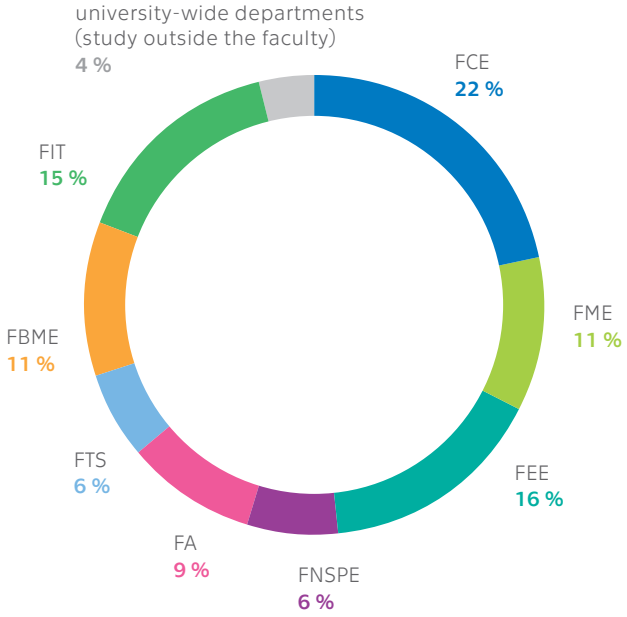
Table 3.1: Students in accredited study programmes (number of studies)

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		162							162
Arts and Human Sciences	02	85				44		7	3	139
Business, Administration and Law	04	397				188	146	10	4	745
Natural Sciences, Mathematics and Statistics	05	561				157		40	2	760
Information and communication technologies	06	2,452	123			879		154	36	3,644
Technology, manufacturing and construction	07	5,488	121			2,267	49	786	570	9,281
Health and social care, care for favourable living conditions	09	915				139	89	25	15	1,183
Services	10	791	140			336	195	78	96	1,636
UNIVERSITIES TOTAL	X	10,689	546			4,010	479	1,100	726	17,550
Of which the number of women	X	3,358	141			1,246	202	287	177	5,411
Of which the number of foreigners	X	2,058	41			701	56	219	77	3,152

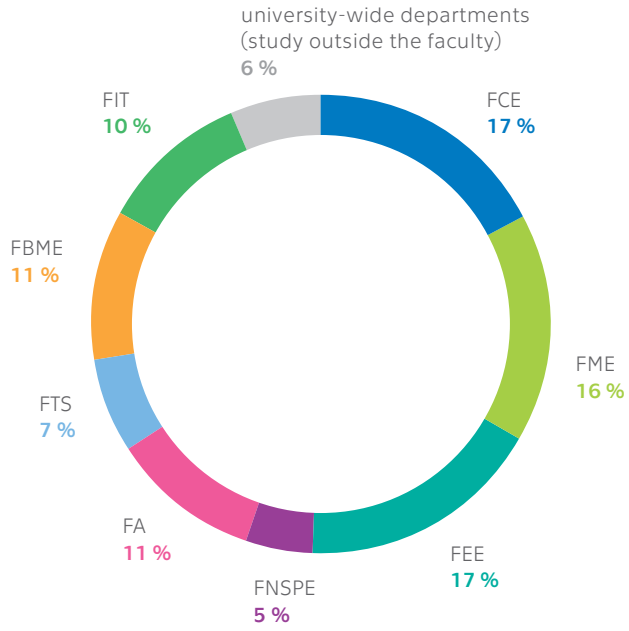
Note: * Faculty or other part of the university implementing the accredited study programme

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

STUDENTS IN BACHELOR'S DEGREE PROGRAMMES IN 2021



STUDENTS IN CONTINUING MASTER'S DEGREE PROGRAMMES IN 2021



STUDENTS IN DOCTORAL DEGREE PROGRAMMES IN 2021

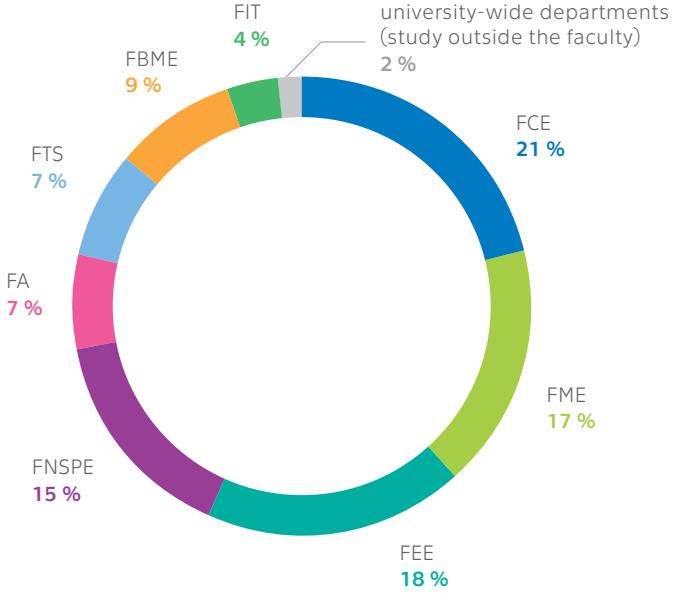


Table 3.2: Self-paying students** (number of studies)

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	11				6				17
Faculty total	X	11				6				17
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	54				64				118
Faculty total	X	54				64				118
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06					6		2		8
Technology, manufacturing and construction	07	60				20		1	1	82
Faculty total	X	60				26		3	1	90
Faculty of Nuclear Sciences and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05					2				2
Technology, manufacturing and construction	07							1		1
Faculty total	X					2		1		3
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07					11			2	13
Faculty total	X					11			2	13
Faculty of Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Services	10	19								19
Faculty total	X	19								19
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07	5								5
Health and social care, care for favourable living conditions	09	5				2				7
Faculty total	X	10				2				12
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	108				11				119
Faculty total	X	108				11				119

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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	
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04	2				5				7
Faculty total	X	2				5				7
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04	2				5				7
Natural Sciences, Mathematics and Statistics	05					2				2
Information and communication technologies	06	108				17		2		127
Technology, manufacturing and construction	07	130				101		2	3	236
Health and social care, care for favourable living conditions	09	5				2				7
Services	10	19								19
UNIVERSITIES TOTAL	X	264				127		4	3	398

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-tim
PT/DL = part-time / distance learning

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

CTU in Prague	Bachelor's studies			Master's studies		
	FT	PT/DL	TOTAL	FT	PT/DL	TOTAL
Faculty of Civil Engineering***	42.6	0.0	42.6			
Faculty of Mechanical Engineering***	31.6	77.4	35.9			
Faculty of Electrical Engineering***	31.8	68.0	33.0			
Faculty of Nuclear Sciences and Physical Engineering***	54.0	0.0	54.0			
Faculty of Architecture***	20.4	0.0	20.4			
Faculty of Transportation Sciences***	47.4	63.4	49.2			
Faculty of Biomedical Engineering***	30.1	32.1	30.4			
Faculty of Information Technology***	44.5	63.6	46.7			
School-wide workplaces (study outside the faculty)***	21.3	0.0	21.1			
UNIVERSITIES TOTAL	37.2	60.6	38.5			

Note: * Study failure rate is the ratio of the number of studies started in calendar year 'n' to the sum of failed studies of this cohort in calendar years n and n+1.

Note: ** These are all students who enrolled in a given college in calendar year 'n', whether they are first-time enrollees or not.

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

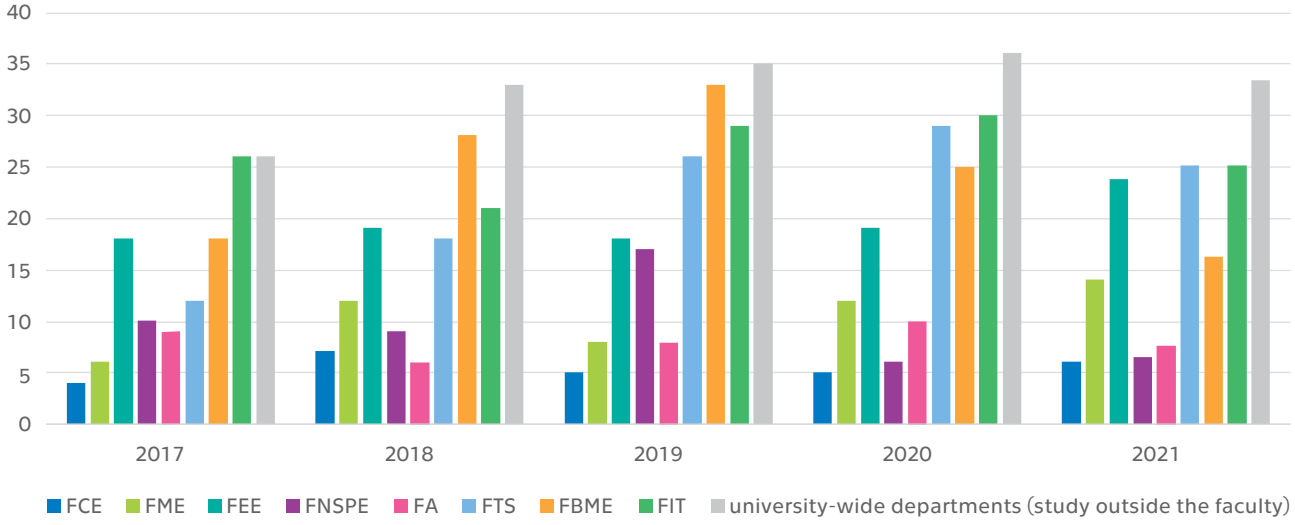
FT = full-time
PT/DL = part-time / distance learning

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:

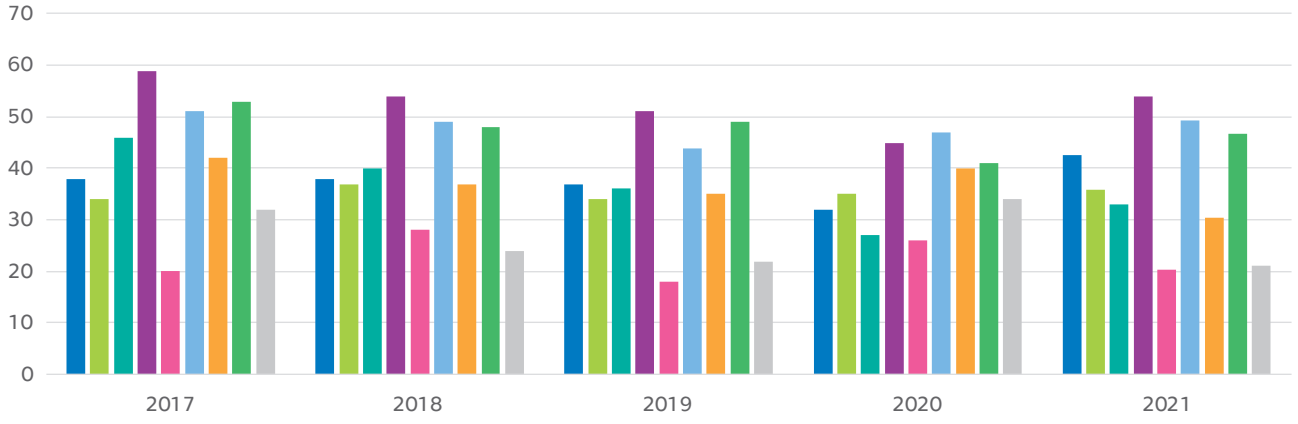
In 2020 (between 1 January and 31 December), 500 full-time undergraduate students were enrolled at the Faculty. In the same and the following year, 180 of this cohort were unsuccessfully completed. The first year failure rate for this cohort is 180/500=0.36, or 36%.

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



Continuing Master's studies			Doctoral studies			TOTAL
FT	PT/DL	TOTAL	FT	PT/DL	TOTAL	
6.0	0.0	6.0	9.8	30.8	13.5	30.2
9.6	50.0	14.0	6.3	4.5	5.9	26.3
21.6	75.0	23.7	10.7	46.7	18.3	29.2
6.5	0.0	6.5	3.9	0.0	3.6	39.6
7.6	0.0	7.6	5.6	11.1	6.9	15.2
15.4	50.0	25.1	23.1	25.0	23.5	40.5
13.6	18.6	16.2	25.0	17.4	20.9	26.0
25.1	0.0	25.1	6.7	0.0	6.3	41.9
32.0	34.8	33.3	0.0	0.0	0.0	25.9
14.0	35.2	16.7	9.2	18.7	11.3	30.6

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



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

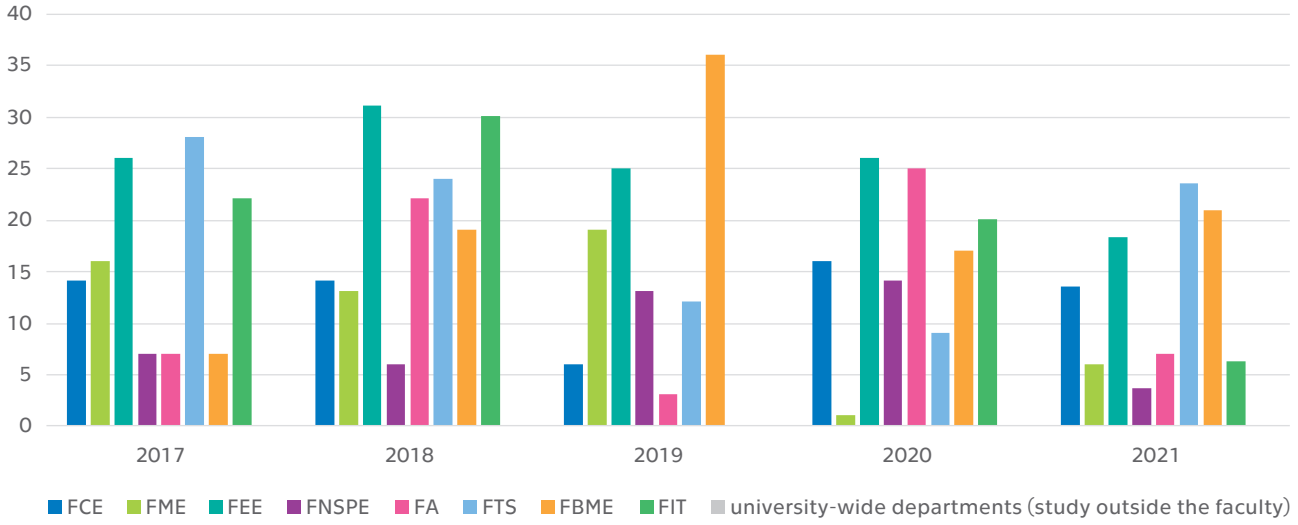


Table 3.4: Scholarships* to students by purpose of the scholarship (number of individuals)

CTU in Prague

Purpose of the scholarship	Number of students	Average scholarship amount**
For outstanding academic performance according to § 91 (2) (a)	3,542	9,022
For outstanding scientific, research, development, artistic or other creative achievements pursuant to Section 91(2) (b)	908	32,268
For research, development and innovation activities according to a special legal regulation, § 91 (2) (c)	784	38,636
In the case of a student in a difficult social situation according to § 91 (2) (d)	8	21,990
In the case of a student in a difficult social situation according to § 91 (3)	23	18,961
In cases of special consideration pursuant to Section 91(2) (e)	14,179	9,961
Of which accommodation scholarship	**13,697**	**4,153**
To support study abroad according to § 91 (4) (a)	85	29,326
To support studies in the Czech Republic according to § 91 (4) (b)	93	23,987
Students of doctoral study programmes according to § 91 (4) (c)	1,346	62,079
Other scholarships	972	11,182
TOTAL***	21,940	15,157

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	333				399		4	49	785
Total faculty	**X**	**333**				**399**		**4**	**49**	**785**
Of which the number of women	X	148				168		2	11	329
Of which number of foreigners	X	54				37			2	93
Faculty of Mechanical Engineering*										
Broadly defined fields of ISCED-F	code									
Business, Administration and Law	04						1			1
Technology, manufacturing and construction	07	335	7			283	13	5	17	660
Total faculty	**X**	**335**	**7**			**283**	**14**	**5**	**17**	**661**
Of which the number of women	X	36				35			4	75
Of which number of foreigners	X	26	2			49	3	1		81
Faculty of Electrical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05							2		2
Information and communication technologies	06	169	1			81				251
Technology, manufacturing and construction	07	167	2			141	3	11	25	349
Total faculty	**X**	**336**	**3**			**222**	**3**	**13**	**25**	**602**
Of which the number of women	X	47	1			38		2	1	89
Of which number of foreigners	X	50	1			77		1	6	135
Faculty of Nuclear Sciences and Physical Engineering*										
Broadly defined fields of ISCED-F	code									
Natural Sciences, Mathematics and Statistics	05	87				2				89
Information and communication technologies	06					72				72
Technology, manufacturing and construction	07							8	31	39
Total faculty	**X**	**87**				**74**		**8**	**31**	**200**
Of which the number of women	X	29				26		1	4	60
Of which number of foreigners	X	12				15		1	3	31
Faculty of Architecture*										
Broadly defined fields of ISCED-F	code									
Arts and Human Sciences	02	29				19				48
Technology, manufacturing and construction	07	146				157		1	6	310
Total faculty	**X**	**175**				**176**		**1**	**6**	**358**
Of which the number of women	X	123				101			3	227
Of which number of foreigners	X	38				45		1		84

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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 Transportation Sciences*										
Broadly defined fields of ISCED-F	code									
Technology, manufacturing and construction	07							1	6	7
Services	10	116	4			65	18		2	205
Total faculty	**X**	**116**	**4**			**65**	**18**	**1**	**8**	**212**
Of which the number of women	X	35	3			22	3			63
Of which number of foreigners	X	15	2			8	4		2	31
Faculty of Biomedical Engineering*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06					4				4
Technology, manufacturing and construction	07	50				35	5		5	95
Health and social care, welfare	09	146				8	9			163
Services	10	19	14			22	53		2	110
Total faculty	**X**	**215**	**14**			**69**	**67**		**7**	**372**
Of which the number of women	X	162	2			35	26		1	226
Of which number of foreigners	X	12				10			1	23
Faculty of Information Technology*										
Broadly defined fields of ISCED-F	code									
Information and communication technologies	06	236	14			130		1	4	385
Total faculty	**X**	**236**	**14**			**130**		**1**	**4**	**385**
Of which the number of women	X	31	1			14		1	1	48
Of which number of foreigners	X	61	1			27				89
School-wide workplaces (study outside the faculty)*										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		56							56
Arts and Human Sciences	02								3	3
Business, Administration and Law	04	101				74	24			199
Technology, manufacturing and construction	07								3	3
Total faculty	**X**	**101**	**56**			**74**	**24**		**6**	**261**
Of which the number of women	X	58	25			55	16		2	156
Of which number of foreigners	X	9				5				14

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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	
CTU in Prague										
Broadly defined fields of ISCED-F	code									
Education and upbringing	01		56							56
Arts and Human Sciences	02	29				19			3	51
Business, Administration and Law	04	101				74	25			200
Natural sciences, mathematics and statistics	05	87				2		2		91
Information and communication technologies	06	405	15			287		1	4	712
Technology, manufacturing and construction	07	1,031	9			1,015	21	30	142	2,248
Health and social care, welfare	09	146				8	9			163
Services	10	135	18			87	71		4	315
UNIVERSITIES TOTAL	X	1,934	98			1,492	126	33	153	3,836
Of which the number of women	X	669	32			494	45	6	27	1,273
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)

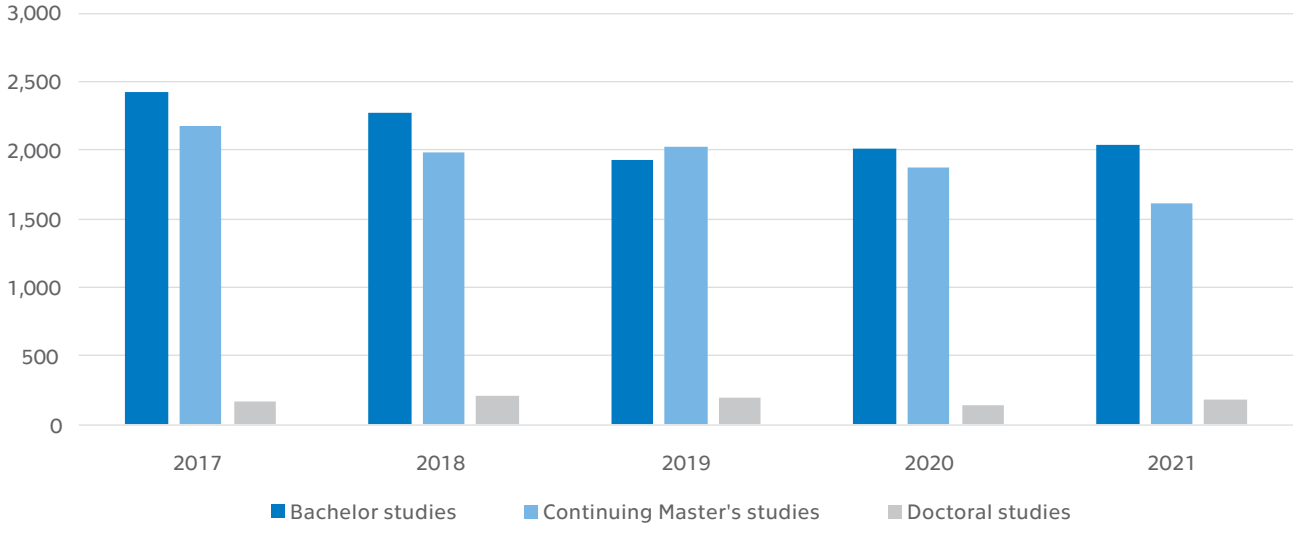

Table 5.1: Interest in studying at university

CTU in Prague		Bachelor studies				Master's studies	
		Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications
Faculty of Civil Engineering*							
Broadly defined ISCED-F disciplines	code						
Natural sciences, mathematics and statistics	05						
Technology, manufacturing and construction	07	1,893	2,281	1,452	1,106		
Total faculty	X	1,893	2,281	1,452	1,106		
Faculty of Mechanical Engineering*							
ISCED-F broadly defined disciplines	code						
Business, Administration and Law	04						
Technology, manufacturing and construction	07	998	1 012	635	531		
Total faculty	X	998	1 012	635	531		
Faculty of Electrical Engineering*							
ISCED-F broadly defined fields	code						
Arts and Human Sciences	02						
Business, Administration and Law	04						
Natural sciences, mathematics and statistics	05						
Information and Communication Technologies	06	873	996	324	251		
Technology, manufacturing and construction	07	939	1,106	546	431		
Total faculty	X	1,674	2,102	870	682		
Faculty of Nuclear Sciences and Physical Engineering*							
ISCED-F broadly defined disciplines	code						
Natural sciences, mathematics and statistics	05	519	551	315	270		
Information and communication technologies	06	239	246	103	87		
Technology, manufacturing and construction	07						
Health and social care, welfare	09	34	34	20	14		
Total faculty	X	781	831	438	371		
Faculty of Architecture*							
ISCED-F broadly defined disciplines	code						
Arts and Human Sciences	02	156	156	31	23		
Technology, manufacturing and construction	07	722	810	364	323		
Total Faculty	X	826	966	395	346		
Faculty of Transportation Sciences*							
ISCED-F broadly defined disciplines	code						
Information and communication technologies	07						
Health and social care, welfare	09	573	614	396	305		
Total faculty	X	573	614	396	305		

		Continuing Master's studies				Doctoral studies			
Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study
						1	1	1	1
		435	501	425	362	84	84	84	84
		435	501	425	362	85	85	85	85
		44	44	36	31				
		431	458	368	322	64	64	56	48
		471	502	404	353	64	64	56	48
						1	1	1	1
						7	7	6	6
						10	10	9	9
		293	313	216	173	54	55	50	50
		322	359	293	217	42	42	36	36
		583	672	509	390	114	115	102	102
		113	116	81	80	21	21	21	21
		7	7	7	7	4	4	4	4
						55	55	55	51
		120	123	88	87	80	80	80	76
		41	41	18	18				
		232	252	196	179	42	42	29	28
		269	293	214	197	42	42	29	28
						3	3	3	3
		232	263	150	135	27	27	27	27
		232	263	150	135	30	30	30	30

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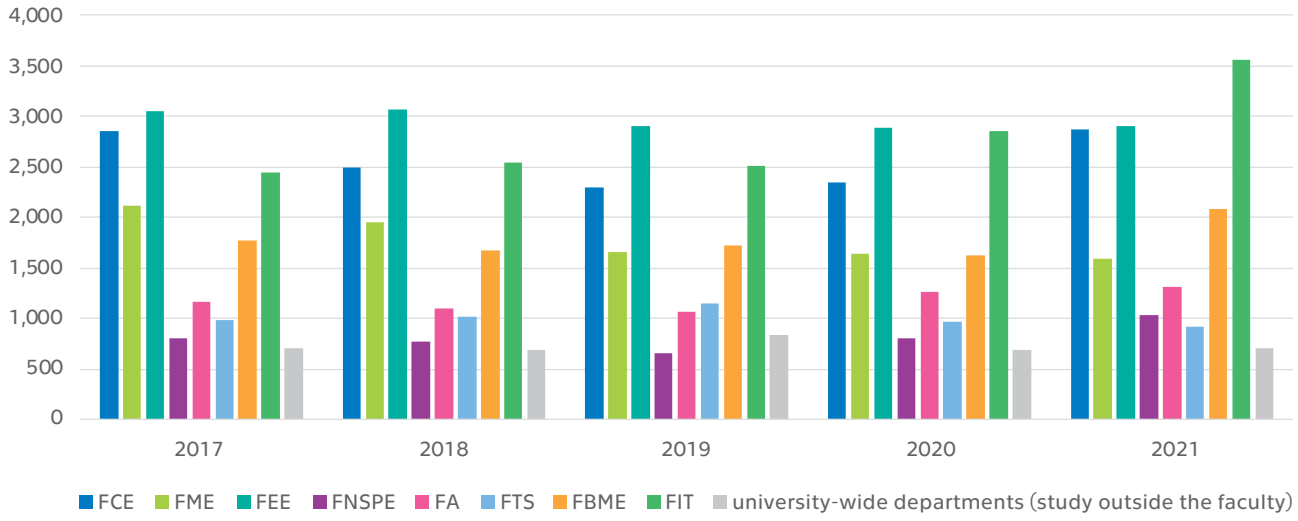
Table 5.1: Interest in studying at university

CTU in Prague		Bachelor studies				Master's studies	
		Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications
Faculty of Biomedical Engineering*							
ISCED-F broadly defined disciplines	code						
Information and Communication Technologies	06	39	39	20	18		
Health and social care, welfare	09	1,082	1,213	570	477		
Services	10	189	189	128	118		
Total faculty	X	1,268	1,441	718	613		
Faculty of Information Technology*							
ISCED-F broadly defined disciplines	code						
Information and Communication Technology	06	2,837	3,082	1,029	939		
Total Faculty	X	2,837	3,082	1,029	939		
Masaryk Institute of Advanced Studies*							
ISCED-F broadly defined fields of study	code						
Education and upbringing	01	81	81	73	72		
Business, Administration and Law	04	378	382	265	142		
Total Faculty	X	459	463	338	214		
CTU in Prague	– the total figure for HEIs is not the sum of the figures for individual faculties!						
ISCED-F broadly defined disciplines	code						
Education and upbringing	01	81	81	73	72		
Arts and Human Sciences	02	156	156	31	23		
Business, Administration and Law	04	378	382	265	142		
Natural sciences, mathematics and statistics	05	519	551	315	270		
Information and communication technologies	06	3,988	4,363	1,476	1,295		
Technology, manufacturing and construction	07	4,552	5,209	2,997	2,391		
Health and social care, welfare	09	1,116	1,247	590	491		
Services	10	762	803	524	423		
College TOTAL	X	9,229	12,792	6,271	5,107		

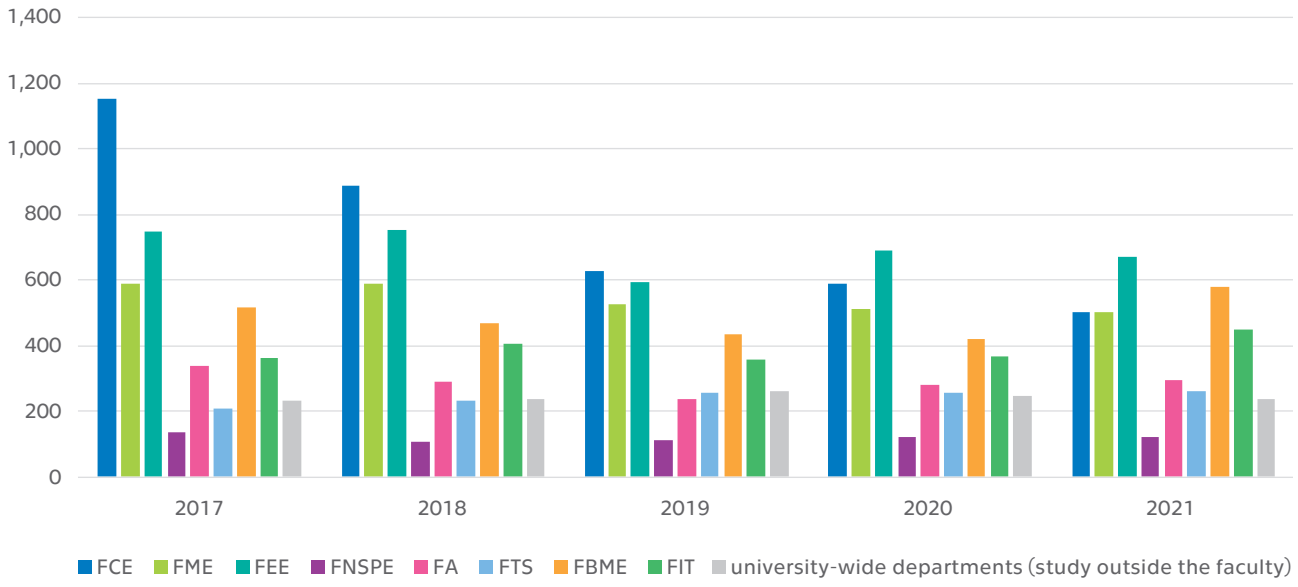
Note: * Faculty or other part of the university implementing the accredited study programme

		Continuing Master's studies				Doctoral studies			
Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study	Number of applicants (natural persons)	Number of applications	Number of admissions	Number of enrolments to study
		19	20	16	11	11	11	11	10
		232	263	187	150	21	21	18	18
		285	295	126	112	19	19	15	14
		513	578	329	273	51	51	44	42
		442	450	271	249	16	16	12	12
		442	450	271	249	16	16	12	12
		234	236	205	168				
		234	236	205	168				
		41	41	18	18	1	1	1	1
		278	280	241	199	7	7	6	6
		113	116	81	80	32	32	31	31
		761	790	510	440	85	86	77	76
		1,420	1,570	1,282	1,080	290	290	263	250
		232	263	187	150	21	21	18	18
		517	558	276	247	46	46	42	41
		3,143	3,618	2,595	2,214	482	483	438	423

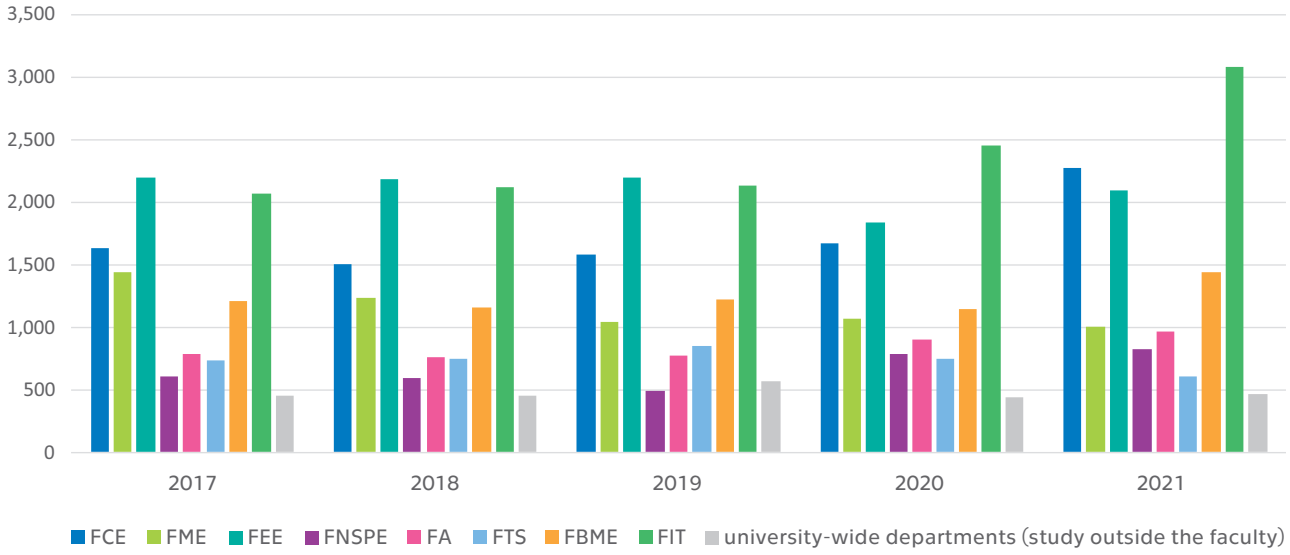
NUMBER OF APPLICATIONS (Bc.,NMgr.,Ph.D. studies total)



NUMBER OF APPLICATIONS (NMGR. STUDIES)



NUMBER OF APPLICATIONS (BC. STUDIES)



NUMBER OF APPLICATIONS (PH.D. STUDIES)

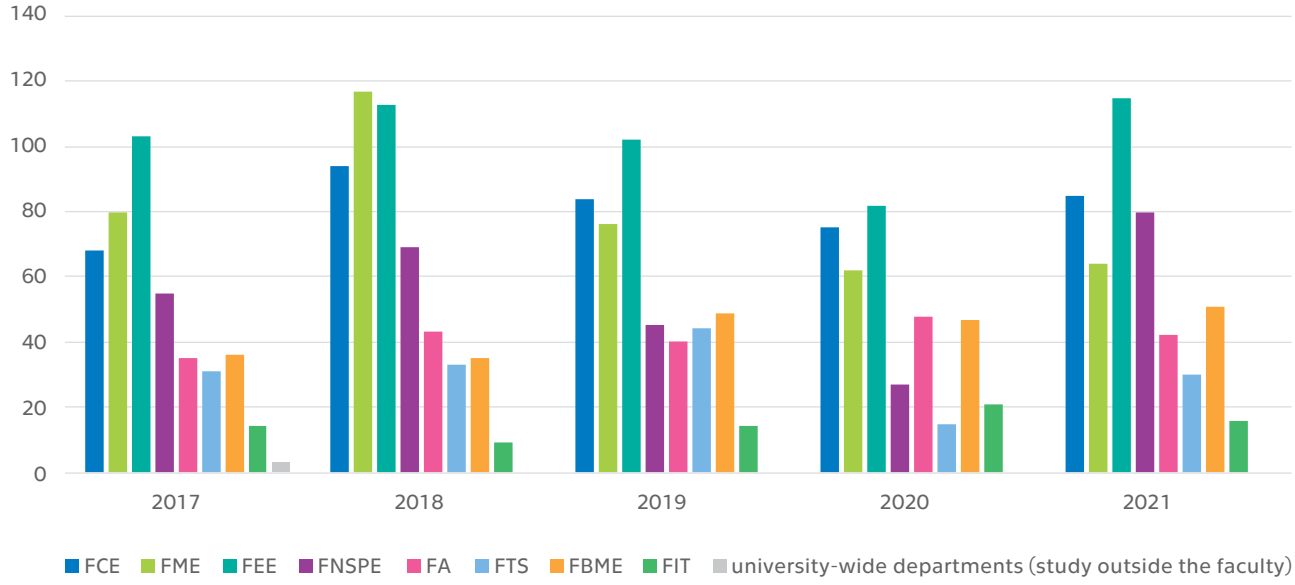


Table 6.1: Total academic and scientific staff and other employees (average headcount*)

CTU in Prague		Academic staff				
	TOTAL academic staff	Professors	Associate Professors	Assistant Professors	Assistant	Lecturers
Faculty of Civil Engineering******	368.2	49.0	105.8	212.4	1.1	0.0
Number of women	92.6	6.6	19.1	66.9	0.0	0.0
Faculty of Mechanical Engineering******	270.7	27.8	37.5	163.5	35.5	3.7
Number of women	26.2	0.4	3.0	20.8	0.1	1.3
Faculty of Electrical Engineering******	261.4	51.6	70.5	106.7	1.0	31.7
Number of women	22.1	2.0	3.0	12.7	4.4	0.0
Faculty of Nuclear Sciences and Physical Engineering******	149.7	25.0	37.0	84.8	0.7	2.1
Number of women	22.5	3.0	0.9	18.5	0.0	0.2
Faculty of Architecture******	114.1	16.3	23.7	73.7	0.0	0.0
Number of women	36.4	1.0	5.6	29.5	0.0	0.0
Faculty of Transportation Sciences******	133.0	8.0	31.5	78.1	9.9	5.4
Number of women	42.5	1.4	6.7	27.9	3.4	3.1
Faculty of Biomedical Engineering******	109.7	11.2	19.0	34.3	41.6	3.6
Number of women	38.5	0.9	3.8	14.2	16.9	2.6
Faculty of Information Technology******	103.9	4.5	17.7	71.9	4.6	5.2
Number of women	16.8	0.0	3.0	12.3	0.9	0.7
Masaryk Institute of Advanced Studies******	34.4	0.2	7.1	27.2	0.0	0.0
Number of women	15.7	0.0	2.5	13.2	0.0	0.0
Total other departments	59.3	6.3	5.5	37.3	2.4	0.1
Number of women	17.2	1.0	1.2	10.3	0.0	4.5
TOTAL	1,604.3	199.8	355.2	889.7	96.7	51.8
Total number of women	330.5	16.3	48.8	226.3	25.7	12.3

Note: * Average converted number is 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 reference category; incl. FTE, non-FTE) to the total annual working time pool per full-time employee.

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 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/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. Only an indicative number of postdoctoral students is given, due to the fact that they are registered in the CTU IS under other categories (separate functionality of postdoctoral students is not implemented in the EGJE IS).

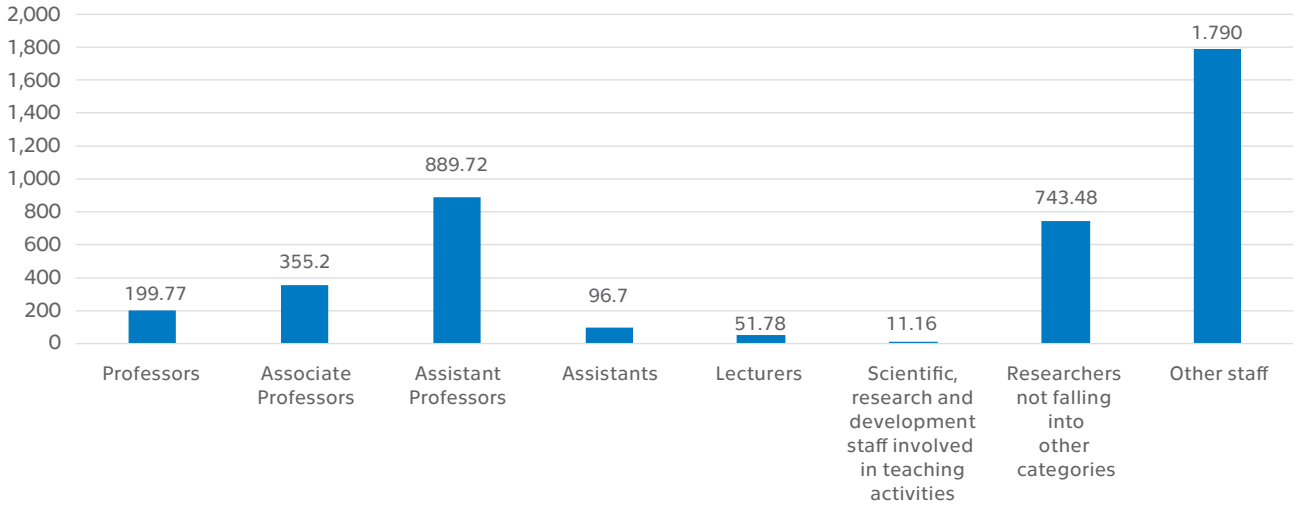
Note: **** The category "Other scientific, research and development personnel" includes technical and professional staff who are not directly involved in the research but are indispensable to the research activity (e.g. operators of research facilities).

Note: ***** Other staff means all other staff not directly involved in education and research. This includes administrative, technical and other staff.

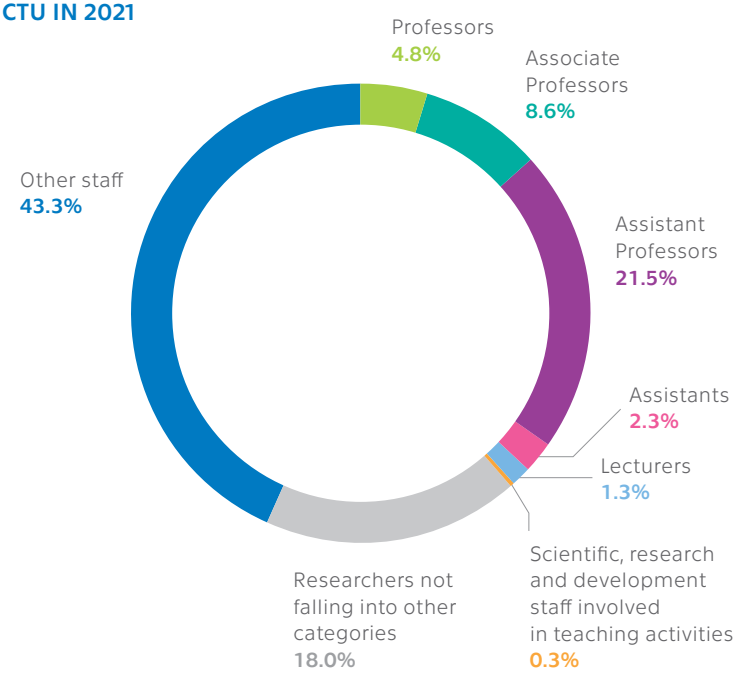
Note: ****** Faculty or other part of a higher education institution carrying out an accredited study programme.

Scientific and professional staff**					Other staff*****	TOTAL employees
Scientific, research and development staff involved in teaching activities	Extraordinary professors	Postdoctoral fellows ("postdocs")*** Indicative number	Researchers not falling into other categories	Other scientific, research and development personnel****		
0.0			79.8	0.0	220.5	668.5
0.0			25.1	0.0	127.5	245.2
2.8			27.3	0.0	252.6	550.6
0.8			3.8	0.0	85.9	116.0
0.0			208.4	0.0	192.7	662.5
0.0			15.3	0.0	98.4	135.9
0.2			108.7	0.0	114.3	372.7
0.0			25.4	0.0	77.6	125.4
0.4			6.0	0.0	57.1	177.2
0.3			1.8	0.0	40.8	79.1
0.0			21.8	0.0	138.1	292.9
0.0			7.0	0.0	69.8	119.3
0.0			26.7	0.0	41.8	178.2
0.0			8.0	0.0	27.6	74.1
0.0			21.3	0.0	62.4	187.6
0.0			3.7	0.0	32.4	52.9
0.0			1.0	0.0	24.5	60.0
0.0			0.7	0.0	18.9	35.4
7.8			242.6	0.0	686.0	987.9
0.2			34.0	0.0	387.0	438.2
11.2		34.0	743.5	0.0	1,790.1	4,171.9
1.2			124.9	0.0	965.9	1,421.3

STRUCTURE OF STAFF IN 2021 (AVERAGE RECALCULATED NUMBERS)

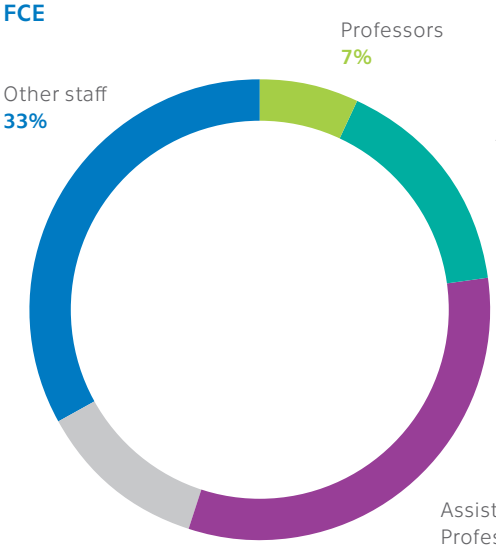


THE STRUCTURE OF THE EMPLOYEES OF CTU IN 2021
(AVERAGE RECALCULATED NUMBERS)



STRUCTURE OF EMPLOYEES BY INDIVIDUAL FACULTIES IN 2021 (AVERAGE RECALCULATED NUMBERS)

FCE



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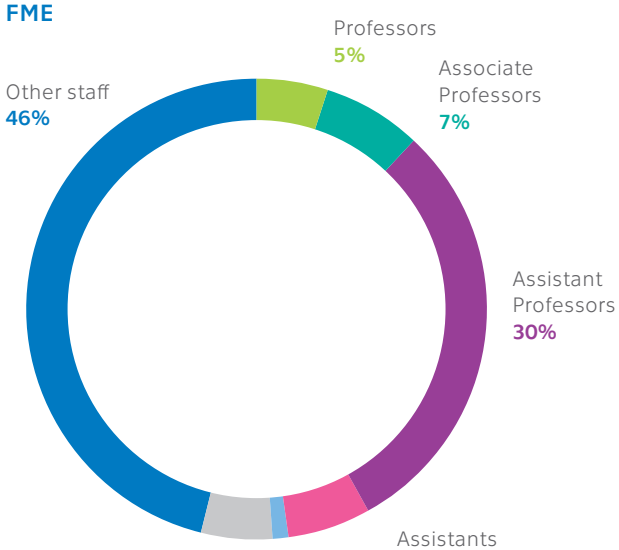

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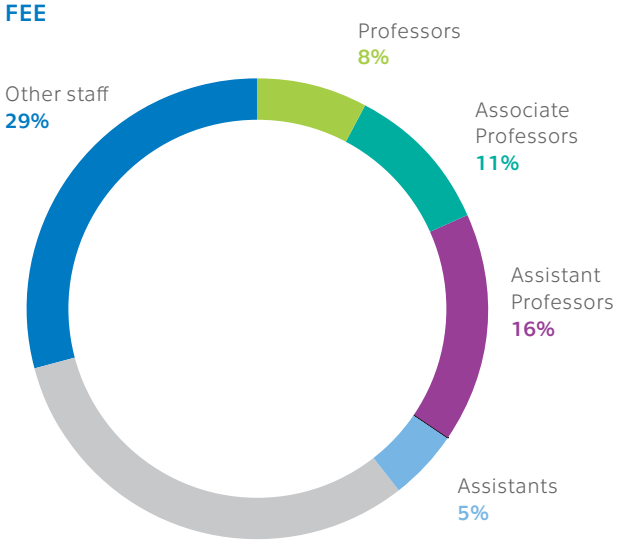

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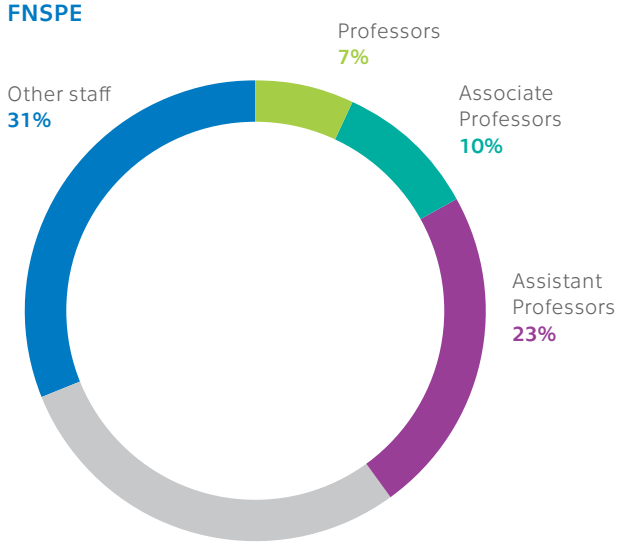
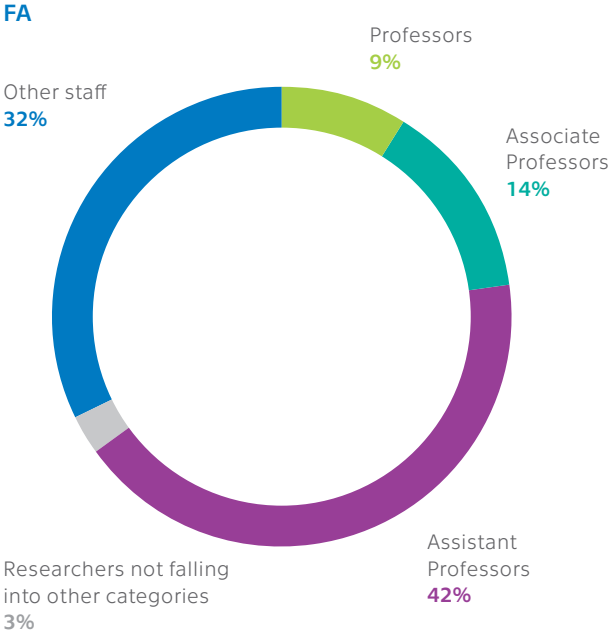


STAFF STRUCTURE BY INDIVIDUAL FACULTIES IN 2021
(AVERAGE RECALCULATED NUMBERS)

FA



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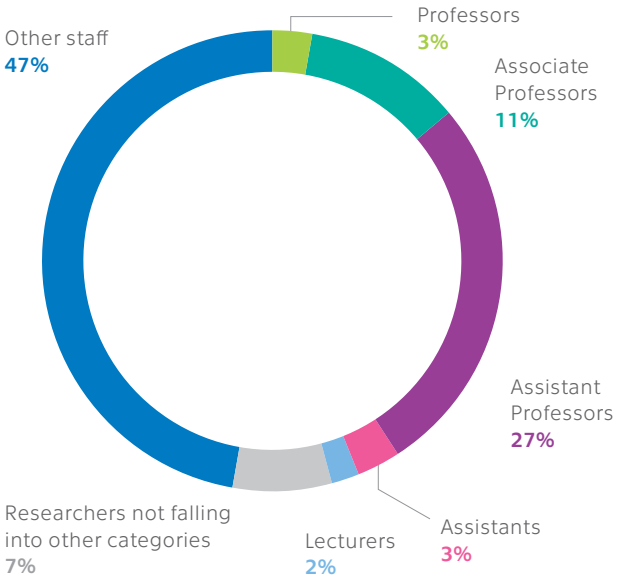

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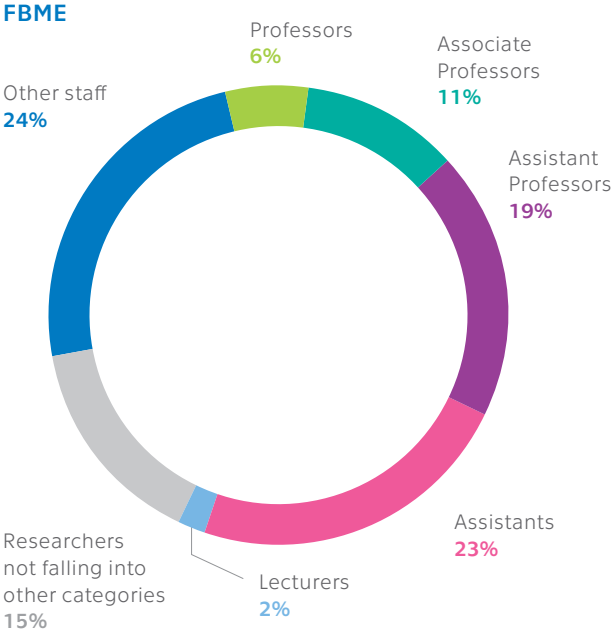

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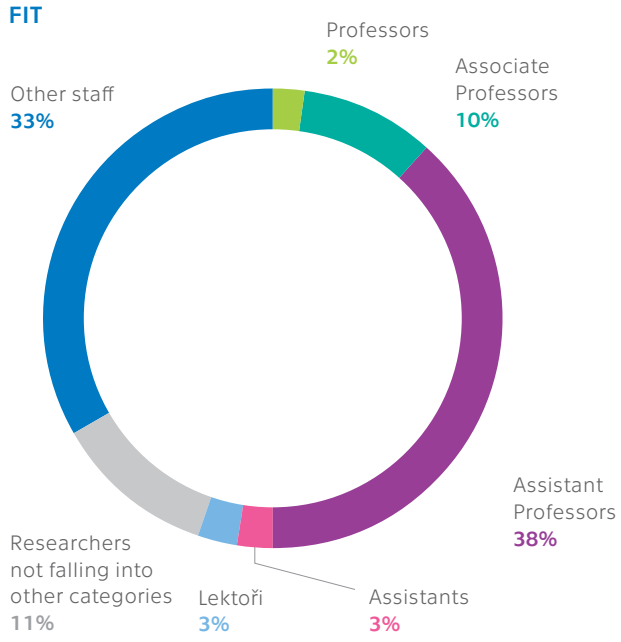
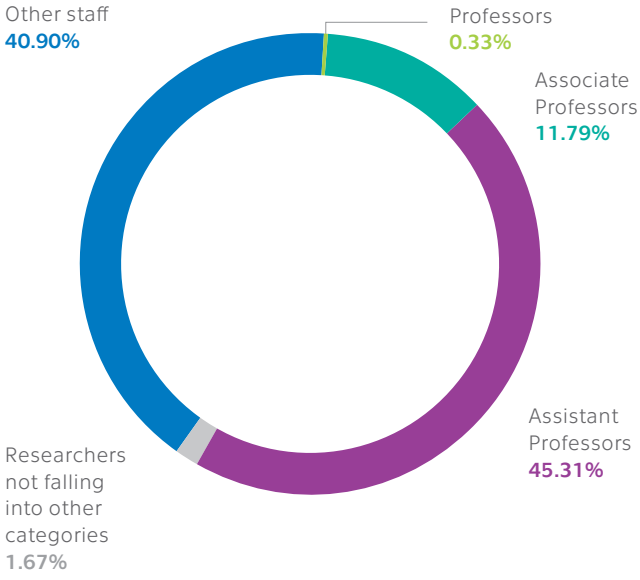


MIAS



UNIVERSITY-WIDE DEPARTMENTS
(STUDY OUTSIDE THE FACULTY)

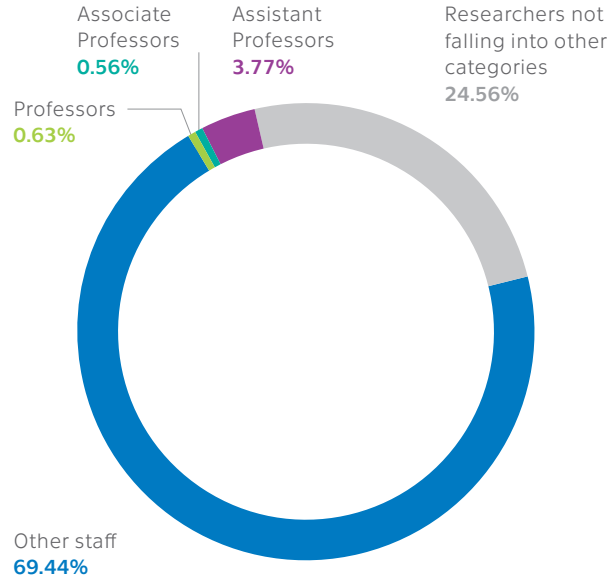


Table 6.2: Age structure of academic, scientific and other staff (number of natural persons*)

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	31	8	41	14	2	1	0	0
30–39 years	0	0	31	1	372	82	71	21	15	2	0	0
40–49 years	45	4	163	14	481	131	30	8	25	5	2	2
50–59 years	43	1	88	20	172	54	12	4	12	4	1	0
60–69 years	84	8	94	22	140	56	3	0	11	5	1	0
over 70 years	107	10	104	8	41	10	3	0	3	0	0	0
TOTAL	279	23	480	65	1,237	341	160	47	68	17	4	2

Note: * The total number of employees/workers is given regardless of the amount of time worked, but indicating only employees 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. Only an indicative number of postdoctoral fellows is given, given that they are registered in the CTU IS under other categories (separate functionality of postdoctoral fellows within the EGJE IS is not implemented).

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")*** Indicative number		Researchers not falling into other categories		Other scientific, research and development personnel****					
TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women	TOTAL	Women		
				444	99			333	127	851	249
				559	120			455	207	1,503	433
				195	35			551	301	1,492	500
				67	4			484	282	879	369
				41	3			299	140	673	234
				35	3			157	51	450	82
		34		1,341	264			2,279	1,108	5,848	1,867

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	17	0	23	5
0,31–0,5	7	0	13	2	31	11
0,51–0,7	2	1	4	2	3	1
0,71–1	47	6	96	17	150	46
TOTAL	61	7	130	21	207	63
Faculty of Mechanical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0,3	15	2	12	1	17	2
0,31–0,5	6	0	12	2	12	3
0,51–0,7	3	0	3	1	8	2
0,71–1	22	0	34	2	122	11
TOTAL	46	2	61	6	159	18
Faculty of Electrical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
do 0,3	5	0	3	0	19	0
0,31–0,5	6	0	10	0	15	4
0,51–0,7	7	0	2	0	2	1
0,71–1	44	2	67	3	100	5
TOTAL	62	2	82	3	136	10
Faculty of Nuclear Sciences and Physical Engineering**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Time ranges	TOTAL	Women	TOTAL	Women	TOTAL	Women
up to 0,3	6	0	4	1	9	2
0,31–0,5	4	0	2	0	4	0
0,51–0,7	1	0	3	0	5	1
0,71–1	23	3	38	1	71	14
CELKEM	34	3	47	2	89	17

	Scientific staff*		TOTAL	of which women
Other	TOTAL	Women		
TOTAL / Women				
8 / 2	29	8	82	15
26 / 7	37	13	114	33
1 / 0	16	5	26	9
38 / 21	63	17	394	107
73 / 30	**145**	**43**	**616**	**164**
Other	TOTAL	Women		
TOTAL / Women				
12 / 0	18	5	74	10
9 / 3	11	3	50	11
4 / 1	14	3	32	7
60 / 10	18	2	256	25
85 / 14	**61**	**13**	**412**	**53**
Other	TOTAL	Women		
TOTAL / Women				
5 / 1	75	4	107	5
4 / 2	108	10	143	16
5 / 1	38	3	54	5
24 / 8	138	12	373	30
38 / 12	**359**	**29**	**677**	**56**
Other	TOTAL	Women		
TOTAL / Women				
1 / 1	86	22	106	26
2 / 1	43	14	55	15
0 / 0	17	5	26	6
13 / 6	83	19	228	43
16 / 8	**229**	**60**	**415**	**90**

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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	3	0	2	0	6	2
0,31–0,5	4	0	14	2	12	4
0,51–0,7	1	0	2	0	10	4
0,71–1	14	1	17	5	16	11
TOTAL	22	1	35	7	44	21
Faculty of Transportation Sciences**						
	prof.		doc.		DrSc., CSc., Dr., Ph.D., Th.D.	
Rozsahy úvazků	TOTAL	Women	TOTAL	Women	TOTAL	Women
do 0,3	4	1	6	1	25	3
0,31–0,5	3	0	8	1	11	4
0,51–0,7	2	0	1	0	5	1
0,71–1	4	1	27	6	47	15
TOTAL	13	2	42	8	88	23
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	10	3	15	4	25	8
0,31–0,5	2	1	8	2	12	6
0,51–0,7	0	0	1	1	4	0
0,71–1	10	0	15	3	41	19
TOTAL	22	4	39	10	82	33
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	7	2
0,31–0,5	1	0	5	0	15	2
0,51–0,7	0	0	1	0	9	5
0,71–1	5	1	15	2	47	6
TOTAL	10	1	22	2	78	15

		Scientific staff*		TOTAL	of which women
Other		TOTAL	Women		
TOTAL	Women				
3	0	8	4	22	6
51	16	5	3	86	25
10	3	2	1	25	8
22	10	2	0	71	27
86	29	17	8	204	66
Other		TOTAL	Women		
TOTAL	Women				
16	5	16	3	67	13
11	6	13	3	46	14
6	3	7	5	21	9
28	15	13	4	119	41
61	29	49	15	253	77
Other		TOTAL	Women		
TOTAL	Women				
30	9	0	0	80	24
25	8	0	0	47	17
6	2	0	0	11	3
44	25	0	0	110	47
105	44	0	0	248	91
Other		TOTAL	Women		
TOTAL	Women				
3	0	16	2	31	4
11	5	12	1	44	8
2	1	2	0	14	6
18	1	16	4	101	14
34	7	46	7	190	32

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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	0	0	2	1	0	0
0,31–0,5	1	0	6	2	11	6
0,51–0,7	0	0	0	0	0	0
0,71–1	0	0	5	2	16	6
TOTAL	1	0	13	5	27	12
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	3	1
0,31–0,5	0	0	1	0	2	1
0,51–0,7	0	0	0	0	0	0
0,71–1	6	1	8	1	20	3
TOTAL	8	1	9	1	25	5
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	6	62	8	134	25
0,31–0,5	34	1	79	11	125	41
0,51–0,7	16	1	17	4	46	15
0,71–1	175	15	322	42	630	136
TOTAL Universities	279	23	480	65	935	217

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	0	0	2	1
2	2	2	0	22	10
0	0	0	0	0	0
8	6	0	0	29	14
10	**8**	**2**	**0**	**53**	**25**
Other	TOTAL	Women		
TOTAL	Women			
2	2	56	8	63	11
1	0	47	9	51	10
0	0	23	7	23	7
23	7	307	65	364	77
26	**9**	**433**	**89**	**501**	**105**
Other	TOTAL	Women		
TOTAL	Women			
80	20	304	56	634	115
142	50	278	56	658	159
34	11	119	29	232	60
278	109	640	123	2,045	425
534	**190**	**1,341**	**264**	**3,569**	**759**

Table 6.4: Managers (natural persons)

CTU in Prague	Rector/ Dean	Vice-Rector/ Provost	Academic Senate	Scientific/Artistic/ Academic Council
Rectorate of CTU	1	4	45	52
of which women	0	2	9	5
Faculty of Civil Engineering*	1	5	0	0
of which women	0	1	0	0
Faculty of Mechanical Engineering*	1	4	0	0
of which women	0	0	0	0
Faculty of Electrical Engineering*	1	5	0	0
of which women	0	1	0	0
Faculty of Nuclear Sciences and Physical Engineering*	1	4	0	0
of which women	0	0	0	0
Faculty of Architecture*	1	5	0	0
of which women	0	2	0	0
Faculty of Transportation Sciences*	1	5	0	0
of which women	0	0	0	0
Faculty of Biomedical Engineering*	1	4	0	0
of which women	0	0	0	0
Faculty of Information Technology*	1	3	0	0
of which women	0	2	0	0
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	35	0	0
of which women	0	6	0	0
COLLEGE TOTAL*****	9	39	45	52
of which women	0	8	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			118
0	2			18
1			27	34
0			2	3
1			20	26
0			2	2
1			27	34
0			1	2
1			10	16
1			1	2
1			17	24
1			3	6
1			11	18
1			1	2
1			8	14
0			2	2
1			6	11
0			2	4
		5	12	17
		1	2	3
		5	0	5
		2	0	2
8		10	138	199
3		3	16	28
9	15	10	138	317
3	2	3	16	46

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	1	1.5	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 Mechanical Engineering					
of which: Germany	0	0	0	0	0
Poland	0	0	0	0	0
Austria	0	0	0	0	0
Slovakia	1	1.25	0.75	0	0
Other EU countries	0.25	0	0	0	0
other non-EU countries	0.08	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	1	0.67	0	0
Other EU countries	0	1	1	0	1
other non-EU countries	0	1	2.81	0	2.4
Women out of total (regardless of nationality)	0	0	0.67	0	1
Faculty of Nuclear Sciences and Physical Engineering					
including: Germany	0	0	0	0	0
Poland	0	0	0.24	0	0
Austria	0	0	0	0	0
Slovakia	1	1.5	3.3	0.5	0.1
Other EU countries	0	0	2.83	0	0.32
other non-EU countries	1	0	1.57	0	0
Women out of total (regardless of nationality)	0	0	2.74	0.5	0

Scientific and professional staff**				Other staff*****
Scientific, research and development staff involved in teaching activities	Postdoctoral fellows ("postdocs")*** Indicative number	Researchers not falling into other categories	Other scientific, research and development personnel****	
0	0	1.83	0	0
0	0	0.25	0	0
0	0	0	0	0
0	0	2	0	3
0	0	2.3	0	0
0	0	8.12	0	1
0	0	5.2	0	1
0	0	0.5	0	0.1
0	0	0	0	1
0	0	0	0	0
0	0	0	0	4.23
0	0	0	0	1
0	0	3.43	0	4.11
0	0	1.2	0	2.85
0	0	2.4	0	0
0	0	0.53	0	0
0	0	0	0	0
0	0	9.1	0	3.33
0	0	17.75	0	0
0	0	41.35	0	0.64
0	0	8.3		1.64
0	0	0.68	0	0
0	0	1.43	0	0
0	0	0	0	0
0	0	12.43	0	0.1
0	0	3.16	0	0
0	0	9.88	0	0
0	0	6.3	0	0.77

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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	0.17	0	0
Poland	0	0	1	0	0
Austria	0	0	0	0	0
Slovakia	1	0	0.53	0	0
Other EU countries	0.98	0.5	0.17	0	0
other non-EU countries	0	0	0.63	0	0
Women out of total (regardless of nationality)	0	0	0	0	0
Faculty of Transportation Sciences					
of which: Germany	0	0	0	0	0
Poland	0	0	1	0	0
Austria	0	0	0	0	0
Slovakia	0	2.5	2.5	2.62	0.1
Other EU countries	0	0	0	0	0
other non-EU countries	0	0	1.1	0	0
Women out of total (regardless of nationality)	0	1	0.45	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	1.02	0.93	0.12	0
Other EU countries	0	0	0	0	0
other non-EU countries	0	0	3.75	0.75	0
Women out of total (regardless of nationality)	0	0	3.93	0.62	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	0.33	0	3	0.5	0
Other EU countries	0	0	2.8	0	0
other non-EU countries	0	0	2.7	0.57	0
Women out of total (regardless of nationality)	0	0	3.63	0.74	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	1.25	0.5	0	0
Other EU countries	0	0	1	0	0
other non-EU countries	0	0.5	0.17	0	0
Women out of total (regardless of nationality)	0	0.75	0.5	0	0

	Scientific and professional staff**			
Scientific, research and development staff involved in teaching activities	Postdoctoral fellows ("postdocs")*** Indicative number	Researchers not falling into other categories	Other scientific, research and development personnel****	Other staff*****
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0.6	0	1.6
0	0	0.23	0	0
0	0	0	0	0
0	0	0.23	0	1.6
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1.55	0	2.1
0	0	1	0	0
0	0	1.28	0	2.92
0	0	1.75	0	0
0	0	0	0	0.43
0	0	0	0	0
0	0	0	0	0
0	0	0.67	0	0.06
0	0	0	0	0.1
0	0	1.4	0	0
0	0	0.67	0	0.2
0	0	0.5	0	0
0	0	1	0	0
0	0	0	0	0
0	0	0.23	0	5.79
0	0	2.84	0	0
0	0	6.71	0	1.14
0	0	3.67	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0.7	0	2
0	0	0	0	0
0	0	0	0	0
0	0	0.7	0	1

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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	0.72	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)		1.2	0.55	0	0
TOTAL UNIVERSITY					
of which: Germany	0	1	0.17	0	0
Poland	0	0	3.24	0	0
Austria	0	0.5	0	0	0
Slovakia	6.33	10.02	14.9	3.74	0.2
Other EU countries	1.23	1.5	8.3	0	1.32
other non-EU countries	1.08	1.5	15.73	1.32	2.4
Women out of total (regardless of nationality)	0	1.95	15.02	1.86	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. Only an indicative number of postdoctoral fellows is given, given that they are registered in the CTU IS under other categories (separate functionality of postdoctoral fellows within the EGJE IS is not implemented).

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")*** Indicative number	Researchers not falling into other categories	Other scientific, research and development personnel****	Other staff*****
0	0	6.54	0	0
0	0	1.51	0	
0	0	0.69	0	
0	0	9.14	0	12.19
0	0	12.33	0	1.63
0	0	24.76	0	10.38
0	0	8.69	0	13.02
	34			
0	0	12.45	0	0.53
0	0	4.72	0	1
0	0	0.69	0	0
0	0	36.42	0	34.4
0	0	38.61	0	2.73
0	0	96.93	0	20.19
0	0	34.96	0	23.08

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 2021	3	2		48
of which women	0	0		
Associate professors appointed in 2021	4	4		38
of which women	1	1		40
Faculty of Mechanical Engineering****				
Professors appointed in 2021	1	1		61
of which women	0	0		
Associate Professors appointed in 2021	1	0		43
of which women	0	0		
Faculty of Electrical Engineering****				
Professors appointed in 2021	2	2		58
of which women	0	0		
Associate professors appointed in 2021	5	5		39
of which women	0	0		
Faculty of Nuclear Sciences and Physical Engineering****				
Professors appointed in 2021	4	2	1	55
of which women	0	0	0	
Associate Professors appointed in 2021	1	0	1	39
of which women	0	0	0	0
Faculty of Architecture****				
Professors appointed in 2021	0	0		
of which women	0	0		
Associate Professors appointed in 2021	3	3		50
of which women	0	0		
Faculty of Transportation Sciences****				
Professors appointed in 2021	0	0		
of which women	0	0		
Associate professors appointed in 2021	1	1		32
of which women	0	0		

>>>

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 Biomedical Engineering****				
Professors appointed in 2021	1	1		40
of which women	0	0		
Associate Professors appointed in 2021	3	3		41
of which women	2	2		39
Faculty of Information Technology****				
Professors appointed in 2021	2	1		58
of which women	1	1		65
Associate professors appointed in 2021	1	1		39
of which women	0	0		
MIAS****				
Professors appointed in 2021				
of which women				
Associate professors appointed in 2021			1	
of which women			0	
CIIRC****				
Professors appointed in 2021			1	
of which women			0	
Associate professors appointed in 2021			1	
of which women			0	
TOTAL professors	13	9	2	
of which women	1	1	0	
TOTAL associate professors	19	17	3	
of which women	3	3	0	

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			TOTAL
	TOTAL	Of which Marie-Curie Actions	Other	
Number of projects*	48	6	41	89
Number of students sent**			183	183
Number of accepted students***	1	2	307	308
Number of academic and scientific staff seconded****	37		128	165
Number of academic and scientific staff recruited*****	2	2	28	30
Grants in thous. CZK******	163,541	11,269	201,700	365,241

Note: * These are ongoing projects in a given year.

Note: ** Outgoing students (i.e. number of departures) – who have completed a stay abroad in 2021; students whose stay started in 2020 are also counted. Only students whose stay lasted more than 4 weeks (28 days) are counted. If the HEI reports other long-term trips, please indicate this in a note to the table.

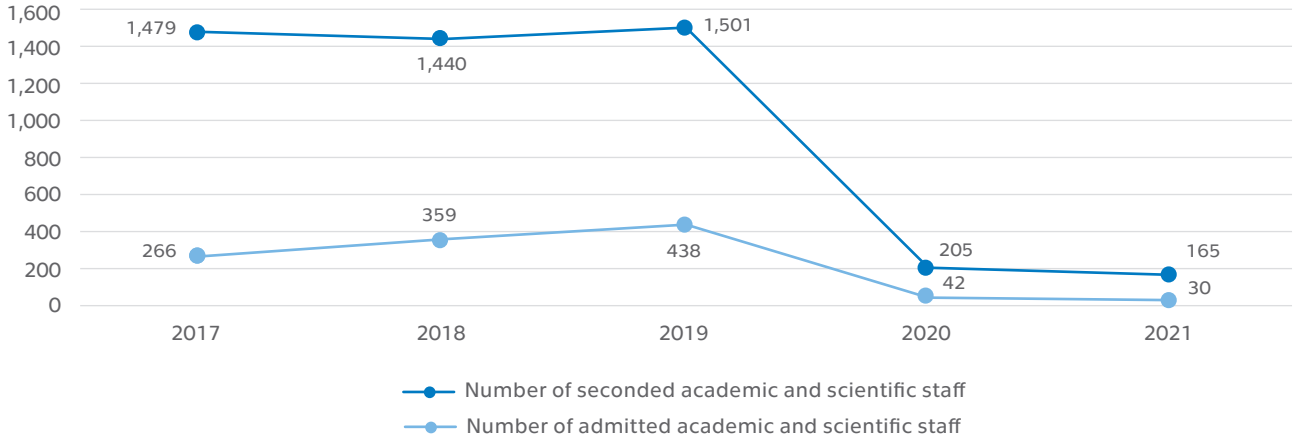
Note: *** Arriving students (i.e. number of arrivals) – who arrived in 2021; students whose stay started in 2020 are also counted. Only students whose stay lasted more than 4 weeks (28 days) are counted. If the HEI reports other long-term trips, please indicate this in a note to the table.

Note: **** Outgoing academic staff (i.e. numbers of trips) – who undertook an overseas placement in 2021; staff whose placement started in 2020 are also counted.

Note: ***** Incoming academics (i.e. arrival numbers) – who arrived in 2021; those whose stay started in 2020 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)



UNIVERSITY INVOLVEMENT IN INTERNATIONAL COOPERATION PROGRAMMES – STUDENTS (REGARDLESS OF FUNDING SOURCE)

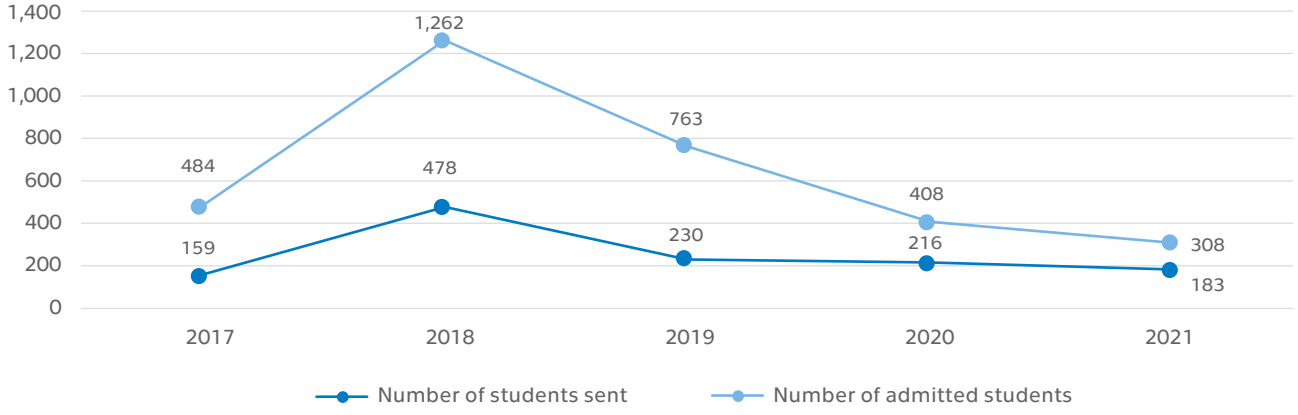


Table 7.2: Mobility of students, academic and other staff by country***** (irrespective of funding source) (the HEI simply fills in the table with the rel

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 Albania	0	0	0	0	2
Democratic and People's Republic of Algeria	0	0	0	0	1
Republic of Angola	0	0	0	0	4
Republic of Azerbaijan	0	0	1	5	39
Republic of Argentina	4	0	1	2	5
Commonwealth of Australia	7	0	2	0	0
Republic of Austria	17	2	2	3	8
People's Republic of Bangladesh	0	0	0	2	5
Republic of Armenia	0	0	0	0	3
Kingdom of Belgium	23	2	2	2	14
Plurinational State of Bolivia	0	0	0	1	4
Bosnia and Herzegovina	0	0	2	3	16
Federal Republic of Brazil	4	0	1	2	10
Republic of Kosovo	0	0	0	1	3
Republic of Bulgaria	0	0	0	2	12
Republic of the Union of Myanmar	0	0	0	0	1
Republic of Belarus	0	0	0	5	97
Kingdom of Cambodia	0	0	0	0	1
Canada	6	1	1	2	12
People's Republic of China	1	0	0	4	38
Republic of China (Taiwan)	14	1	2	2	6
Republic of Colombia	0	0	0	0	1
Republic of Costa Rica	2	0	0	0	1
Republic of Croatia	3	1	1	1	2
Republic of Cuba	0	0	0	0	2
Republic of Cyprus	2	0	0	1	3
Kingdom of Denmark	19	2	2	1	1
Republic of Ecuador	1	0	0	0	2
Federal Democratic Republic of Ethiopia	0	0	0	1	4
Republic of Estonia	4	0	0	1	3
Republic of Fiji	0	0	0	0	1
Republic of Finland	21	1	2	2	5
Republic of France	31	4	4	12	159
Georgia	0	0	0	2	12
Federal Republic of Germany	47	5	2	5	40
Republic of Ghana	0	0	0	1	1
Republic of Greece	2	0	0	1	11
Hungary	6	1	0	0	6
Republic of Iceland	2	0	1	0	0
Republic of India	1	0	0	5	111
Republic of Indonesia	0	0	0	0	1

evant values without further intervention)

Number of seconded academic staff***	Number of admitted academic staff****	Number of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	2
0	0	0	0	1
0	0	0	0	4
1	1	0	2	43
1	1	1	1	13
1	0	1	4	13
4	5	2	2	38
0	0	0	0	5
0	0	0	0	3
6	5	4	2	54
0	0	0	0	4
1	0	0	0	17
1	1	1	1	18
0	0	0	0	3
4	2	0	0	18
0	0	0	0	1
0	0	0	0	97
0	0	0	0	1
2	2	2	2	26
4	3	2	9	57
3	3	2	0	28
1	0	1	0	3
1	0	1	1	6
4	4	1	2	16
0	0	0	0	2
0	0	0	0	5
2	2	2	4	30
0	0	0	0	3
0	0	0	0	4
1	0	0	0	8
0	0	0	0	1
4	5	4	5	44
15	11	16	11	243
1	0	0	1	14
41	45	18	15	206
0	0	0	0	1
2	1	1	4	21
2	0	0	4	18
1	0	0	0	3
2	3	2	5	124
0	0	0	0	1

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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 rel

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 Iran	0	0	0	1	7
Republic of Iraq	0	0	0	0	3
Ireland	1	0	0	0	1
State of Israel	2	0	0	1	7
Republic of Italy	15	2	2	2	21
Japan	2	0	0	0	3
Republic of Kazakhstan	0	0	0	4	235
The Hashemite Kingdom of Jordan	0	0	0	1	5
Republic of Korea	13	0	1	1	12
State of Kuwait	0	0	0	0	1
Republic of Kyrgyzstan	0	0	0	1	14
Republic of Lebanon	0	0	0	0	2
Republic of Latvia	1	0	0	0	4
Republic of Lithuania	8	1	0	1	7
The Grand Duchy of Luxembourg	1	0	0	0	1
Republic of Malta	3	0	0	0	2
United Mexican States	7	0	0	3	20
Mongolia	0	0	0	0	6
Republic of Moldova	0	0	0	1	13
Montenegro	0	0	0	0	1
Kingdom of Morocco	0	0	0	0	2
Sultanate of Oman	0	0	0	0	0
Republic of Namibia	0	0	0	0	1
Federal Democratic Republic of Nepal	0	0	0		1
The Netherlands	19	4	0	1	12
New Zealand	2	0	0	0	0
Federal Republic of Nigeria	0	0	0	1	5
Kingdom of Norway	3	1	0	0	1
Islamic Republic of Pakistan	0	0	0	1	6
Republic of Peru	1	0	0	0	1
Republic of Poland	9	1	0	1	9
Republic of Portugal	21	2	2	2	21
Romania	0	0	0	1	12
Russian Federation	1	0	0	2	827
Kingdom of Saudi Arabia	0	0	0	0	2
Republic of Serbia	2	0	0	1	4
Republic of Singapore	1	0	0	0	0
Slovak Republic	1	0	0	4	1,024
Socialist Republic of Vietnam	0	0	0	1	22
Republic of Slovenia	11	2	1	1	10
Republic of South Africa	2	0	0	0	2

evant values without further intervention)

Number of seconded academic staff***	Number of admitted academic staff****	Number of other staff seconded***	Number of other staff recruited****	TOTAL for the country
0	0	0	0	7
0	0	0	0	3
1	0	2	2	7
0	0	0	0	9
4	5	2	4	51
1	0	2	1	9
2	1	1	4	243
0	0	0	0	5
2	2	1	4	34
0	0	0	0	1
0	0	0	0	14
0	0	0	0	2
1	1	1	0	8
1	1	0	2	19
0	0	0	0	2
1	0	1	1	8
11	14	4	4	60
0	0	0	0	6
0	0	1	2	16
1	0	0	4	6
0	0	0	0	2
1	0	0	0	1
0	0	0	0	1
0	0	0	0	1
7	8	8	15	69
1	0	1	1	5
0	0	0	0	5
2	1	1	3	11
0	0	0	0	6
0	0	1	2	5
4	14	2	11	49
6	6	2	7	63
1	2	2	4	21
4	7	73	14	926
0	0	1	1	4
1	2	1	4	14
0	0	0	0	1
41	47	24	41	1,178
2	2	0	0	26
4	2	2	4	33
0	0	0	0	4

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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 rel

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
Kingdom of Spain	29	2	5	4	81
Republic of Sudan	0	0	0	0	1
Kingdom of Sweden	8	1	1	1	10
Swiss Confederation	9	1	0	0	2
Syrian Arab Republic	0	0	0	1	21
Republic of Tajikistan	0	0	0	0	2
Kingdom of Thailand	1	0	0	0	1
State of the United Arab Emirates	0	0	0	0	0
Republic of Tunisia	0	0	0	1	4
Republic of Turkey	8	0	0	4	53
Ukraine	4	0	0	4	440
Republic of Northern Macedonia	0	0	0	1	6
Arab Republic of Egypt	0	0	0	1	11
United Kingdom of Great Britain and Northern Ireland	21	2	1	2	9
United States of America	23	1	0	2	16
Eastern Republic of Uruguay	0	0	0	0	0
Republic of Uzbekistan	0	0	0	1	8
Bolivarian Republic of Venezuela	0	0	0	0	1
Republic of Yemen	0	0	0	0	2
Republic of Zambia	0	0	0	0	1
TOTAL	446	40	39	123	3,643

Note: * Outgoing students (i.e. number of departures) – students who have completed their stay abroad in 2021; students whose stay started in 2020 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 2021; students whose stay started in 2020 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 2021; staff whose stay started in 2020 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 2021; staff whose stay started in 2020 are also counted. Only staff whose stay lasted at least 5 days are counted.

Note: ***** Table 7.2. 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).

evant values without further intervention)

Number of seconded academic staff***	Number of admitted academic staff****	Number of other staff seconded***	Number of other staff recruited****	TOTAL for the country
7	8	4	44	173
0	0	0	0	1
7	7	4	8	44
4	5	2	7	29
0	0	0	0	21
0	0	0	0	2
1	0	0	1	4
4	0	12	4	20
0	0	0	0	4
2	7	2	4	76
2	5	2	17	470
1	0	0	0	7
0	0	0	1	12
7	8	5	1	51
14	11	14	8	86
1	0	2	0	3
1	0	0	0	9
1	1	1	0	4
0	0	0	0	2
0	0	0	0	1
256	261	242	305	5,153

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	2.7%	9.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Mechanical Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	2.9%	10.0
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	5.6%	19.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		
Faculty of Nuclear Sciences and Physical Engineering*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	2.3%	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	0.0%	0.0
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	3.3%	4.0
Percentage [%] and number of doctoral 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	0.9%	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 Information Technology*		
Percentage [%] and number of graduates who went on a stay abroad of at least 14 days during their studies	10.0%	25.0
Percentage [%] and number of PhD graduates whose duration of their stay abroad was at least 1 month (i.e. 30 days)		

Master's studies		Continuing Master's studies		Doctoral studies		TOTAL**	
Proportion	Number	Proportion	Number	Proportion	Number	Proportion	Number
0.0%	0.0	6.8%	27.0	20.8%	11.0	6.0%	47.0
				20.8%	11.0	20.8%	11.0
0.0%	0.0	15.5%	46.0	13.6%	3.0	8.9%	59.0
				13.6%	3.0	13.6%	3.0
0.0%	0.0	22.2%	50.0	31.6%	12.0	13.5%	81.0
				28.9%	11.0	28.9%	11.0
0.0%	0.0	9.5%	7.0	5.1%	2.0	5.5%	11.0
				5.1%	2.0	5.1%	2.0
0.0%	0.0	35.2%	62.0	0.0%	0.0	17.3%	62.0
				0.0%	0.0	0.0%	0.0
0.0%	0.0	14.5%	12.0	0.0%	0.0	7.5%	16.0
				0.0%	0.0	0.0%	0.0
0.0%	0.0	4.4%	6.0	0.0%	0.0	2.2%	8.0
				0.0%	0.0	0.0%	0.0
0.0%	0.0	12.3%	16.0	0.0%	0.0	10.6%	41.0
				0.0%	0.0	0.0%	0.0

>>>

Table 7.3: Graduate mobility** (numbers and proportions of graduates)

CTU in Prague	Bachelor studies	
	Proportion	Number
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	2.5%	4.0
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	3.7%	2,032
Percentage [%] and number of doctoral graduates whose length of stay abroad was at least 1 month (i.e. 30 days)		

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

Note: ** The totals for both the faculty (last field in the top row for each faculty) and the college (all blank fields for the college in the AR structure) 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
0.0%	0.0	5.1%	5.0	0.0%	0.0	3.4%	9.0
				0.0%	0.0	0.0%	0.0
0.0%	0	14.3%	1,618	15.1%	186	8.7%	3,836
				14.5%	27.0	14.5%	27.0

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	6	5	10	5
Faculty of Mechanical Engineering	4	4	3	3
Faculty of Electrical Engineering	0	1	0	1
Faculty of Nuclear Sciences and Physical Engineering	3	2	1	1
Faculty of Architecture	3	2	2	1
Faculty of Transportation Sciences	1	1	0	2
Faculty of Biomedical Engineering	5	1	2	0
Faculty of Information Technology	4	5	2	0
Masaryk Institute of Advanced Studies	0	0	0	3
Other workplaces total	1	8	2	10
TOTAL	27	29	22	26

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

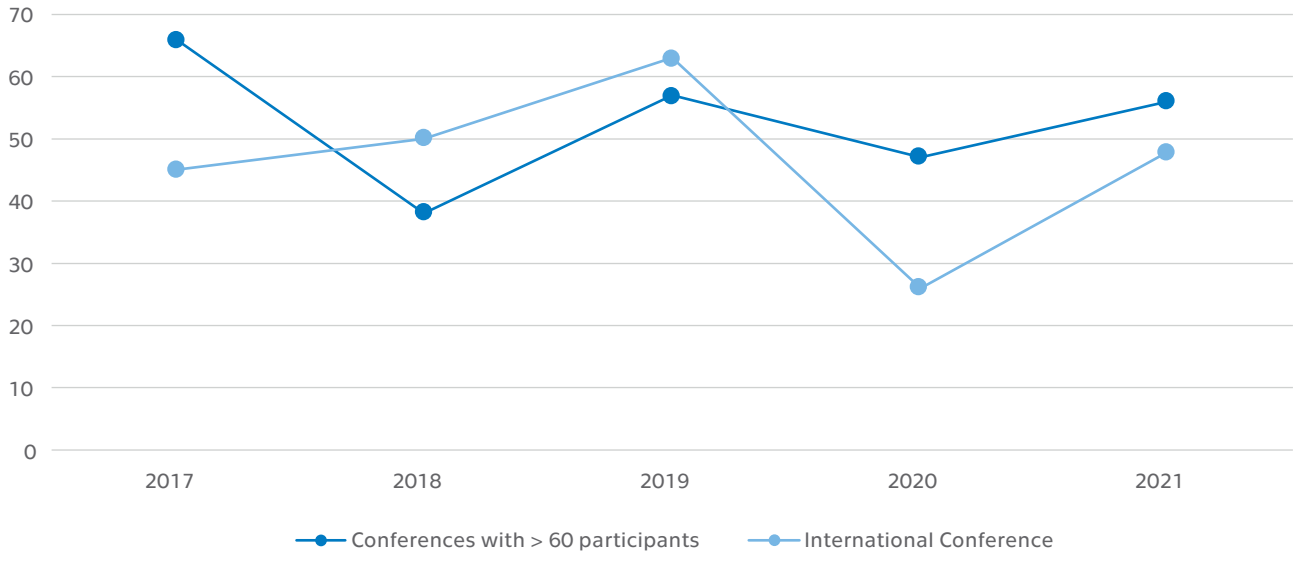


Table 8.2: Experts from the application sphere* involved in teaching and practice in accredited study programmes (numbers)

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**	147	0	0	0	0	0
of which women	55	0	0	0	0	0
Faculty of Mechanical Engineering**	43	23	0	13	6	0
of which women	3	3	0	0	0	0
Faculty of Electrical Engineering**	31	89	0	4	0	6
of which women	3	9	0	0	0	0
Faculty of Nuclear Sciences and Physical Engineering**	102	0	2	4	60	3
of which women	50	0	1	2	30	1
Faculty of Architecture**	69	48	0	0	0	0
of which women	18	10	0	0	0	0
Faculty of Transportation Sciences**	192	192	0	0	0	0
of which women	62	62	0	0	0	0
Faculty of Biomedical Engineering**	97	53	14	0	0	37
of which women	42	21	11	0	0	26
Faculty of Information Technology**	40	16	0	0	45	0
of which women	4	0	0	0	2	0
Masaryk Institute of Advanced Studies**	21	18	2	0	0	39
of which women	9	6	2	0	0	22
TOTAL	742	439	18	21	111	85
of which women	246	111	14	2	32	454

Note: * Professionals from the application sphere participating at least at one third of the time in teaching at least one course or supervising the student's thesis. If the professional is a full-time employee of the HEI/faculty, he/she should have at least the same amount of time outside the HEI/faculty.

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

Note: *** These are the persons directly responsible 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	0	129			0	0
Faculty of Biomedical Engineering**	16	2	10			0	4
Masaryk Institute of Advanced Studies**	1	0	1			0	0
TOTAL	18	2	140			0	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 should be indicated.

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-up companies*				
Patent applications filed	17	17	34	
Granted patents**	37	12	49	
Registered utility models	56	1	57	
Licence agreements valid as of 31.12.	25	0	25	
Newly concluded licence agreements	20	0	20	1,535,866 CZK
Contract research***, consulting and advisory services***			938	331,054,000 CZK
Paid training courses for employees of application entities***			11	528,000 CZK

Note: * These are newly established spin-off/start-up companies supported by the university in 2021 (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 2021 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.

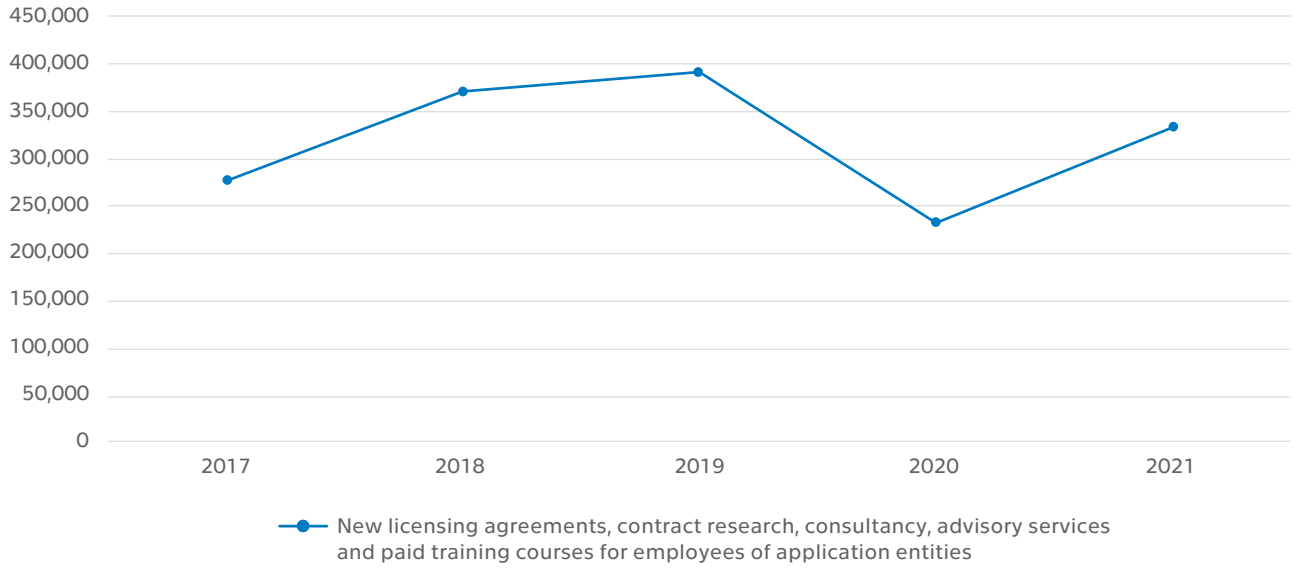
Paid training courses to improve the qualifications of employees of the application entities (e.g. corporate training courses). An application sector entity is defined here as a legal entity whose main activity is not research and development. It can be a business entity, a public administration body, 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.

Summary information on Table 8.4

	Number TOTAL	Total revenue
New licensing agreements, contract research, consultancy, advisory services and paid training courses for employees of application entities	969	333,117,866 CZK
	Average revenue per 1 order	
	343,775 CZK	

TRANSFER OF KNOWLEDGE AND RESEARCH RESULTS INTO PRACTICE (TOTAL INCOME IN THOUSANDS CZK)



NEWLY CONCLUDED LICENCE AGREEMENTS

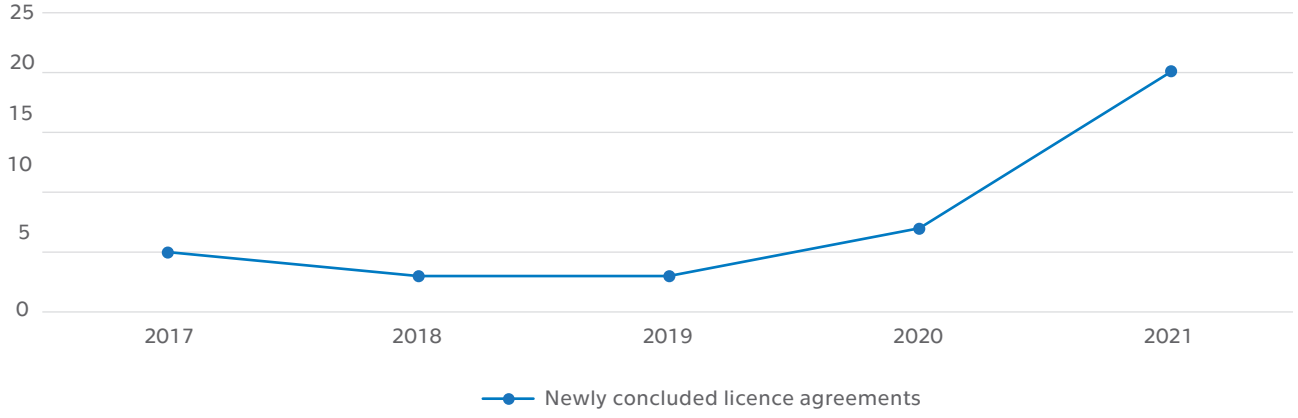
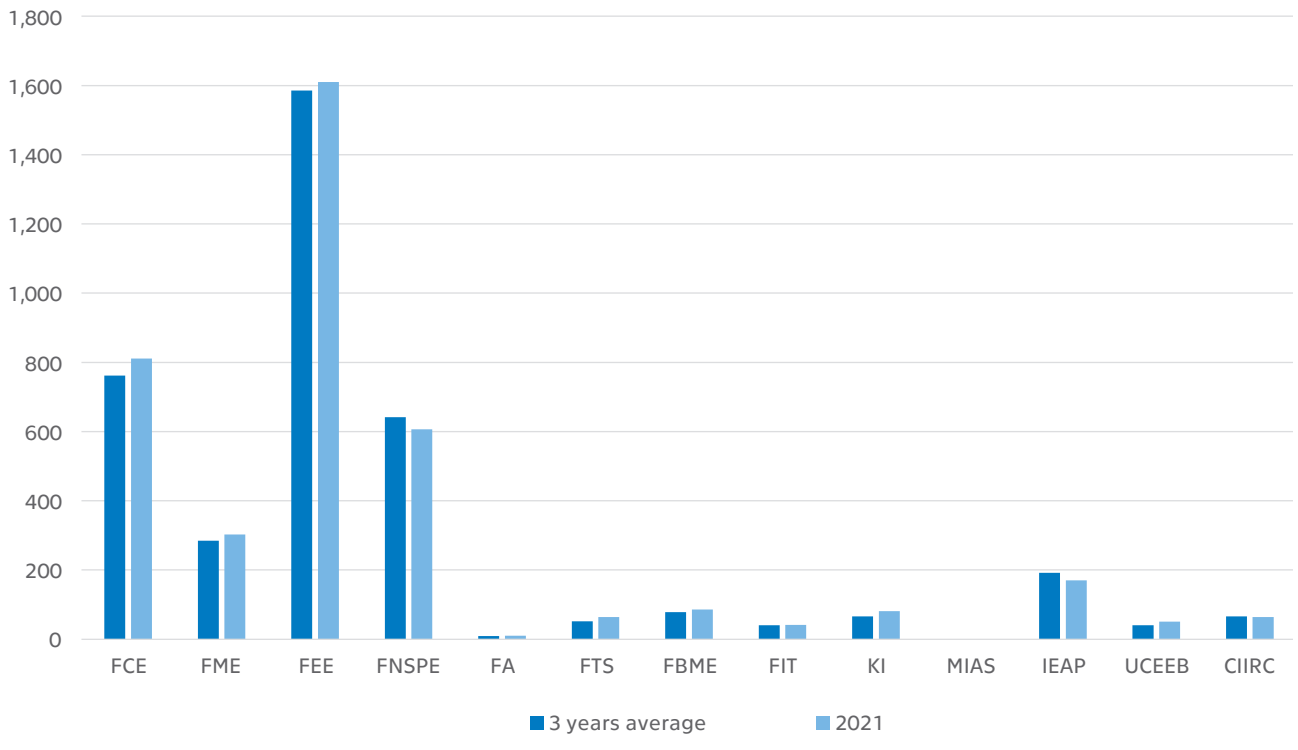


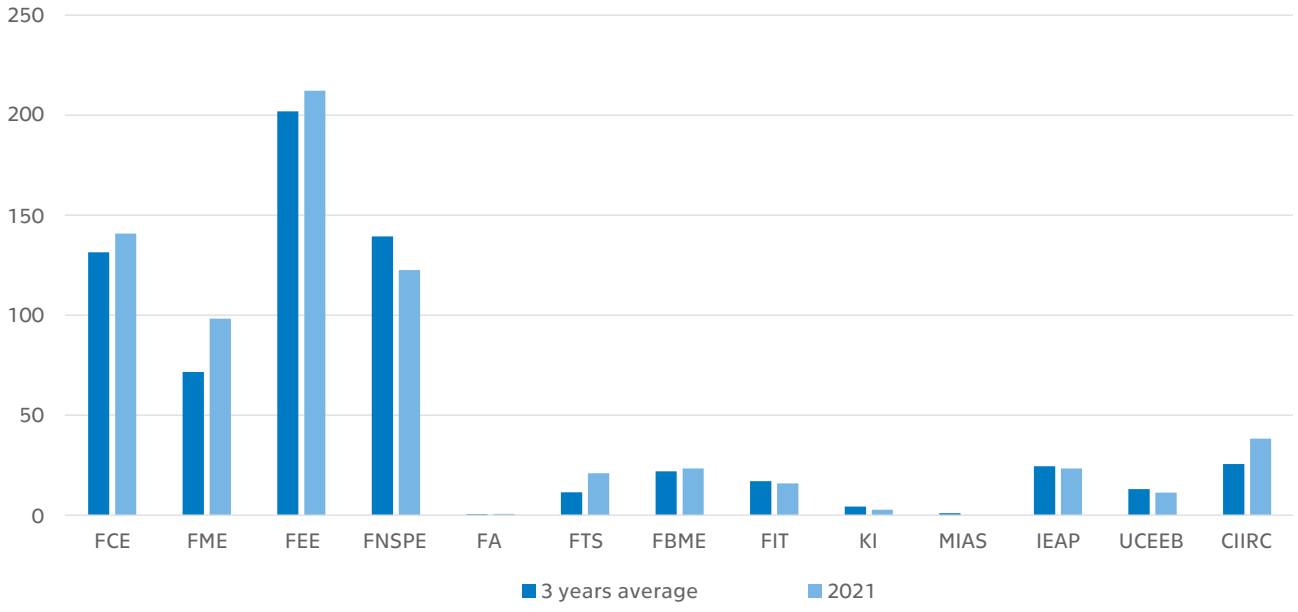
Table 8.5: Citations and publications 2021 (points for impacted publications and citations by V3S)

CTU in Prague	Citation		Publications	
	3 years average	2021	3 years average	2021
Faculty of Civil Engineering	761.95	811.35	131.50	140.71
FFaculty of Mechanical Engineering	284.37	302.98	71.56	98.34
Faculty of Electrical Engineering	1,585.58	1,610.12	201.88	212.16
Faculty of Nuclear Sciences and Physical Engineering	641.90	606.30	139.32	122.54
Faculty of Architecture	9.03	9.84	0.55	0.62
Faculty of Transportation Sciences	52.08	64.41	11.42	20.99
Faculty of Biomedical Engineering	78.01	86.12	21.94	23.43
Faculty of Information Technology	40.37	41.65	16.95	15.84
Klokner Institute	65.75	80.92	4.26	2.76
Masaryk Institute of Advanced Studies	0.75	0.34	0.97	
Institute of Technical and Experimental Physics	191.57	169.67	24.50	23.43
University Centre for Energy Efficient Buildings	40.19	50.24	13.02	11.36
Czech Institute of Informatics, Robotics and Cybernetics	66.08	63.53	25.57	38.30
TOTAL	3,817.63	3,897.46	663.45	710.48

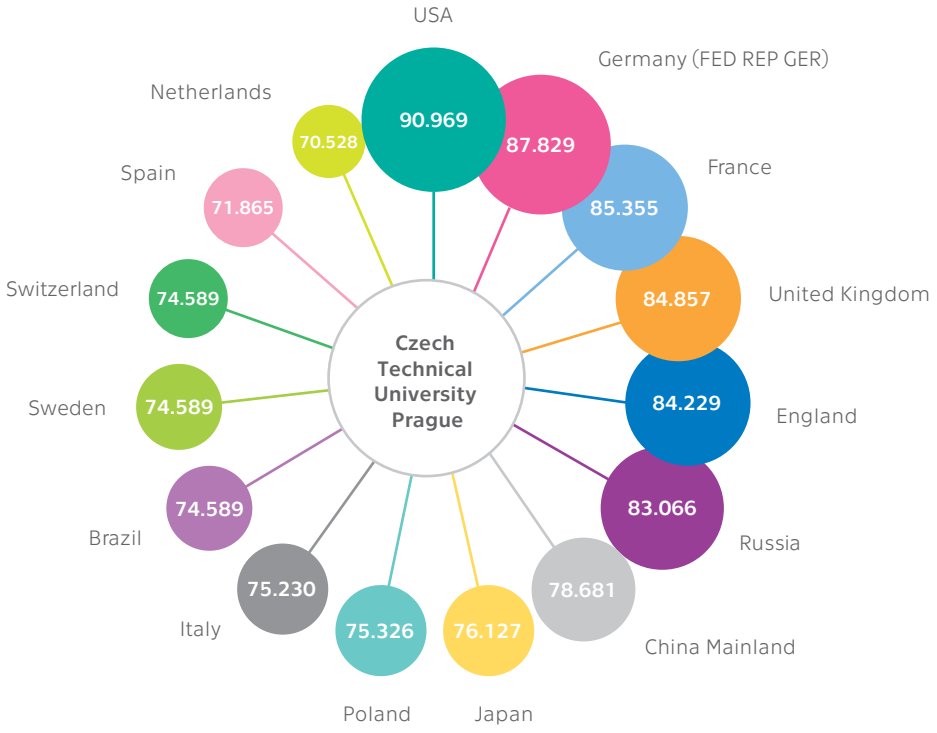
CITATIONS



PUBLICATIONS



NUMBER OF CITATIONS BY CTU AUTHORS IN INDIVIDUAL COUNTRIES FOR THE PERIOD 2012–2021 IN THOUSANDS (SOURCE: INCITES, 6. 4. 2022)



NUMBER OF PUBLICATIONS BY CTU AUTHORS AND AUTHORS FROM INSTITUTIONS BASED IN INDIVIDUAL COUNTRIES FOR THE PERIOD 2012–2021 IN THOUSANDS (SOURCE: INCITES, 6. 4. 2022)

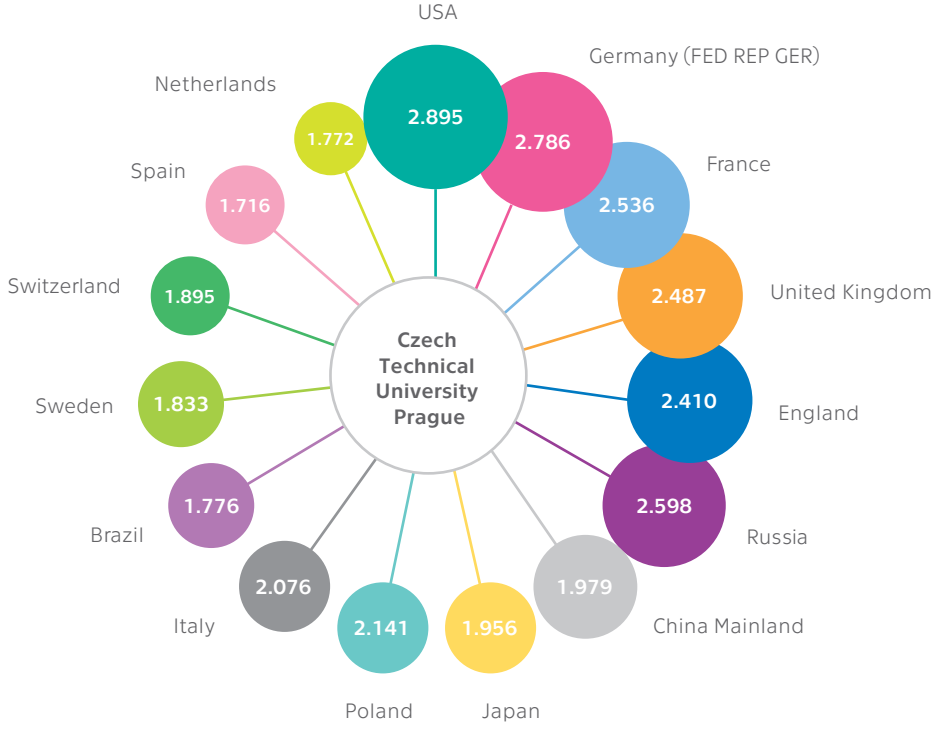


Table 8.6: Specific university research projects at CTU (2017–2021). Overview of the number of results achieved with the support of SVV.

CTU in Prague	2017	2018	2019	2020	2021
Article in a professional periodical	373	340	296	310	388
Professional book	5	9	4	4	1
Chapter(s) in a professional book	13	8	2	6	4
Article in the proceedings	769	753	633	494	480
Patent	7	6	4	5	3
Results with legal protection (utility model, industrial design)	6	5	3	4	6
Semi-production, proven technology, variety, breed	5	0	3	1	2
Technically realised results (prototype, working sample)	15	21	12	19	23
Provider-implemented results	1	2	0	3	1
Certified methodologies, therapeutic procedures, heritage procedures, specialized maps with specialized content	9	8	7	0	4
Software	6	11	14	8	9
Research report containing classified information or summary research report	3	4	5	6	2
Audiovisual production, electronic documents	2	1	0	0	1
Organisation of a conference	2	4	2	3	2
Organisation of a workshop	6	6	4	6	6
Organisation (organisation) of an exhibition	0	0	2	2	1
Total number of results	1,222	1,178	991	871	933

Table 8.7: Funds earmarked for research, development and innovation received in 2017–2021 (thous. CZK)

CTU in Prague	2017	2018	2019	2020*	2021
Total earmarked funds	1,280,237	1,711,424	2,216,072	2,049,632	1,934,417
Of which: earmarked funds of CTU for grants and projects	1,060,831	1,523,131	1,891,937	1,741,865	1,669,232
Of which: CTU issued to co-researchers and suppliers	219,406	188,293	321,135	307,768	265,185

* Note: based on the refinement of the financial statements for 2020, there has been an increase compared to the amount originally stated in AR 2020.

EARMARKED FUNDS FOR RESEARCH, DEVELOPMENT AND INNOVATION RECEIVED IN 2017–2021 (THOUS. CZK)

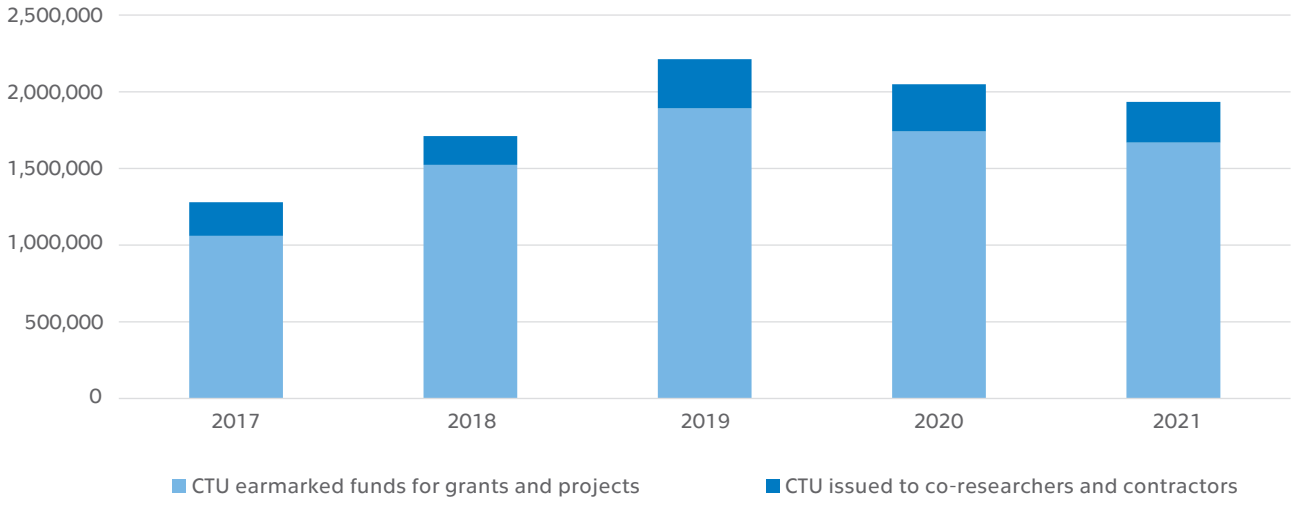


Table 8.8: Faculty citation performance from the perspective of the QS and THE rankings >>>

CTU in Prague	CTU Average	FCE	FME	FEE	FNSPE
QS/THE: International headcount ratio	12%	5%	5%	21%	18%
QS/THE: International student ratio	20%	14%	16%	28%	21%
QS/THE: Staff to student ratio	7.0	7.5	6.1	6.2	4.3
QS Citacitons / employees, weighted average over 5 years	9.1	4.3	5.3	7.4	29.4
THE Citations / Publications, five-year weighted average	6.0	5.3	7.2	5.5	5.1

Staff and student categories: the QS and THE use the FTE (Full Time Equivalent) model. This calculation is used in the staff and student statistics in the chart.

Citation categories: the CTU does not submit citation data from QS and THE rankings, but obtains them directly from the Scopus database and adjusts them according to its 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 across topics and publication types; this process is not public and THE weights change each year according to THE averages within each category.

– QS and THE select data somewhat differently (although both collect data from the Scopus database).

– QS and THE use a different methodology for calculating the final score (citation per faculty member vs. citation per publication).

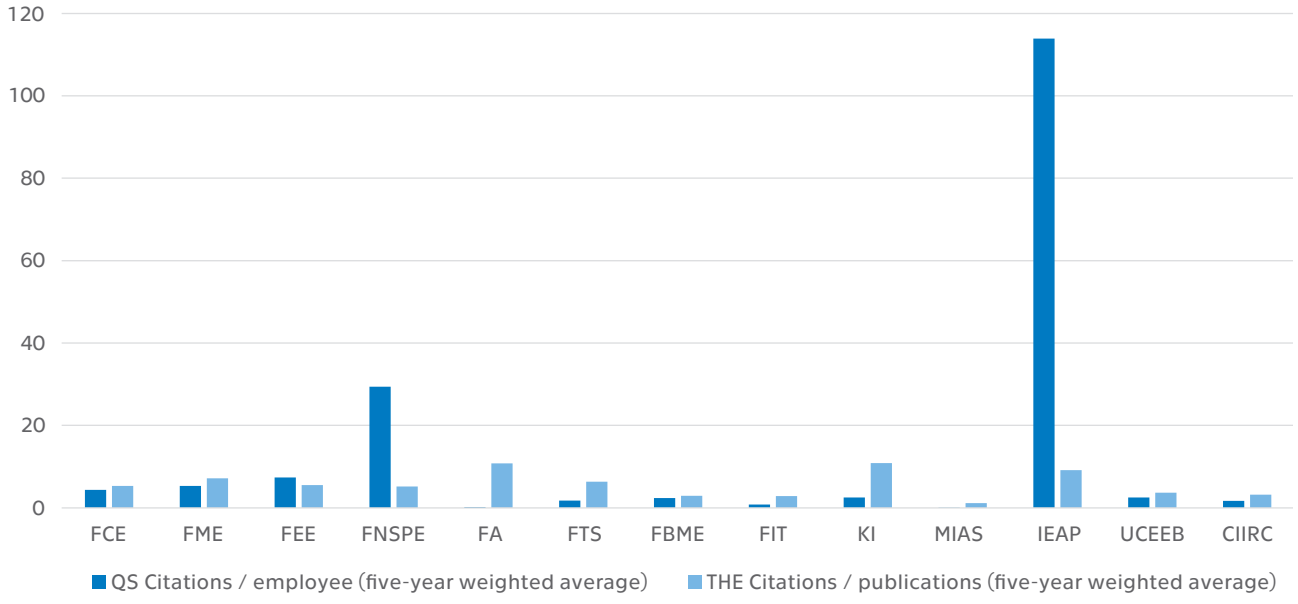
To get a clearer picture of faculty performance in terms of evaluation, available internal data was used and proprietary evaluation methodologies were developed:

Citation data provided by the Central Library of CTU, 2016–2021.

The absolute number of publications and citations was normalized annually according to the weight of the evaluation agencies: (2021*0.30)+(2020*0.25)+(2019*0.20)+(2018*0.15)+(2017*0.10)

Based on the data on employees (provided by the HR department of R CTU) and citation data (normalized for the previous 5 years), the citation score per faculty (QS) and citation score per thesis (THE) can be calculated. This calculation is a rough approximation of performance in international rankings.

CITATIONS



FA	FTS	FBME	FIT	KI	MIAS	IEAP	UCEEB	CIIRC
5%	8%	8%	19%	3%	10%	47%	9%	21%
27%	23%	8%	30%	0%	11%	0%	0%	0%
13.3	6.7	13.1	17.6	0.4	22.4	0.0	0.0	0.0
0.2	1.7	2.4	0.8	2.5	0.1	113.9	2.5	1.7
10.8	6.3	2.9	2.8	10.8	1.1	9.1	3.6	3.2

QS/THE

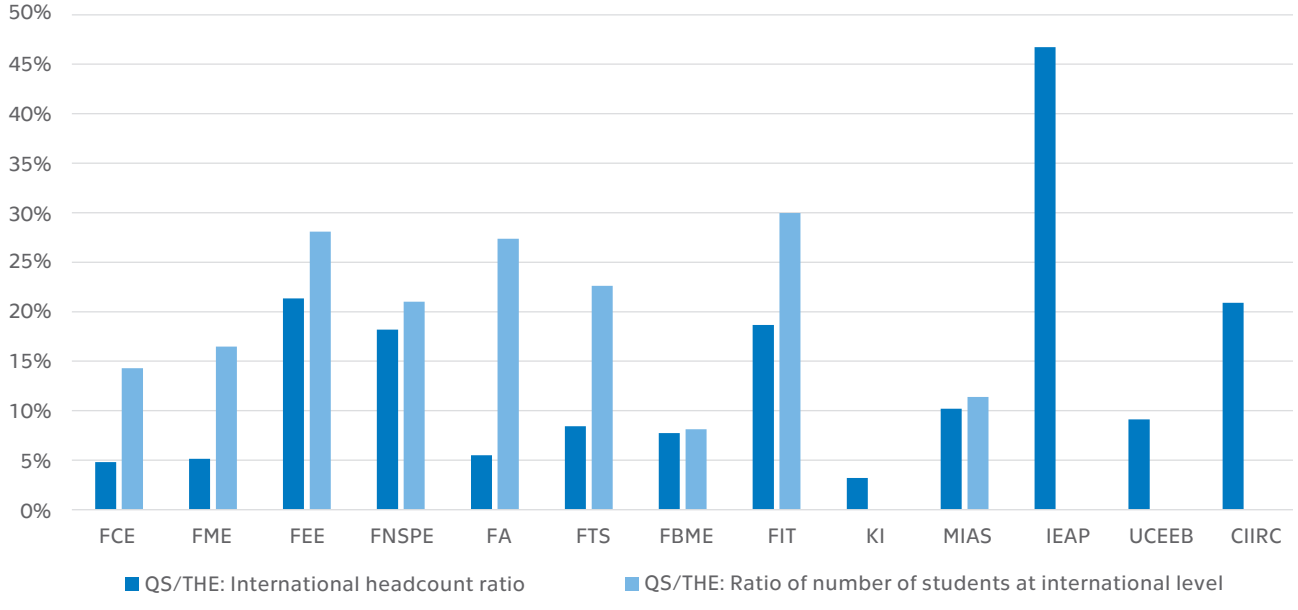


Table 12.1: Accommodation, catering

CTU in Prague	Number of
Total bed capacity of university halls of residence	7,413
Number of beds in rented facilities	0
Number of applications/reservations for accommodation submitted as of 31. 12. 2021	10,570
Number of successful applications/reservations for accommodation as of 31. 12. 2021	6,387
Number of bed days in 2021	1,647,937
Total number of terminated contracts (pandemic)*	2,559
Total number of modified contracts (pandemic)**	1,159
Total number of contracts with exceptions (pandemic)***	50
Number of main meals issued to students in 2021	320,519
Number of main meals issued in 2021 to college staff	30,846
Number of main meals issued in 2021 to other diners	310,157

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 with an exception to 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

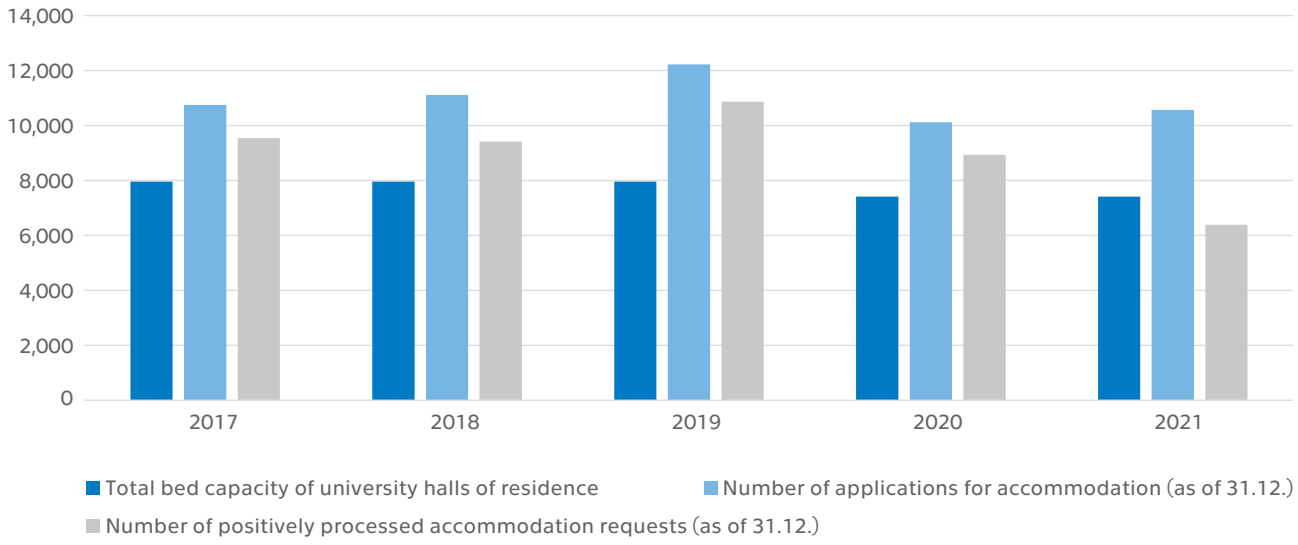


Table 12.2: University libraries

CTU in Prague	Number of
Library collection growth for the year	3,860
of which increase in physical units	3,762
of which increment of e-books in permanent purchase	98
Total library collection	335,147
of which physical units	332,113
of which e-books in permanent purchase	3,034
Number of periodical titles subscribed:	
– physical	233
– 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.

In 2021, the library collection sees an increase in items by 3,860. Of these, 3,632 were books, 130 bound journals and 98 e-books.

1,373 books are placed in the Dejvice Library (NTK building), 1,710 in local libraries (FTS, FNSPE, FBME) and 549 books are deposited at faculty offices in Dejvice.

Thanks to the preparation of the transition to the new library platform, a detailed analysis, comparison and analysis of the library units in the printed accession lists (from 1954 to 1980) and in the ALEPH database was carried out. We discovered a statistical error, the retroconversion was not taken into account. Duplicate records were cleaned up, resulting in a large decrease in the 'number' of library units. This is not a matter of depreciation of library units, but of correct reporting of the volume of the library collection of the CCHR. This discrepancy is explained in the CTU's Annual Report for 2021.

LIBRARY FUND (PHYSICAL UNITS, E-BOOKS ON PERMANENT PURCHASE)