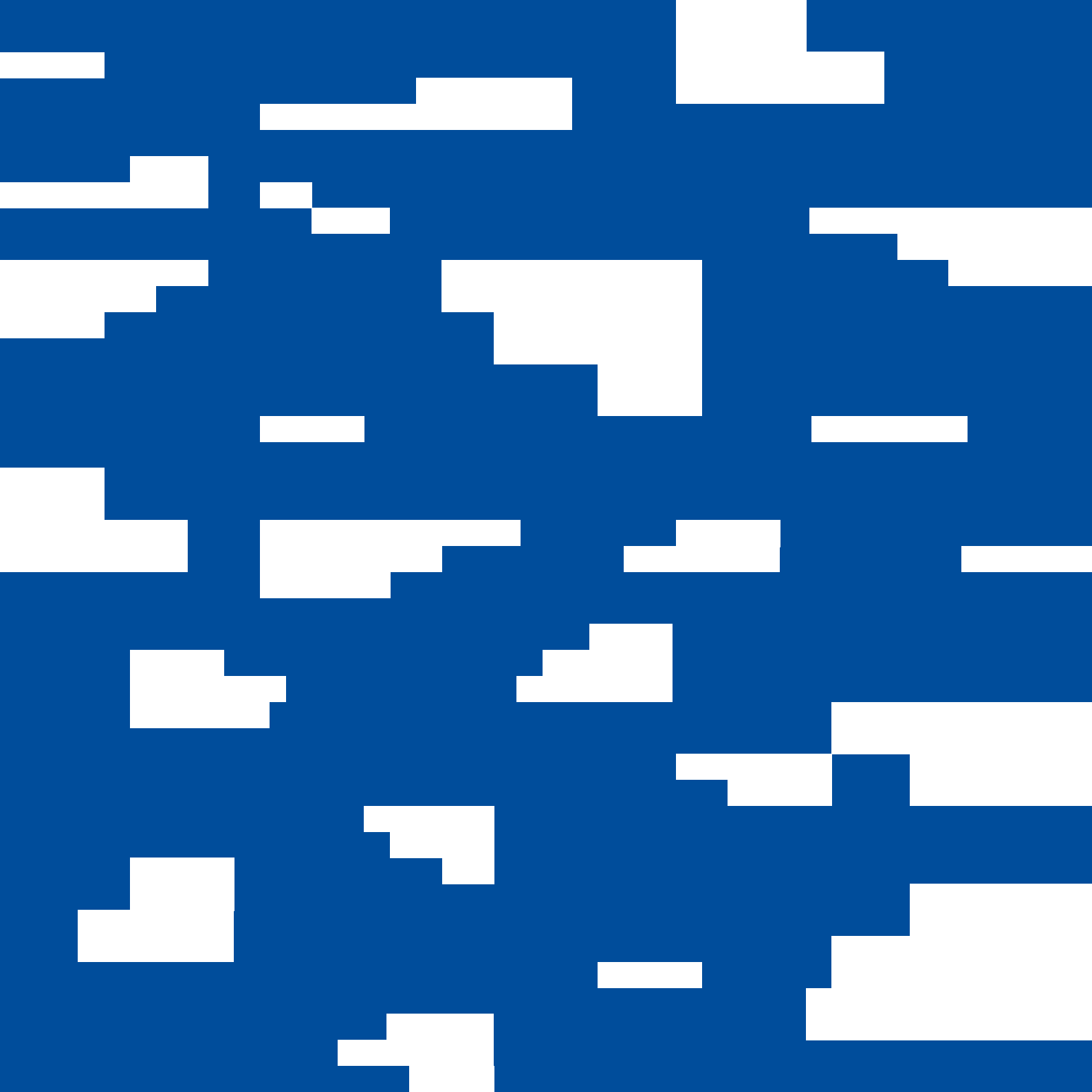
BRNO UNIVERSITY OF TECHNOLOGY
FACULTY OF ELECTRICAL ENGINEERING AND COMMUNICATION

ANNUAL REPORT 2024



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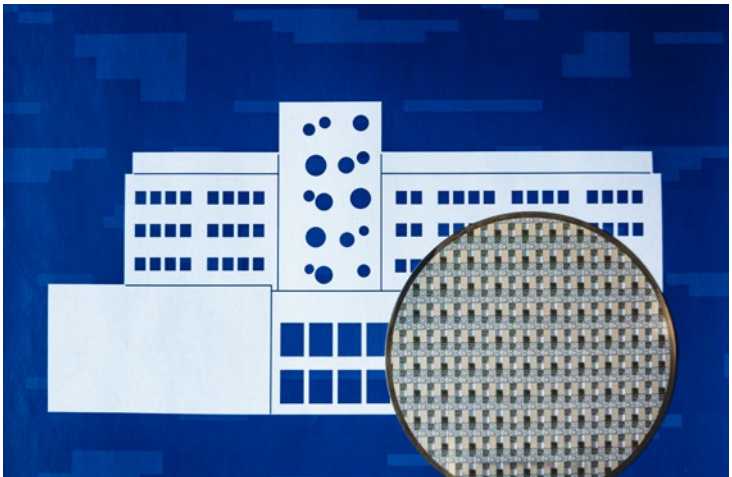


CONTENTS

OPENING WORD OF THE DEAN

Dear Readers,

It is my honour to present to you the Annual Report of the Faculty of Electrical Engineering and Communication, Brno University of Technology for the year 2024. This year has been a time of academic and scientific achievements, but also of innovations in the field of education, scientific cooperation and development of new projects.

The year 2024 was exceptional for our faculty for another important reason – we celebrated the 65th anniversary of the founding of the faculty and 125 years of the university. This anniversary was an opportunity not only to recapitulate our achievements up to now, but also to present our vision for the future. Celebratory events and expert lectures attracted alumni and the professional public, as well as a wide range of partners and friends of the faculty who shared this important anniversary with us.

One of the key highlights of 2024 was the opening of the new nuclear laboratory and the launch of the new Nuclear Energy degree programme, which responds directly to the growing demand for professionals in the field of energy and sustainable technologies. The faculty has also been actively involved in international conferences and projects, including the prestigious Marie Skłodowska-Curie Actions programme. Our students and researchers have won numerous awards, for example, the Fulbright Scholarship and the Brno PhD Talent competition. We were also very pleased to organise the first year of the FEKTTeams competition, which motivates students to teamwork and creativity from the very beginning of their academic careers.

Another major achievement was winning the GOLDEN AMPER 2024 award for the Smartbox project, a revolutionary technology for smart metering and control of electricity consumption. This innovation serves as a proof not only of scientific excellence but also of its practical impact on industry and the modernisation of energy networks. The GOLDEN AMPER award confirms that our faculty is one of the leading scientific institutions that actively contribute to innovation in the field of technology through its outputs.

Our students have also been awarded the prestigious Hlávka Foundation Prize for outstanding academic and scientific achievements. This achievement proves that our

faculty is not only educating proficient engineering professionals, but also future scientific leaders who are contributing to the development of technologies with global reach. We were also very pleased that the student team YSpace has received support from the European Space Agency (ESA) under the prestigious Fly Your Satellite! Design Booster programme.

Among unforgettable events of the year 2024 we need to highlight the Electromobility Afternoon, which introduced the latest trends in the field of electromobility to our students and the wider public. Visitors had the opportunity to learn about modern electric vehicles, charging infrastructure and the technological innovations that are shaping the future of transport.

Another major milestone was the inauguration of the first Czech accredited inverter compliance test facility, in which SZU International will participate alongside our faculty. Creating such a workplace represents a major step in the testing and certification of technologies for distribution systems, thus contributing to the safety and efficiency of the energy sector in the Czech Republic. The opening of this testing facility furthermore confirms the leading role of the faculty in technological innovation and applied research.

I would like to thank all the academics, students and partners who have contributed to the faculty's success in 2024. I am confident that together we will continue to push the boundaries of knowledge and innovation in electrical engineering and communication technologies.

Photo: Jakub Rozboud

Prof. RNDr. Vladimír Aubrecht, CSc.
Dean

MISSION, VISION AND STRATEGIC GOALS OF THE FACULTY

The mission of the faculty is to provide university-educated professionals with comprehensive knowledge and skills in the various degree programmes, to develop high-quality scientific work at national and international level and to produce such results of creative activity which apart from a considerable contribution to further knowledge also have a significant social relevance.

Photo: Jakub Rozboud

F

Faculty

is an excellent educational institution preparing graduates ready to participate in the dynamical development of advanced technologies. Thanks to close faculty cooperation with the industry a vast majority of students finds their job even before the study completion.

E

Excellent

scientific research is conducted not only at individual faculty departments. The faculty also takes part in the activities of the CEITEC BUT scientific research centre of excellence. Our scientific research is focused on a vast range of projects affecting not only everyday life, but forming also our future, such as the development of Parkinson disease early diagnosis tool, secure cyberspace or the Smart Cities project.

E

Engineering

Tradition of the faculty dates back to the second half of the last century. More than sixty years the faculty has been developing instruction and research activities in electrical engineering, electronics and other related fields. It was founded in 1959 by the Government Act no.58 which divided the Faculty of Energy into Faculty of Mechanical Engineering and Faculty of Electrical Engineering. Since 12 August 1959 the Faculty of Electrical Engineering has been working independently.

C

Campus

of the Faculty of Electrical Engineering and Communication is situated in Brno-Královo Pole. The construction of the modern educational and research complex was completed in 2013 and after more than 50 years of faculty existence it enabled to unite all faculty workplaces into one place located Pod Palackého vrchem.

FEEC in 2024 in numbers

3,186
students

887
courses

186
projects

467
publications

46
prototypes, software, or functional sample

7
successfully completed habilitation and professor appointment procedures

569
staff members

9
international conferences (co-)organised by the faculty

LIFE AT FEEC

The faculty traditionally organises or co-organises dozens of events during the year for the general and professional public, students, and employees. These include various conferences, competitions, popular education events, or lectures. Join us for a tour of the entire year 2024.

PerFEKT year 2024

JANUARY

11.

Leading Taiwanese university NYCU signed a Memorandum of Understanding with BUT

Photo: Václav Koníček

On 11 January, BUT welcomed a delegation of representatives from Taiwan's National Yang Ming Chiao Tung University (NYCU) and Taiwan Semiconductor Research Institute (TSRI). During the meeting, a memorandum of cooperation in the areas of education, research and mobility of students and teachers was signed. The meeting followed up on the previous contacts between the two sides and deepened cooperation with a focus on semiconductor technology, an area in which Taiwanese universities, research organisations and enterprises in particular are world leaders.

19.

Open Day for prospective students

Photo: Jakub Rozboud

The faculty's Open Day was a great success, thanks to the huge interest in electrical engineering degree programmes, which was evident on site in the completely full auditorium.

Photo: Jakub Rozboud

The interested students not only had the opportunity to see the laboratories, but also to meet the students of all the bachelor's degree programmes.

23.–25.

Gaudeamus Prague

The last of the Gaudeamus post-secondary education fairs in the academic year 2023/2024 took place in Prague. The representatives of our students could not miss it.

24.

Visit of three primary schools at the faculty

Photo: Nikola Čková

At the end of January, pupils from the 7th and 8th grades from three primary schools – Antonínská Primary School (Brno), Jana Babáka Primary School (Brno) and Sokolnice Primary School – visited FEEC. For most of them, it meant their first steps on the university ground and sitting in the tiered benches of Prof. Brauner's auditorium gave the whole event an air of importance.

The presentation, tailored to the age of the pupils, aimed to show the real-life use of technology in everyday life. The videos of "heroes" who are changing the world thanks to technology showed how important it is to have dreams and the determination to follow them. During the visit, the pupils visited the laboratories of the Department of Microelectronics and the Department of Telecommunications.

26.

Reprezentative ball of FEEC and FIT 2024

Photo: Jakub Vodrážka

A joint representative ball of the faculties FEEC and FIT BUT took place. The ball took place in Hotel Passage Brno.

FEBRUARY

1.

10th year of the superfinal Merkur perFEKT Challenge

On Thursday, 1 February 2024, the faculty hosted the superfinal of the tenth annual Merkur perFEKT Challenge organised by the Department of Microelectronics. The nine final teams had the task of building a vehicle that would drive through a set course.

Photo: Jakub Rozboud

To do this, the students had to program microcontrollers, build moving structures and find a strategy to win. An expert jury evaluated the completion of the assignment.

Photo: Jakub Rozboud

The winner was the StarkIndustries team from the Secondary School of Electrical Engineering and Informatics in Mohelnice,

which won the title of the overall winner of the 10th edition of the competition and a travelling trophy for their school.

12. 2. – 23. 5.

Mikrokontroléry letí 2024

The 15th annual of the Mikrokontroléry letí competition, organised by the Department of Theoretical and Experimental Electrical Engineering for secondary-school and university students, was for the first time open to participants from the Slovak Republic. The contestants had to design and construct a device with a microcontroller.

Photo: Zbyněk Polák

At the final workshop on 23 May, 19 projects from a total of 25 competitors (5 teams and 14 individuals) were presented. The winner was Sebastian Matoušek from the Matyáš Lerch Grammar School in Brno with a humanoid robot communicating over a serial half-duplex UART bus.

14.

Open Science Day at FEEC

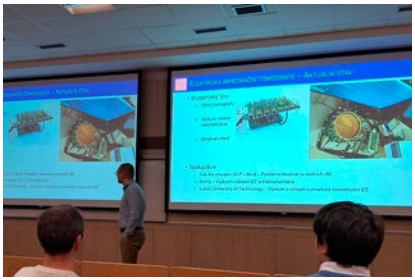


Photo: Zdeňka Koubová

The first Open Science Day was held with the subtitle of What we do when we are not teaching. The event featured over 30 speakers from all faculty departments. Each of them had to present their research in progress in four minutes, which is a very short time limit. This included setting requirements for a potential new member of the research team. The event should serve as an incentive for the current master's students to pursue doctoral studies, but it is also intended for all academic and non-academic staff to gain an insight into the work of their colleagues at other departments. Projects in cooperation with industrial partners manifest the high quality of our academic knowledge, as they produce results intended for real-life applications.

16.

Open Day for prospective students

Photo: Jakub Rozboud

Those interested in studying had the opportunity to meet the representatives of the individual bachelor's degree programmes and also to visit the faculty laboratories and premises.

20. 2. – 23. 4. a 8. 10. – 19. 11.

Colloquium Technical challenges and visions for future mobility

Under Petr Baxant's supervision, the Department of Electrical Power Engineering organised the 2nd year of a series of lectures on trends in mobility with a focus on electromobility and technological solutions for transport today and in the near future. The lectures were led by selected experts from a number of companies and provided an opportunity for expert discussions on various topics. In 2024, 13 such meetings were held. The main event was the Electromobility Afternoon held on 14 May, which offered test drives in Škoda Enyaq, Tesla, and Alfa profi cars and over

15 dynamic and static demonstrations, including an Formula E car, a SAKO collection vehicle, and an electric Trabant. It also included a tour of the laboratories and a film screening. The event continues in 2025.

20. 2. – 21. 6.

STEAM club Radioelektronika

Photo: ÚREL archive

In 2024, the Department of Radio Electronics hosted the first year of a series of eight afternoon sessions in which high school students learned about the world of electronics.
In addition to expert lectures on space technology, optical communications and virtual reality, students explored various aspects of electronic circuit design, such as simulation, circuit board design, box design and 3D printing, component fitting and measurement of finished device parameters.

29.

Meeting with deans and professors emeriti

Photo: Jana Němcová

At the end of February, the dean of FEEC, Vladimír Aubrecht, held a meeting with the former deans of the faculty and professors emeritus. He thus started a new tradition, extending the original idea of the meetings of the former deans to include professors emeriti as well.

MARCH

11.

BUT presented security and defence research applications to representatives of the Ministry of Defence

Photo: Václav Koníček

A delegation of the Ministry of Defence of the Czech Republic led by Radka Konderlová, Director general for industrial cooperation, visited BUT.
During the meeting with the university management, defence and security technologies that are developed and tested at BUT in cooperation with the army or with their potential use for the needs of national defence were presented.

19.–21.

AMPER 2024 Fair

Photo: Nikola Číková

At the AMPER international trade fair, which took place at Brno Exhibition Centre, experts from the Department of Telecommunications presented their Smartbox project – a novelty in power networks, on which they cooperate with the distribution company EG.D.

Photo: Nikola Číková

The faculty received the GOLDEN AMPER 2024 award for Smartbox. The project impressed the expert jury, which declared it one of the most beneficial exhibits at the fair.

APRIL

18.

Opening ceremony of the first Czech accredited inverter compliance testing laboratory

Photo: Václav Koníček

In the presence of the representatives of the state administration, Czech and Slovak distribution system operators, industry associations, representatives of inverter distributors and implementation companies, the Department of Electrical Power Engineering in cooperation with SZU International inaugurated the first domestic accredited test facility for verification of compliance of inverters with the requirements of the Czech electricity system. The commercially offered service will support the reliability and user safety of the electricity system and will be used mainly by the companies engaged in the production of photovoltaic inverters and their distribution in the Czech Republic.

Photo: Václav Koníček

The accredited test facility for inverter compliance verification at FEEC is the first of its kind in the Czech Republic and follows the legislative measures in force in the Czech Republic.

23.

30th STUDENT EEICT Conference and Competition and 15th perFEKT JobFair

Photo: Jakub Rozboud

The 30th anniversary year of the STUDENT EEICT student conference took place, with 150 bachelor's, master's and doctoral students + 5 secondary school student projects participating this year. At the same time, the 15th edition of the perFEKT JobFair was held, which again

Photo: Jakub Rozboud

hosted more corporate partners than in previous years. As part of the anniversary, in addition to the winning projects, the long-term cooperation of our corporate partners was awarded with a shining prize, as befits an electrical engineering faculty.

29.

Day with Schrack technik

Photo: UVEE archive

The Department of Power Electrical Engineering and Electronic Engineering held an event called Day with Schrack technic, which consisted of a demonstration of the Schrack Design program and an expert lecture on the most common faults in low-voltage switchgear manufacturing. The event ended with a quiz show offering interesting prizes.

30.

Run for 53

Photo: SPS archive

The traditional sports and recessional Run for 53, which is organised by the faculty Students for Students association, took place.

MAY

14.

Electromobility Afternoon

Photo: Jakub Rozboud

The Electromobility Afternoon at FEEC offered a taste of electromobility of the future, present and past. Visitors had the opportunity to see various electric vehicles, a Formula E car, electric charging infrastructure for drones and an electric truck for waste collection. The programme also included excursions to selected laboratories, discussions and a screening of the film Biomasakr. The highlight of the programme was the opportunity to test drive the featured electric vehicles. The event also took part in the celebration of the 125th BUT anniversary.

21.

International Seminar Electrotechnology 2024

Photo: UETE archive

The Department of Electrical and Electronic Technology organised the international seminar Electrotechnology 2024 in Vémyslice, which brought together representatives of institutes and departments focused on the issue of electrical engineering in teaching and research.

23.

Lecture by Prof. Caroline Friedel – Expect the Unexpected: Lessons for RNA-seq Analysis from HSV-1 Infection and CDK Inhibition

Prof. Caroline Friedel from the LMU Munich gave a fascinating talk on RNA-seq analysis in HSV-1 infection and CDK inhibition. The lecture brought new insights in bioinformatics and enriched the students and experts at the Department of Biomedical Engineering.

JUNE

1.

Elektrikárium reopened for schools and the public

Photo: FEEC archive

In June and July, the faculty welcomed several groups of pupils from the 4th-9th grades of the Jan Hus Christian Primary School in Brno, pupils from the Holubice Primary School and children from the LOGO speech therapy clinic's suburban camps.

Photo: FEEC archive

They visited the reopened interactive playroom Elektrikárium, which is available for school excursions, interest groups and summer camps. The playroom offers 15 interactive stations including, for example, a force gauge, a 3D light cubes, a rotogen and wireless sound transmission.

13.

Handover ceremony of Emaldo 6-V-1 at FEEC

Photo: Mirek Kodeš

The handover ceremony of Emaldo 6-V-1 technology took place at FEEC. This is the most modern photovoltaic and charging technology that has recently entered the Czech market.

16.

Life Sciences 4.0 Platform discussion on Digital Therapies

Photo: RHK Brno

The Department of Biomedical Engineering hosted a roundtable on digital therapies. The event for experts from research, commercial and academic environments was organised by the MedTech working group within the Life Sciences 4.0 association. The latter connects corporate and university stakeholders in the life sciences to increase their competitive edge. The association is under the auspices of Brno Regional Chamber of Commerce.

17.–19.

Summer School of Biomedicine

Photo: Cto Janoušek

The Summer School of Biomedical Engineering was held at the Department of Biomedical Engineering. Secondary school students explored the world of technology and the human body over three days. For example, they measured their own muscle activity or used their DNA to assess how we differ from dinosaurs.

19.–21.

18th IFAC Conference on Programmable Devices and Embedded Systems (PDeS)

The main aim of the conference is to provide a platform for experts to meet and present the latest research results and experiences in the design and application of programmable devices and systems. The conference

Photo: UAMT archive

also serves as a forum to discuss the current status and future trends in this specific field of applied electronics in control and information technology.
The event is organised by the Department of Control and Instrumentation.

20.

Picnic with the Dean

Photo: Miroslav Škapa

The second annual informal meeting of staff, PhD students and faculty management, aka Picnic with the Dean, took place near the Professor Brauner Auditorium.

20.–21.

International Conference on Mathematics, Information Technology and Applied Sciences – MITAV 2024

The Department of Mathematics co-organises an annual conference, which is intended primarily for teachers of all types and levels of schools. It focuses on the latest findings in mathematics, computer science and other sciences, as well as on the issues of teaching these disciplines at all types and levels of schools, including e-learning and other applications of information technology in the educational process.

24.–26.

Summer School of Sports Technologies

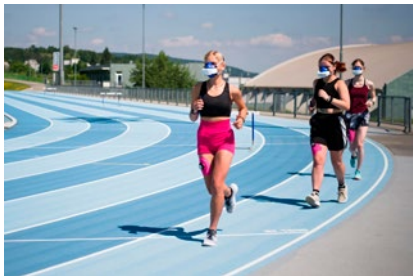


Photo: CESA archive

In cooperation with the Centre of Sports Activities, BUT (CESA), the Department of Biomedical Engineering has prepared a summer school for those interested in sports technologies. High school students had the opportunity to get an insight into the field of sports technologies and the study programme of the same name, which is taught at CESA.

24.–26.

45th Unconventional Sources of Electricity Conference

Photo: UETE archive

The 45th Unconventional Sources of Electricity Conference, organised by the Department of Electrical and Electronic Technology, was held in a new location in Hatě near Znojmo. The main expert topics were photovoltaic systems including their legislative and technological framework, community energy, energy communities, and management of consumption within the community, including the so-called grid overflows. A significant part of the contributions focused on electricity storage in batteries, as well as their management, operation and monitoring

26.–27.

Graduation ceremony of master's and bachelor's graduate

Photo: Jakub Rozboud

Within two days, graduation ceremonies were held first for master's and then for bachelor's graduates of FEEC 2024. The photo below shows the first graduates of the new degree programme Space Applications.

Photo: Jakub Rozboud

JULY

1.

Signing of the Cooperation Agreement between FEEC and the town of Pohořelice

Photo: Miroslav Škapa

The Dean Vladimír Aubrecht welcomed Miroslav Novák, the Mayor of Pohořelice, and the Vice-Mayor Ondřej Veselý to the faculty. The meeting itself took place at the Department of Electrical Power Engineering, because it is this department, namely assistant professor Jan Morávek, who was at the birth of the cooperation, will also ensure the subsequent implementation of the contract. The cooperation between the town of Pohořelice and FEEC will concern energy projects in the field of photovoltaics and renewable energy sources. The task of FEC students and experts will be to analyse the data obtained by measurement and subsequently propose improvements to the town's energy projects. As part of the cooperation, a FabLab teaching truck trip was subsequently organised by the FEKT on 17-19 September, 2024, offering free tutored technical workshops to the pupils of Pohořelice Primary school.

1.–26.

Summer School of Chip Design in Taiwan

Photo: UREL archive

Representatives from the Department of Radio Electronics attended the TSRI Integrated Circuit Design and Implementation Course: Full-Custom IC Design & CMOS MEMS IC Design summer school hosted by Taiwan Semiconductor Research Institute on their home turf. They gained the knowledge needed to implement advanced electronic systems directly on the chip.

10.–12.

47th International Conference on Telecommunications and Signal Processing (TSP) 2024

47th International conference for academic and scientific researchers working in telecommunication engineering and signal processing is organised annually by the Department of Telecommunications in cooperation with other universities from the Czech Republic, Hungary, Turkey, Croatia,

Taiwan, Japan, Slovak Republic, Spain, Bulgaria, France, Romania, Slovenia, Greece and Poland under the auspices of IEEE Region 8 and the Czechoslovak section of IEEE.

19.

BUT at Meltingpot as part of Colours of Ostrava

Photo: Václav Koníček

Representatives of our faculty and BUT participated for the first time ever at the Meltingpot discussion forum within the festival Colours of Ostrava. FEEC was represented by experts from the student association YSpace, who participated in the discussion on space engineering "Where science fiction ends and space science begins." The event featured a model of the student association's lunar rover Brno Mars Rover (Department of Control and Instrumentation) and a swarm of artificial intelligence-controlled drones (Department of Theoretical and Experimental Electrical Engineering).

AUGUST

12.–21.

International Summer School of Microcontroller Programming

Photo: Jana Němcová

In the course of August, the International Summer School of Microcontroller Programming was held at the faculty in cooperation between FEEC and the University of Applied Sciences Technikum Wien. The course was led by Thomas Fischer from the University of Applied Sciences Technikum Wien, who is an expert in software design for microcontrollers.

22.–25. a 25.–28.

BUT Pre-school

The traditional getting-to-know-you event took place at the Vranov Dam under the auspices of the Rector of BUT. Prospective students were "pre-trained" by the members of student associations active at BUT, including students of our faculty from the Students for Students association. Participants took part in a wide range of activities and competitions aimed at getting to know their new fellow students and the functioning of the faculty.

25.–28.

25th international conference Advanced Batteries, Accumulators and Fuel Cells (ABAF)

Photo: UETE archive

At the end of August, the international conference Advanced Batteries, Accumulators and Fuel Cells (ABAF) was held for the twenty-fifth time. This year's event was organised in a somewhat untraditional settings of the BUT rectorate premises. Moreover, thanks to the anniversary, the event was held under the auspices of the BUT Rector, Ladislav Janíček. The conference focuses on topics related to basic research and application of modern electrochemical power sources such as Li-ion batteries and newer battery technologies, fuel cells and renewable energy sources. The conference also focuses on linking research with practice, and that is why it is attended by the representatives of Czech and international companies.

The conference is organised by the Department of Electrical and Electronic Technology.

SEPTEMBER

1.

65th anniversary of FEEC

Photo: BUT archive

In addition to 125 years of BUT, FEEC celebrated its 65th anniversary this year. Despite the fact that the first electrical engineering subjects were taught at BUT as early as 1905, an independent faculty was established only in 1959.

1. 9. – 31. 12.

Cooperation with primary and secondary schools

In this period, the faculty started a more active cooperation with schools, which meant either pupils and students attending the faculty´s professional programme prepared for them, or academics visiting schools. A total of 44 events (workshops or lectures) were held within the framework of cooperation with schools. In Elektrikárium, we welcomed 21 schools from September to December.

5. 9. a 27. 11.

Seminar series: Reaching and keeping compliance of production modules/ manufactures with network requirements

Photo: UEEN archive

The seminars focused on the exchange of experience and deepening of knowledge in verification of compliance of production modules (PM) with the requirements of PPDS Annex 4 (PPDS:P4), following the Regulation (EU) 631/2016 (RfG).
The aim of the seminar series, organised by the Department of Electrical Power Engineering, is to provide the participants with information for understanding the key aspects of compliance assurance for (primarily non-synchronous) generation modules of both categories A and B.
The participants were given a detailed explanation of the network requirements associated with each PM category and the different procedures for PM compliance assurance as well as the associated verification system.

6.–8.

Festival of Science and Technology

Photo: Václav Koníček

BUT participated in the Festival of Science and Technology, which took place at the beginning of September at the Brno Exhibition Centre.
FEEC participated in this event for the first time, and with great enthusiasm. Nine departments presented their scientific research work so that it could be understood mainly by young visitors. Children had the opportunity, for example, to take a photo of the retina background and learn more about the applications of this technology in medicine, try out a drone flight simulator or print their own photo from the brightness analyser.

6.–13.

Summer School of Nuclear Engineering 2024

The summer school for those interested in the future development of nuclear energy is co-organised by BUT and CTU. The programme included thematic lectures on practical

Photo: UEEN archive

or non-traditional nuclear topics, excursions, nuclear competitions and cinematography dealing with nuclear issues. Everything was provided by experts from practice and Czech universities. The summer school was supported by the organisers and their partners from industry.

9.–11.

Conference European Wireles

European Wireless is a prestigious conference where European and international researchers can learn about the latest trends in wireless communications and networks. 29th conference took place in Brno, at FEEC. The conference is organised by the Department of Telecommunications in cooperation with the Technical University of Dresden.

13.

Students' matriculation ceremony

Photo: Jakub Rozboud

Just before the beginning of the winter semester, the matriculation ceremony of newly enrolled students took place. The matriculations transitioned freely from the official ceremonial part to the opening presentation for the first years.

13.

Autumn graduation

Photo: Jakub Rozboud

13.–15.

PerFEKT start

Photo: SPS archive

The traditional welcome event for the first years of the bachelor's degree programmes is organised by the members of the Students for Students association. The newcomers had the opportunity to get acquainted with the faculty premises and future fellow students. They were given practical tips from current students on both course registration and studying at FEEC.

16.

Opening of the Technology Club Brno and clubs for primary school children at FEEC

FEEC will no longer be just a place of education for university students. Since September 2024, in cooperation with the World of Education, the Technology Club Brno will open in Technická 10. Parents and children will thus be in close proximity to scientific research and technological innovations.

17.

Ceremonial opening of the nuclear laboratory and the launch of the new study programme Nuclear Power Engineering

Photo: Jakub Rozboud

Brno University of Technology inaugurated a new study programme Nuclear Power Engineering at FEEC.
The two-year master's programme responds to the needs of industry and the state, especially with regard to the completion of the Dukovany power plant.

Photo: Jakub Rozboud

It has a capacity of 24 students and 4 faculties will participate in its tuition. The new Laboratory of Nuclear Energy and Ionizing Radiation was also presented during the opening ceremony.

18.

Hudba z FEKTu

Photo: Jakub Brandejs

For the sixteenth time, the festival Hudba z FEKTu took care of the traditional summer season ending in the FEEC parking lot.

Photo: Jakub Rozboud

On Wednesday, 18 September 2024, five student bands performed in succession between Technická 10 and 12 from 12:00 p.m. onwards, and the event was rounded off by two headliners, Deloraine and Cocotte Minute.

24.–25.

Gaudeamus Nitra

The first round of the European fair of post-secondary and lifelong learning in the academic year 2024/25, of course with the participation of the representatives of FEEC. Gaudeamus tries to reach mainly the last years' students of secondary schools, but it also targets their teachers and counsellors.

27.

Researchers' Night 2024

Photo: Jakub Rozboud

The faculty traditionally participated in a nationwide popularization event called Researchers' Night. The theme of this year's event was CHANGE. During the Researchers' Night, 920 visitors came to us despite the rainy weather. A big thank you to the seventy researchers, students and enthusiasts who were involved in the preparations or on the spot, giving out knowledge and passion for science and technology!

Photo: Jakub Rozboud

We were able to make the results of scientific research accessible to all ages, which we are particularly pleased about.

OCTOBER

1.

European Cyber Security Month

Photo: FEEC archive

Within the European Cyber Security Month, two events were held at FEEC. The Cyber Security Conference 2024 took place on 22 October as part of the Safe Internet Festival and was organised in cooperation with CyberSecurityPlatform.cz. It included a workshop for secondary school teachers and a meetup on the implementation of the NIS2 directive. The second event was the beFaster.cz Workshop - focused on effective detection of cyber threats, which took place on 24 October.

1.–3.

Gaudeamus roadshow Poprad – Prešov – Košice

Event focusing on Slovak applicants.

8.

Day full of energy + Robe

Photo: Jakub Rozboud

On Tuesday, 8 October, the first round of the Day full of Energy took place at FEEC, organized in cooperation with the strategic partner of the faculty, E.ON. A small town with various stands was set up in the outdoor area in front of the T12 building.

Photo: Jakub Rozboud

In a large heated tent, students and our experts had the opportunity to discuss topics related to cyber and physical security in the energy sector, smart charging and energy sharing, optical networks or SF6-free technologies with experts from E.ON.
Parallel to this event, a presentation of the latest innovations in lighting technology was also held in the ROBE truck, i.e. Robe on the Road. The students certainly enjoyed the informal seating on the roof of the truck.

8.–10.

Gaudeamus Bratislava 2024

Another round in a series of Gaudeamus fairs, this time in Slovakia. The fair is an opportunity for personal meetings with our potential students.

8.–11.

65th International Engineering Fair in Brno

Photo: Václav Koníček

BUT exhibition also featured FEEC exhibits - a Fanuc robotic cell for sorting components and a robotic bartender consisting of production cells that provide glass storage, liquid dispensing, mixing, soda and ice dispensing.

This is an example of Testbed 4.0, a smart self-learning environment designed to simulate real industrial production. The Volteek project, which was inspired by the development of a battery system for BUT student formula, was also presented at the exhibition.

Photo: Václav Koníček

Its author Dominik Klement and his teammates also succeeded in BUT Student Entrepreneurship Award competition.

9.

President of the Republic Petr Pavel visited FEEC

As part of his working trip to South Moravia, the President of the Czech Republic Petr Pavel visited Brno University of Technology on Wednesday, 9 October.

Photo: Václav Koníček

His agenda included a debate with the students of the university and a presentation of students' creative activities in technological areas, mainly focused on automotive, aerospace and robotic applications. The President Petr Pavel's visit took place at the Faculty of Electrical Engineering and Communication.

10.

Open Science Day and the Meeting of Secondary School Directors

Photo: Zdeňka Koubová

At the Open Science Day, 33 scientists and students presented their research teams and projects to their colleagues and those interested in PhD studies. Secondary school directors, who also participated in the parallel event Meeting of Secondary School Directors, had the opportunity to gain some insight into research work. During the event, they were able to discuss technical education issues with academics. This was the first year of this event, which was supported by the faculty's strategic partner Škoda Auto.

16.

Breakfast with the Dean

Photo: Jakub Rozboud

The second annual Breakfast with the Dean was held. The aim of the event is to connect the students with the faculty management and to allow discussion of ideas to improve the environment and functioning of the faculty.

19.–20.

Maker Faire Brno

Photo: Jitka Janů

Innovation, creativity and unusual ideas. Makers filled the Brno Exhibition Centre with their projects for the fifth time on the weekend of 19-20 October. There were also bastlers from FEEC and their extraordinary technologies. Modern DIY fans were very interested in drones and their virtual

control by the students from BUT Drone Research Center. The Faculty of Electrical Engineering and Communication was also represented by the student team YSpace, which deals with the development of satellites and space technologies.

Photo: Jitka Janů

Visitors also admired a prosthetic hand from a 3D printer, thanks to which they could try out how the prosthesis learns individual movements, a modern CNC router or demonstrations of how 3D printing is used in teaching at BUT. For the first time, a humanoid robot by the student Jan Toman was presented for FEEC.

from 20.

DiskUTEEr

In 2024, the Department of Theoretical and Experimental Electrical Engineering started a series of lectures with the possibility of discussion among students, academics and representatives from industry. It is highly encouraging to see a great interest from industrial companies experts, who pass on the latest knowledge to students and open the way for possible collaboration in student work or contract research.

21.

Expert lecture by Japanese scientist Shoko Miyauchi

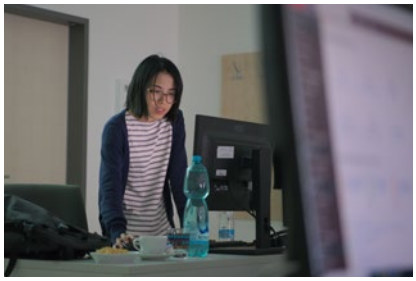


Photo: Oto Janoušek

As part of her two-year training program at Kyushu University, a Japanese scientist, Shoko Miyauchi, gave a lecture at the Department of Biomedical Engineering on her research into computer vision and the application of artificial intelligence in 3D shape modelling.

23.

Lecture An Introduction to Quantum Computing

Prof. Juan-Carlos Perez-Cortes from the Universitat Politècnica de València visited the Department of Biomedical Engineering, where he gave a lecture on the introduction to quantum computing. The event offered a unique insight into current trends and research in this field.

24.–25.

IMAPS Flash Conference 2024

IMAPS CZ & SK (International Microelectronics Assembly and Packaging Society) in cooperation with the Department of Microelectronics and the Czech National Semiconductor Cluster (CNSC) organized the 10th IMAPS Flash Conference. The conference is

Photo: UMEL archive

focused on modern trends in microelectronics. This year's conference focused mainly on SiC and GaN semiconductors, photonics, nanotechnology and perspectives of the semiconductor industry including advanced microelectronic technologies.

31.

Blood donation at FEEC: "Donate blood – donate life!"

Photo: Jakub Rozboud

The first year of the event "Donate blood – you give life!" organized in cooperation with the Transfusion and Tissue Department of the University Hospital Brno. During the morning, when the event took place, about fifty people decided to donate. Finally, 25 of them were able to do so. The staff present at the University Hospital Brno evaluated the result positively and therefore we agreed to continue this joint event.

31.

Influence of light on health – lecture afternoon

More than a hundred people visited Prof. Brauner's Auditorium for the multidisciplinary lecture afternoon The Influence of Light on Health. The meeting was organized by the Institute of Manual Treatment and Education (IMTE) in cooperation with the Department of Electrical Power Engineering (organizer Petr Baxant).

31.

Seminar How to navigate in the MDR jungle

Photo: Oto Janoušek

The seminar focused on MDR (Medical Device Regulation) issues and attracted a wide range of experts.
The event was part of the Life Sciences 4.0 series and offered practical tips and experience in navigating biomedical device regulations.

NOVEMBER

1.–3.

Hackaton Hack jak Brno

Photo: Petr Hrabovský

The first year of the Hack jak Brno medical hackathon was a triumph of biomedical topics and innovative solutions led by the experts from the Department of Biomedical Engineering.

11.–13.

V4 – ROK forum

The second forum of rectors, vice--rectors and university experts of the Visegrad Four (V4) countries and the Republic of Korea was organised by BUT and KEPCO International Nuclear Graduate School (KINGS). The meeting, which took place on 11-12 November at BUT headquarters, brought together representatives of the universities from the Czech Republic, Slovakia, Hungary, Poland and South Korea.

Photo: Václav Koníček

The main topic was the need for human resources for nuclear energy and the importance of STEM fields for the energy sector and the national economy. The following day, the foreign participants visited partners from the nuclear industry.

13.

Workshop focusing on chips

Photo: Vysočina Region archive

In mid-November, a workshop on chips and semiconductor technologies took

place in the auditorium of The College of Polytechnics Jihlava, aimed especially at secondary school students and teachers. The event, prepared in cooperation with a team from the Department of Microelectronics and the Vysočina Region, presented the growing need for experts in chip design and manufacturing.
The seminar attracted about 100 participants – pupils, students and teachers from the region's secondary schools, grammar schools and the host college.

14.

First round of the Merkur perFEKT Challenge 2024-25

Photo: Václav Koníček

Merkur PerFEKT Challenge – a competition for high school students and its 11th year, which was attended by an incredible 52 student teams from 28 high schools. The top teams advanced to the super finals in January. The topics the students had to work on were: Automated waste sorting machine, Autonomous vehicle, Functional model of a wind turbine with energy storage, Drawing a picture using a robotic arm, Armadillo controlled by coloured markers on a track, Armadillo following the light, Muscle to robot, Synchronous generator and Race with the Sun.

Photo: Václav Koníček

18.

Training of cyber security experts from the Prague Airport security monitoring centre team

Photo: Václav Koníček

We trained cyber security experts from the Prague Airport Security Monitoring Centre team on the unique BUTCA platform. The training was conducted on physical scenarios representing, for example: smart meters (DLMS/COSME security) or a wastewater treatment plant (operational technology security). All under the guidance of the lecturers Ondřej Pospíšil and Tomáš Lieskovan.

19.–22.

Gaudeamus Brno 2024

BUT and the FEEC representatives could not miss the Gaudeamus Brno post-secondary education fair.

Photo: Václav Koníček

Visitors had the opportunity to see the new university stand at the fair, where, in addition to exhibits, our students were waiting for them, ready to answer their inquisitive questions.

19.

Open Day

Photo: Jakub Rozboud

The Open Day welcomed almost 400 people interested in studying at FEEC.

26.–28.

ICUMT 2024

Photo: Nikola Číková

The international congress was organized by the Department of Telecommunications in cooperation with the Tampere University (Finland) as an open forum particularly for researchers in telecommunications, control systems, automation and robotics. The event was intended to present original results from basic and applied research and was held in Gran Canaria, Spain.

26.–28.

Wide Band-gap Semiconductor Workshop

Photo: UMEL archive

The workshop focused on the latest innovations in chips and semiconductors, which was held for three days with the Czech and foreign leaders in the field, including the representatives of the Department of Microelectronics. The workshop took place in Brno and Rožnov pod Radhoštěm at onsemi.

DECEMBER

4.

Punch from Students for Students

The Students for Students association organized a traditional informal pre-Christmas meeting in front of the faculty building with St. Nicholas punch for students and staff.

4.–5.

International workshop Post-Quantum Transition Workshop (PQT)

The Department of Telecommunications and the National Cyber and Information Security Agency (NÚKIB) organized an international workshop called Post-Quantum Transition Workshop (PQT) at the Olympic Hotel in Prague, which focused on the transition to quantum-safe technologies and post-quantum cryptography (PQC). The aim of the event was to bring together the academic, government and commercial sectors to discuss the challenges

Photo: archiv UTKO

associated with the migration to quantum-safe technologies, with an emphasis on e-government and critical infrastructure within the Czech Republic and the EU. The workshop was not a one-off event, but the first part of a dialogue that will be followed up by further meetings during the first half of 2025.

4.–6.

St. Nicholas Day meeting of the Young Generation of the Czech Nuclear Society

The Department of Electrical Power Engineering was a co-organizer of the 23rd annual St. Nicholas meeting of the Young Generation of the Czech Nuclear Society.

Photo: UEEN archive

Each year, about 50 participants from universities, research organizations, and industry sign up. The meeting also included a presentation of award-winning theses on nuclear energy and a special lecture by the meeting's guest speaker, an employee from FRAMATOME, who presented a plan for the development of nuclear fuel for VVER reactors. The event was accompanied by a visit to the Bukov underground research facility.

5.

Lecture PACS and DICOM – Key technologies for modern healthcare

The experts from the OR-CZ company presented PACS and DICOM technologies at the Department of Biomedical Engineering, which make the archiving and transmission of image data in medicine more efficient. Participants learned about the importance of such technology for diagnostics and therapy in modern healthcare. The event was open to the public and aimed at those interested in technology, medicine and informatics.

11.

Two lectures by Aria Vítková, NASA

The Department of Radio Electronics organized two lectures for the general public by Aria Vítková, who works at the Jet Propulsion Laboratory at NASA, thus fulfilling the third role of the university.

14.

BUT Junior at FEEC

Photo: Dominik Kozlovský

On Saturday, 14 December, we welcomed 100 young scientists to BUT Junior children's university. The children and their parents first explored the world of satellites together with the YSpace

Photo: Dominik Kozlovský

student association, then the children discovered the secrets of science in our fun playroom Elektrikárium and then experimented in five thematic workshops. While the kids explored, their parents toured our space labs.

17.

Finals of the faculty-wide competition FEKTTeams 2024

Photo: Jana Němcová

The final presentations and announcement of the winners of the new competition for the first-year students of bachelor programmes - FEKTTeams 2024 – took place at FEEC on Tuesday, 17 November 2024. This innovative project aims to enrich the beginning of studies with practical experience and to enable students to engage in interesting and topical challenges from the very beginning of their study life. You can read more about the competition and the winners in the chapter People in spotlight.

Significant awards and recognitions

GOLDEN AMPER

The AMPER trade fair at the Brno Exhibition Centre is one of the most important events in power engineering and electrical engineering in Central Europe. At AMPER 2024, FEEC presented a novelty for power networks under the name Smartbox, on which it cooperates with EG.D, a distribution company belonging to the E.ON group. The project impressed the expert jury, which awarded it with the title GOLDEN AMPER 2024 as one of the most beneficial exhibits of the fair.

Smartbox is a unique technical solution for smart metering and load management in power networks. This device can transform the existing electricity meters into so-called smart meters. In addition, the connection of the Smartbox to the meter at the customer interface enables the control and regulation of production and consumption downstream.

Photo: Nikola Číková

Smartbox developers and partners with the prize, see from left: Petr Číka, Lukáš Benešl, Petr Mlýnek, Martin Rusz (all from the Department of Telecommunications), Pavel Čada and Michala Vlčková (both from EG.D).

Josef, Marie and Zdeňka Hlávka Foundation Award

Professor Jan Maxmilián Honzík, who graduated in computer science at the former Faculty of Electrical Engineering, the predecessor of FEEC, received the Josef Hlávka Medal in recognition of his work as an outstanding teacher and respected expert, coupled with a financial award of CZK 90,000. He was at the birth of the Faculty of Information Technology, the Gaudeamus fair, and is one of the pioneers of popularization events aimed at increasing the interest of female students in the study of technical disciplines.

Nikola Musilová (FEEC) received the award for excellent academic results and her master's thesis, in which she designed an integrated system for controlling an electrochromic rear-view mirror in a car using nanotechnology. The results of her work are planned to be used by onsemi.

Matej Grega (FEEC) was awarded the special Prize of Professor Daniel Mayer with a sum of CZK 25,000. He completed his studies in the bachelor's programme Microelectronics and Technology with honours and in his bachelor's thesis he focused on the acoustic detection of a projectile hit point and the design of an electronic target for sport shooting.

Photo: Hlávka Foundation archive

Professor Honzík (in the centre) after receiving the Josef Hlávka Medal with Professor Wilhelm, member of the Foundation's board of trustees and the BUT Rector, Ladislav Janíček (on the right).

Photo: Hlávka Foundation archive

Matej Grega (on the right) after receiving the prize at Josef Hlávka's castle in Lužany u Přeštice on 16 November 2024

GAČR JUNIOR STAR

A young scientist from the Department of Biomedical Engineering has received a prestigious grant. Karel Sedlář is among an elite group of 19 young researchers who have been awarded support from the Czech Grant Agency (GAČR) in the JUNIOR STAR programme. He will be able to fund his research project with CZK 25 million over the next five years. Karel Sedlář's grant research, in collaboration with his colleagues from the Faculty of Chemistry at BUT, brings a completely new perspective on bioplastics (biopolymers) and the subsequent possibility of their decomposition.

Photo: Jakub Rozboud

Photo: Werner von Siemens Prize archive

Werner von Siemens Prize

Veronika Kamenská from FEEC received the Werner von Siemens Prize 2023 for overcoming visual impairment, specific learning disabilities and mental illness while studying biomedical engineering. Together with her colleague Tomáš Chlubna, she created the Nepanikař app to help people with mental health problems, which is used by over half a million users and has won numerous awards including the first place in the Gratias Tibi competition and recognition from the Ministry of Education. She is active in raising mental health awareness in schools and in her spare time she competes in para-karate, in which she won silver at the World Championships.

Photo: Fulbright Czech Republic, Václav Koníček

Fulbright Scholarship

Kryštof Novotný, a PhD student in the Teleinformatics programme at FEEC, received a prestigious Fulbright scholarship for a research stay at Johns Hopkins University. From October 2024 to February 2025, he worked on developing a method for early diagnosis of dementia with Lewy bodies using acoustic speech analysis.

As a member of the BDALab research team, which has been working on digital speech biomarkers for over a decade, he aims to create a fast and accessible diagnostic method that would allow physicians to detect disease risk from speech recordings. He can also add to his achievements a second place award at the STUDENT EEICT 2024 conference for his research on the long-term effects of repetitive transcranial magnetic stimulation in Parkinson's disease patients and a Dean's Award for both his bachelor's and master's theses.

Brno PhD Talent

Enikö Vargová from the Department of Biomedical Engineering is among the nine students from Brno University of Technology who succeeded in the 15th year of the Brno PhD Talent competition. Her project, aimed at developing an advanced tool for detecting cardiac pathologies, uses PPG signals and artificial intelligence to improve prevention. The main goal of her project is to enhance the prevention of heart disease, combining biosignal analysis with artificial intelligence to detect various cardiac pathologies. This innovative method could enable early diagnosis of heart problems.

Project "MiFuture" within the Marie Skłodowska-Curie Actions call

The MiFuture project develops technologies for future 6G mobile networks, where a key element will be the evolution of massive MIMO (Multiple-Input Multiple-Output) towards ultra-massive MIMO and heterogeneous cell-free networks to increase transmission speeds while reducing energy consumption. The project will involve 15 PhD students, including our PhD student Radovan Juráň from the Department of Telecommunications, who will develop the necessary competences to implement these innovative solutions in a real environment under the guidance of experts from industry and academia.

Best Paper Award

The journal article by Petr Kaděra and Jaroslav Láčík from the Department of Radio Electronics was awarded the "Best Paper Award 2023" of the "International Journal of Microwave and Wireless Technologies". It was written in collaboration with colleagues from TU Darmstadt and describes partial results of their research in retroreflectors for indoor localization in the subterahertz band. The award was presented at the opening ceremony of the European event "European Microwave Week 2024", which took place in Paris at the end of September.

Honorable mention from the President of the GAČR

Martin Štumpf from the Department of Radio Electronics received an honorary mention from the chairman of the GAČR for outstanding results of the project "Interaction of pulsed EM field with thin--film structures". His paper "Time Domain Partial Elements: A New Paradigm for Improved PEEC Models", which describes a new numerical approach to solving integral Maxwell's equations using the PEEC method and on which he collaborated with the author of this method, Dr. Albert Ruehli, at IBM Laboratories (Yorktown Heights, NY, USA), won the "Best Paper Award" at the 2023 IEEE Electrical Design of Advanced Packaging and Systems (EDAPS) conference.

City of Brno Award

On 30 January 2024, Professor Josef Diblík from the Department of Mathematics received the City of Brno Award for his contribution in natural sciences. The City of Brno Award is presented annually in one of 14 categories for significant activities or works that have enriched one or more areas of public life and have contributed to the enhancement of the reputation of the Brno city.

Photo: Marie Schmerková

Mathematician Prof. RNDr. Josef Diblík, DrSc. received an award for his contribution in the field of natural science.

People in spotlight

The YSpace team from BUT succeeded in the European Space Agency programme. It's a little closer to the stars

The YSpace student team, which focuses on developing technologies for the space environment, is close to completing its CIMER mission. After signing up for the Fly Your Satellite! Design Booster, organised by the European Space Agency (ESA), the team succeeded in presenting its mission to an expert panel and in competition with university teams from across Europe was shortlisted for the participation in the programme. The Fly Your Satellite! Design Booster programme offers student teams the opportunity to take their space mission into the final development phase with ESA support. It is designed for the initial stages of satellite development and precedes the main Fly Your Satellite! programme. In any case, it is a very prestigious event.

Only 2 to 4 teams from all over Europe will succeed in the competition. YSpace has achieved a truly unique success! "We are very excited that ESA has appreciated our mission proposal.

Jakub Rozboud

YSpace team in front of the FEEC campus, where they have their facilities.

This success is the result of the long-term efforts of all team members who have been preparing the mission in their spare time and outside the academic year. YSpace members have already achieved individual successes within ESA, but now we have been able to add the most important one - team success. However, we realise that we still have a long way to go and we intend to make the most of the opportunities offered. I would like to thank all the members for the work they have done, as well as our partners, and especially the university for their support. The latter, together with the Fly Your Satellite! Design Booster, brings us closer to our ultimate goal – the launch of the first Czech student-designed satellite," said Filip Čapka, a technical leader of the CIMER mission and a student of the Space Applications master's programme at FEEC, in response to the success of the mission.

In preparation for the next selection rounds of the programme, YSpace members attended Training Week, an intensive workshop in Noordwijk, the Netherlands, in November. "Here we will attend a series of lectures led by ESA experts covering all aspects of satellite development – from technical issues to

Photo: Václav Koníček

President Petr Pavel also expressed his interest in the creative activities of YSpace and other student teams during his visit to BUT in October.

project and cost management. In addition to new knowledge and experience, we hope to gain advice that should help us improve the satellite design before submitting its documentation for the final selection rounds," explained Dominik Klement, YSpace team leader.

Mise CIMER (Cyanobacteria In Microgravity Environment Research) is the first ever project the YSpace team has worked on since its formation in 2023. It is an inter-university collaboration with Mendel University in Brno, whose research team is preparing an experiment with desiccated (dried) cyanobacteria. The aim of the mission is to take these bacteria into the Earth's orbit, revive them with a culture solution and then observe their activity, including measuring the oxygen (O_2) produced. The task of YSpace will be to design and build a satellite that will ensure the protection of the biological payload in the inhospitable conditions of space, thus making the entire mission feasible.

The development of the satellite will also include a thorough analysis of foreseeable environmental effects. "The success of YSpace proves that in times of growing interest in space technology, BUT is moving in the right direction. It is great that just two years after the opening of the new Space Applications study programme, the university's students have achieved extraordinary international success in the field of 'space'. It is important to remember that the benefits of the mission are not just prestige, but the results can have a real impact on the conquest of the distant space. In the future, cyanobacteria could be used for oxygen production or water purification on interplanetary missions," commented Tomáš Götthans, a guarantor of the Space Applications study programme at FEEC, on YSpace's achievements in collaboration with ESA.

President Petr Pavel also expressed his interest in the creative activities of YSpace and other student teams during his visit to BUT in October. He was impressed by YSpace's cooperation with the ESA, the team's innovation and its ability to respond to current trends.

Fly Your Satellite! is a prestigious ESA-funded programme whose main goal is to launch a satellite, the so-called CubeSat, into the Earth's orbit. The programme also provides the university teams developing the satellites with mentoring and the necessary infrastructure. It consists of four phases that replicate the development stages of space missions.

Unique tool for dysgraphia assessment developed by the researchers from the Czech Academy of Sciences and FEEC in cooperation with Propsyco

In cooperation with the Institute of Psychology of the Czech Academy of Sciences, FEEC and Propsyco s.r.o., a unique diagnostic method for objective assessment of developmental dysgraphia was devised. It will help experts from school counselling centres and workplaces to diagnose and evaluate writing disorders in children of younger school age. The DiaGraMo diagnostic software was presented at a press conference on 20 June 2024, which was attended by the Vice-Dean for Creative Activity of FEEC, Professor Jaroslav Koton, the project's principal investigator Professor Tomáš Urbánek and Dr. Katarína Zvončáková from the Institute of Psychology of the CAS, and Dr. Jiří Mekyska from the Department of Telecommunications. "Developmental dysgraphia, technically referred to as a specific learning disorder with impaired written expression, is manifested by a fine motor impairment that is reflected in writing. For example, a child has a difficulty in following a line smoothly, with letter shapes or with the organisation of a text on a page. This often leads to illegible handwriting and great effort in writing. In addition, the child may experience feelings of inferiority, impaired self-esteem and be misperceived by others (e.g. being labelled as lazy or uncooperative). Some studies even suggest that illegible handwriting can lead to lower grades at school. All this negatively affects the child's overall well-being," explains Dr Zvončáková from the Institute of Psychology of the Czech Academy of Sciences.

Photo: Miroslav Škapa

Assoc. Prof. Jiří Mekyska, PhD (FEEC BUT)

Until now, the diagnosis of dysgraphia has been based on the subjective assessment of practitioners. The newly developed software, called DiaGraMo, uses digitising tablets to record handwriting and then uses mathematical models to automatically evaluate and provide experts with an objective diagnosis and assessment of the various manifestations of dysgraphia. The output of the software is an evaluation of the child's performance in different areas of writing (e.g. writing speed or the ability to distinguish the size of individual letters). "To this day, there is no diagnostic method worldwide that would allow for an objective assessment of the manifestations of dysgraphia. Two experts may disagree on the diagnosis or on the subsequent re-education. This can have a negative

impact on the quality of life of children. Our system does not blindly categorise children as having/not having dysgraphia, as dysgraphia can have different manifestations and these occur to different degrees. Therefore, we have designed a software that identifies and assesses the severity of those manifestations that are associated with a writing disorder. This comprehensive evaluation then enables a targeted re-education and the possibility of objective monitoring of the child's development over time," says Associate Professor Mekyska from the Department of Telecommunications.

Enikö Vargová inventing an algorithm to detect cardiac arrhythmias using smart devices

Biomedical PhD student Enikö Vargová succeeded in the Brno PhD Talent competition and received the financial support for her innovative research, which focuses on the development of advanced algorithms for health monitoring using smart devices.

As part of her PhD thesis "Advanced algorithms for health monitoring using smart devices", Enikö uses photoplethysmographic (PPG) signals to detect cardiac arrhythmias. PPG signals reflect changes in the volume of blood flowing in our cardiovascular system, especially in the vascular system below the surface of the skin. The heart pumps blood into the blood vessels, and owing to their elasticity, a pulse wave is generated that spreads to the fingertips. The pulse wave can be detected at a specific point on the body (e.g. at the fingertip) using light and a sensor. A lot of interesting information about the state of the cardiovascular system can be obtained from PPG, including the detection of cardiac arrhythmias.

Photo: Oto Jandoušek

Capturing PPG using video on the phone.

However, existing smart devices can only detect one type of cardiac arrhythmia - atrial fibrillation. Enikö Vargová's work focuses on early detection of other cardiac pathologies using artificial intelligence methods. This will enhance the prevention and early detection of these pathologies even in people who do not experience any symptoms or only experience them irregularly and rarely. Such a person can then be referred to a specialist in time for a more detailed examination and can be prescribed medication in good time, or the problem can be addressed in other ways.

"My research opens up new possibilities in the field of health monitoring using smart devices, especially the smartphone, which I see as a powerful tool whose potential is not fully exploited in the field of healthcare and especially prevention. The main goal of the project is to improve the prevention and early diagnosis of cardiac arrhythmias,"

explains Enikö the contribution of her work. PPG signals have been used in healthcare for a long time and their potential is well known. For example, they can provide information on heart rate, respiratory rate, blood oxygen saturation or blood pressure. "The blood pressure measurement, by the way, is the concern of my colleague Ing. Jan Šíma," adds Enikö.

Extrasystole leads to premature contraction of the heart and thus disrupts the regular rhythm. Some patients do not notice it. Others experience unpleasant symptoms (e.g. palpitations, nausea, chest tightness) and in a small percentage it can lead to left ventricular dysfunction. "I focus on cardiac arrhythmias. So-called smart watches have been popular for some time. These can currently detect only one of the cardiac arrhythmias, namely atrial fibrillation, which is manifested by an irregular heartbeat. My goal is for the smart devices to be able to detect other types of cardiac arrhythmias, such as extrasystoles, using PPG signals," says Enikö.

A more publicly known method of measuring heart activity, the ECG (electrocardiogram) is a recording of the difference in electrical potential (voltage) at two places on the body. PPG is not intended to be a substitute for it, but due to its wide availability, it can aid early detection of a heart disease in a relatively comfortable way. If a person now suspects a cardiac arrhythmia, which may be a feeling of weakness, chest tightness or rapid heartbeat, they should contact their GP. After the examination, he or she will write a request for an ECG examination, which must be booked. If it is necessary to monitor the patient's heart function over a long period of time (e.g. because the pathology does not occur continuously), then so-called Holters are used. This device has to be worn for several days, which is not very comfortable and does not guarantee that the pathology will be picked up (it may not even show up during the measurement). Waiting times to get a Holter recorder are also a problem. "A not full-fledged but more convenient and affordable alternative is to measure ECGs using a smartwatch. But to do this, you have to create a circuit – actively turn on the measurement and hold the appropriate spot on the watch with your other hand. This way, you don't measure the ECG throughout the day, but only a short, usually half-minute period, which may not detect the arrhythmia," says Enikö.

Photo: Oto Janoušek

Measuring PPG with a smartwatch.

With the enhanced measurement of PPG signals, it should be possible to detect more cardiac arrhythmias, either in the long term while wearing a smartwatch or in the short term using only a smartphone app. Then all you have to do is go to the doctor and present the stored data, including the analyses.

Electric cars under the scrutiny of FEEC researchers

A new scientific study by the researchers led by Kamil Jašša from the Department of Electrical and Electronic Technology brings a major finding in the debate on the environmental impact of electric vehicles. The research debunks the widespread opinion that electric cars have higher life cycle emissions than vehicles with internal combustion engines.
The analysis included a comprehensive look at the entire life cycle of vehicles, from production to operation, and finally to recycling. Kamil Jašša was prompted to prepare the study by discussions on the social networks regarding the increased environmental burden of electric vehicles. Many contributors to this topic argue that electric vehicles are worse for the environment because battery production is not environmentally friendly and electricity is produced in coal-fired power plants. "From a scientific point of view, this didn't make sense to me because the same electricity is used in both the production of fuel and the operation of gas stations. I also didn't understand why mining materials for batteries would be worse for the environment, when most of these materials are mined in the same way as any other raw materials," says Kamil Jasho, who was thus motivated to do a study called Environmental impact of vehicles: A comparative study within the Czech Republic and other Visegrad Four countries. The 2019 Hyundai Kona, available in several powertrain options (petrol, diesel, hybrid and electric), was chosen for the study. The research assumed a lifetime of 15 years and an annual mileage of 10,000 kilometres. The authors note that results may differ for other vehicles with different specifications.

Photo: Jakub Rozboud

Kamil Jaššo in the lab.

Manufacturing of electric cars in the Czech Republic produces 40-70% more emissions than the production of a comparable petrol car, mainly due to the production of the traction battery. While conventional car production produces 4 kg of CO_2 equivalent per kilogram of car, for electric car batteries it is up to 80 kg of CO_2 equivalent per kilowatt hour (CO_2 equivalent is a unit that allows individual greenhouse gases to be described and compared together, editor's note). This creates a notional emissions debt in the production phase for electric vehicles.

On the positive side, this issue debt will be cleared relatively quickly. In the 64 kWh battery version it is after 32.2 thousand kilometres, with the 39 kWh battery it is even after 17.5 thousand kilometres. Even in Poland, where the energy mix, i.e. the sum of all sources from which electricity is produced (fossil fuels, nuclear, renewables, or secondary sources such as municipal waste, editor's note) has a high emission factor, the debt is settled within 50,000 kilometres. Moreover, this gap is expected to decrease further in the future due to shorter transport chains, greater use of recycled materials in battery production and, in particular,

reduced emissions from electricity generation. After 150,000 kilometres, the petrol version of the car emits 38 tonnes of CO_2 equivalent and the diesel version 34 tonnes, while the hybrid technology achieves 30 tonnes. The electric cars are significantly more economical – the version with a 64 kWh battery emits 21 tonnes of CO_2 equivalent, the model with a 39 kWh battery only 18 tonnes. In the smaller electric car, the lower emissions become apparent after 17,800 kilometres.

The lifetime of even smaller batteries is several times longer than the average range of vehicles. A replacement is rare, for example in the event of a defective production run or improper handling. Over time, electric car manufacturers have come up with more efficient batteries, for which they guarantee a range of up to 400,000 km. The research has shown the significant potential of electric vehicles in reducing emissions in the Visegrad Four (V4) countries. Compared to petrol engines, e-cars can reduce emissions by 29-69% (46% in the Czech Republic), while diesel engines can reduce emissions by 19-60% (39% in the Czech Republic). Even in the case of Poland, which has the least favourable conditions due to its high share of coal in the energy sector, an e-car with a 64 kWh battery can produce fewer emissions than a petrol car after a 48,000 km range. For the young researcher it was surprising to see the differences between the V4 countries just because of the different energy mix. All emission sources are the same or quite similar for the V4 countries except

Photo: Jakub Rozboud

for emissions from electricity generation. In this respect, the V4 countries differ quite a lot from each other. Slovakia has a relatively clean energy mix thanks to its nuclear and hydroelectric power plants and it is possible to operate an electric car there with almost no emissions while Hungary comes close. On the other side of the ranking is Poland with a predominantly coal-based energy mix. "The operation of an electric car in Poland has a significant impact on the amount of greenhouse gases emitted due to the structure of electricity production there. In terms of energy mix, the Czech Republic is closer to the Polish model than to the Slovak one. However, even in these two countries it is possible to drive an electric car with almost no emissions – the key is to charge the car with electricity produced from renewable sources," adds Kamil Jaššo.

Further improvements in the environmental performance of electric vehicles are expected in the future. While emissions reductions in fuel production are rare, electricity is projected to decline by 2% annually in all V4 countries. In the Czech Republic and Poland, even more significant reductions can be expected due to the planned transition to renewable and low-emission sources.

"Our research has provided us with a number of compelling and verifiable findings that offer deeper insights into this issue. We believe that the findings presented can help the public build a more complete picture of the situation. We would like to encourage a more fact-based and concrete debate," adds Kamil Jaššo, the study's principal investigator.

Brno researchers triumph with a platform for phobia therapy

Researchers from Brno University of Technology and Masaryk University succeeded in the Prototype and Verify programme. The competition of the South Moravian Innovation Centre and the South Moravian Region supports the development and verification of prototypes of innovative products and services. The team impressed with the BraveMind project, which treats fears by means of virtual reality and has the potential to bring a significant shift in psychotherapy of phobias.

BraveMind is an exposure therapy platform using virtual and mixed reality. It allows clients to safely interact with difficult-to-access phobic stimuli in a controlled environment, increasing the effectiveness of therapy sessions and saving psychotherapists time and costs. A trio of experts with different specializations – a virtual reality developer Vratislav Čmiel, a body signals specialist Oto Janoušek and a psychologist Vojtěch Juřík – are working on the project.

A total of 20 projects applied for the spring Prototype and Verify call. Eight of them advanced to the final round, in which the four winners were selected by a jury of regional entrepreneurs and experts. It was not easy to make it among the experienced competitors with great ideas. "The jury did an excellent job, as we saw last year in the winning Scicake project by the authors from FEEC, who we know are doing really worthwhile things. However, we believe that our product has the potential to significantly improve access to mental health care in the country, which is why we took the courage to apply." explains Oto Janoušek, a biosignals expert from FEEC.

Vojtěch Juřík, an expert in virtual reality technologies from the Department of Psychology at the Faculty of Arts of Masaryk University, explains, "As a psychologist, I perceive the necessity to interconnect psychology with modern technologies, while maintaining the key relationship between the therapist and the client as a further advancement in psychotherapeutic care. In this respect, I am very happy for the multidisciplinary cooperation among the fields of expertise, specifically myself as a psychologist from the Department of Psychology at the Faculty of Arts of Masaryk University and the experts from the Brno University of Technology, Dr. Janoušek and Dr. Čmiel. Our collaboration has resulted in the creation of a product that, thanks to innovation, provides more accessible and effective care for people who are struggling with psychological difficulties. I see this as beneficial not only in terms of research and development, but also in terms of social benefit."

Vratislav Čmiel, a developer and virtual reality expert from FEEC, adds: "Virtual reality opens the door to many innovative applications and I

Photo: archive BraveMind

Developer Vratislav Čmiel is testing a platform for phobia therapy.

believe that connecting our idea with commercialization will allow us to introduce this therapeutic tool directly into the practice of psychotherapy. I have already had a good experience with JIC in the past and we see their support for our project as a key to achieving a successful commercialisation of this platform."

Oto Janoušek adds, "It makes sense to me to transfer knowledge from scientific research into real-life products that actually help people. BraveMind is such a product – it combines the latest findings in the field of psychotherapy with modern technology to significantly improve mental health care.
Thanks to the support of the Prototype and Validate program, we will be able to adapt the platform to the needs of therapists and extend it with new therapy modules and autonomous modes, making it an easy-to-use tool with the potential to help thousands of people."

The success of the Brno team in the Prototype and Verify competition confirms the high quality and innovative potential of BUT and emphasizes the importance of supporting technological and innovative projects that can bring new job opportunities and increase the prestige of the region.

How to care for the greenhouse? An autonomous irrigation system is being built in Lužánky to take care of it for you.

A fully autonomous solar irrigation system is being built in the greenhouse of the Lužánky Leisure Centre.
It is the brainchild of Rastislav Straňák, a second-year student of the master's programme Electrical Engineering and Management at FEEC.

The student project, focusing on sustainability, has evolved from an unassuming bachelor's thesis to implementation and application in practice. "The goal is to create an algorithm that evaluates air humidity, soil moisture and temperature based on the data it receives and then it decides when to irrigate and when not to. The excess energy saved in running the device will then be used to shine UV light to speed up plant development," says Rastislav about his project. When asked about putting it in practice, he adds:

Photo: Jakub Rozboud

"My bachelor's thesis was quite an extensive affair, which took me a long time to prepare and I put a lot of work into it. When the opportunity arose to implement it in a real object, like the one in Lužánky, I thought ok, why not, let's

do it!" The greenhouse is run by the Lužánky Leisure Centre, which focuses on organising leisure activities for people of all ages. "They wanted to use an unconventional way of taking care of the greenhouse, which would help to automatically regulate the climatic conditions of the greenhouse by means of water mist and thus simulate the natural tropical conditions of the plants. They also wanted the final facility to be interesting for children, so I also implemented LED strips." The collaboration also opened up more possibilities for Rastislav. "In my bachelor's thesis, I connected the different modules. Now I am designing and testing the circuit board, so everything will be implemented on one complete system. The sustainable energy source is then a photovoltaic cell combined with a battery for energy storage."

Note: The bachelor's and master's theses, in which the implementation of solar irrigation is covered, are under the supervision of Ms Kristýna Jandová from the Department of Electrical and Electronic Technology.

Photo: Jana Němcová

First year of the FEKTTeams competition

In 2024, the faculty launched a new competition, FEKTTeams, designed for students in the first year of bachelor's programmes. The aim of this initiative was to enrich the introductory phase of the studies with practical experience and to allow students to engage in actual and innovative projects.

Thus, students worked on areas such as hardware design, software, measurement and research. Project topics ranged from the design of a drill rig for a Mars rover to the analysis of bee sounds. The competition promoted teamwork, planning and presentation skills, giving students valuable experience for their future careers.

In the first year of the FEKTTeams 2024 competition, the "Intelligent Hangar" project ranked first. This team, consisting of students Emanuel Antol, Lukáš Lenčeš, Lukáš Lev, Martin Strouhal, Hugo Bohácsek and Tomáš Proks under the guidance of their mentor Ing. Jiří Janoušek, designed a modular docking station for drones. The station provides automatic charging, drone status monitoring and thermoregulation, thus providing optimal conditions for the drone maintenance and readiness

Photo: Václav Koníček

for operations. Second place went to the team with the "DELTABOT" project, aimed at developing a robot with delta kinematics for precision manipulation. Third place went to the "MAT Blinds" project, which focused on designing smart Zigbee blinds that allow automation based on various parameters such as time, sunlight intensity and other user preferences.

Majáles 2024: The title of the King of Brno Majáles goes to BUT!

The king of Brno Majáles 2024 is Jiří Jalůvka, a BUT candidate. Jirka is studying for a master's degree in Space Applications and his enthusiasm and passion are the ideal qualities that the Majáles King should have. He has great ideas, enjoys being in good company and does everything to the fullest. That is why he was the perfect choice for the King of Brno Majáles and the whole city of Brno.

Feelings of surprise and joy of victory at the coronation took over the stage. "It means a lot to me, I'm surprised how much. I would like to thank everyone who went through this with me because this crown goes to all of us," said Jirka with gratitude and emotion after his election.

STUDY AT FEEC

The faculty offers a comprehensive range of study programmes focusing on electronics, electrical engineering and all related fields from microelectronics to telecommunications, cybernetics, and power engineering to interdisciplinary ones such as biomedicine or audio engineering, in 14 three-year bachelor's degree programmes, 26 two-year follow-up master's degree programmes and 32 four-year PhD degree programmes. We are the faculty that offers the widest range of electrical engineering degree programmes, both combined and full-time, in Czech or English. At the same time, with more than 3,100 students, we are the largest electrical engineering faculty in the Czech Republic and Slovakia.

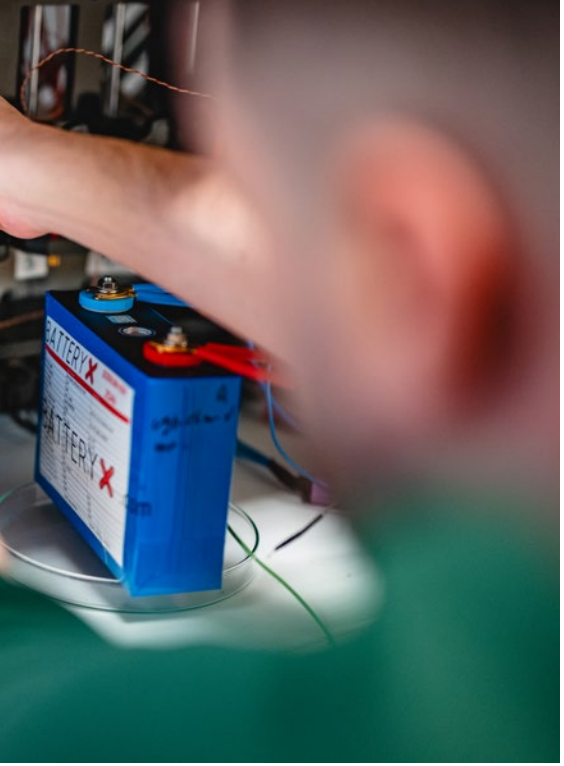


Photo: Jakub Rozboud

Top-class facilities

Since 2013, FEEC has been located in several modern buildings in the campus Pod Palackého Vrchem in Brno. After more than fifty years, the facilities for teaching, cutting-edge research and student life are located in one place, where the most modern technologies, laboratories, lecture halls, canteen, library, as well as spaces for relaxation and sports are available.

Connection with practice and graduate employment

Thanks to the faculty's interconnected cooperation with commercial entities and industrial partners, students have the opportunity to obtain not only a high-quality theoretical preparation, but also practice, which is crucial for future employment. Current research among BUT graduates shows that 82% FEEC students have secured a job already during their studies. 97% graduates have a job within 3 months of successfully completing their studies. We can therefore say that our graduates are very adept at the labour market.

Photo: Jakub Rozboud

FEEC graduates have one of the highest starting salaries at BUT

Our students are in great demand on the labour market and the starting salary is among the highest rated graduates in the entire BUT. The average gross starting salary of a FEEC graduate is currently CZK 54,189.

Teaching with an emphasis on curriculum innovation

The range of study programmes and the content of instruction are undergoing constant innovation. The faculty thus responds, for example, to the trends in the industrial field so that our graduates are 100% competitive and can easily find their place in the current and future labour market.
This is enabled by the broad experience which our academics gained by participating in various research projects with industrial partners and are able to transfer their professional and practical knowledge into teaching.

Study programmes

Bachelor's Degree Programmes

Full-time:

- English for Practice in Electrical Engineering and Communication Technologies
- Audio Engineering – Audio Production and Recording
- Audio Engineering – Audio Technology
- Automation and Measurement
- Biomedical Technology and Bioinformatics
- Electronics and Communication Technologies
- Information Security
- Microelectronics and Technology
- Power Electrical and Electronic Engineering
- Telecommunication and Information Systems
- Electrical Engineering – Electronics and Communication Technologies (EN)
- Electrical Engineering – Power Systems and Automation (EN)

Combined:

- Electronics and Communication Technologies
- Microelectronics and Technology
- Power Electrical and Electronic Engineering
- Telecommunication and Information Systems

Master's Degree Programmes

Full-time:

- Audio Engineering – Acoustics and Audiovisual Technology
- Audio Engineering – Audio Production and Recording
- Bioengineering
- Biomedical Engineering and Bioinformatics
- Electrical Power Engineering
- Power Systems and Communication Technology
- Electronics and Communication Technologies
- Electrical Manufacturing and Management
- Information Security
- Nuclear Power Engineering
- Cybernetics, Control and Measurements
- Microelectronics and Technology
- Power Electrical and Electronic Engineering
- Communications and Informatics (EN)
- Automotive Electronics and Electromobility (EN)
- Bioengineering (EN)
- Communications and Networking (EN)
- Electrical Power Engineering (EN)
- Microelectronics and Technology (EN)
- Power Systems and Communication Technology (EN)
- Space Applications (EN)
- Telecommunications (EN)

Combined:

- Electrical Power Engineering
- Electronics and Communication Technologies
- Electrical Manufacturing and Management
- Power Electrical and Electronic Engineering
- Communications and Informatics

Photo: Jakub Rozboud

PhD Programmes

Full-time:

- Biomedical Engineering and Bioinformatics
- Electronics and Communication Technologies
- Information Security
- Cybernetics, Control and Measurements
- Microelectronics and technology
- Power Systems and Power Electronics
- Teleinformatics
- Theoretical Electrical Engineering
- Biomedical Technologies and Bioinformatics (EN)
- Cybernetics, Control and Measurements (EN)
- Electronics and Communication Technologies (EN)
- Electronics and Information Technologies (EN)
- Microelectronics and Technology (EN)
- Power Systems and Power Electronics (EN)
- Teleinformatics (EN)
- Theoretical Electrical Engineering (EN)

Combined:

- Biomedical Engineering and Bioinformatics
- Electronics and Communication Technologies
- Information Security
- Cybernetics, Control and Measurements
- Microelectronics and technology
- Power Systems and Power Electronics
- Teleinformatics
- Theoretical Electrical Engineering
- Biomedical Technologies and Bioinformatics (EN)
- Cybernetics, Control and Measurements (EN)
- Electronics and Communication Technologies (EN)
- Electronics and Information Technologies (EN)
- Microelectronics and Technology (EN)
- Power Systems and Power Electronics (EN)
- Teleinformatics (EN)
- Theoretical Electrical Engineering (EN)

Number of students

(Altogether 3,186 students)

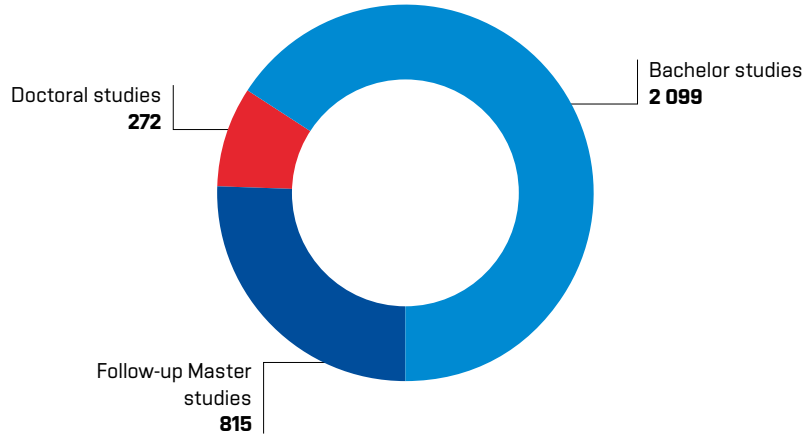
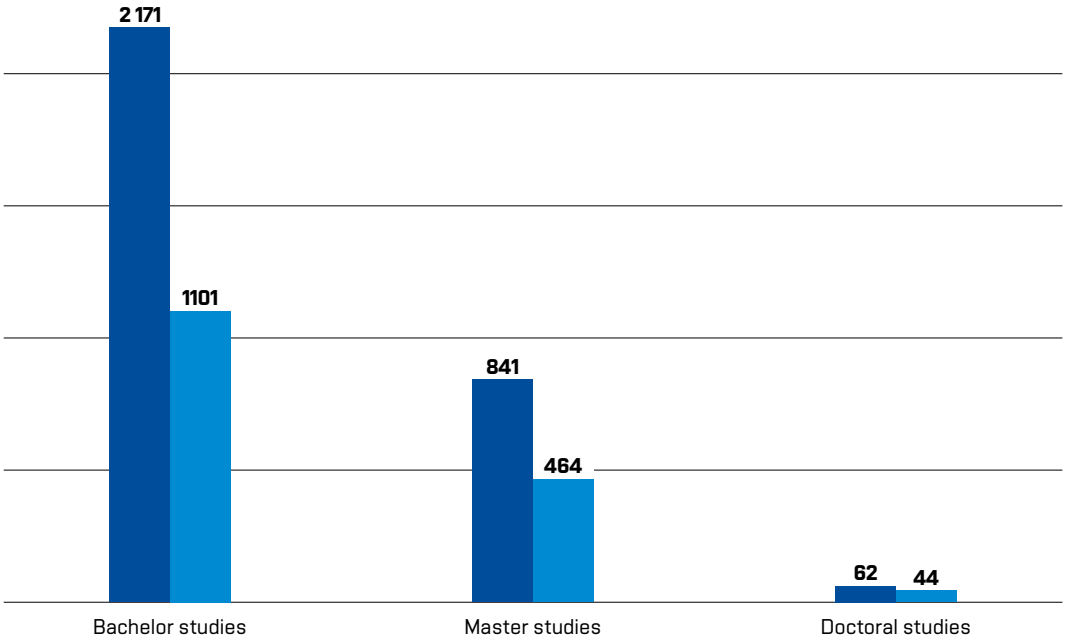


Photo: Jakub Rozboud

Interest in study



Students for Students association

For the 19th year, the Students for Students association (SPS) has been involved in diversifying the cultural life of students at the Faculty of Electrical Engineering and Communication. Moreover, it serves as a mediator between the faculty management and students. It also considerably focuses on helping first-year students, whom it assists even before the start of their studies.

Over the years, many members have joined the association and each has brought their own perspective or ideas to it. For this reason, the association is constantly changing and growing. This year, in particular, the association has attracted an increased number of new members who have come up with a multitude of new ideas, and they also contributed with their commitment to participate in the organisation of traditional events.

One such event was the Run to 53, in which students, academics and other faculty staff measured their strength in a recessional run to the bus of the same name that formerly served a bus stop near the college. The association also held its biggest event, Hudba z FEKTu, to kick off the winter term of the new academic year. Over 9,000 people attended this year's festival. Due to its attendance, this festival of student bands ranks as one of the most successful since its beginning, as well as one of the largest student events held at BUT.

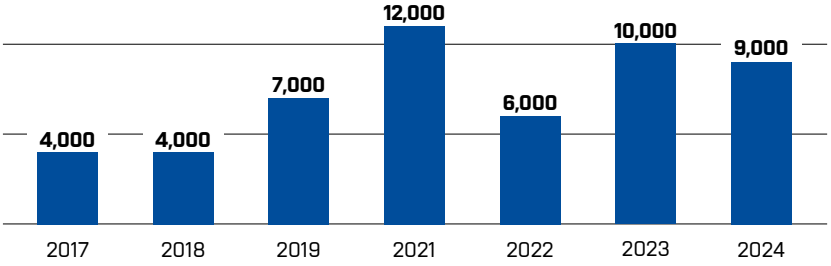
The Students for Students association organizes not only cultural events for students, but it also offers lectures on topics not covered by the faculty. One of them was a seminar on financial literacy, which helps students navigate the world of finance, or a first aid course, which imparts knowledge that can save lives in crisis situations.

Photo: Jakub Razboud

Selected events organized by Students for Students:

- PerFEKT Start
- Hudba z FEKTu
- Tournament in CS:GO FEEC vs FIT and League of Legends
- Run to 53
- Games Evening at FEEC

Visitors to Hudba z FEKTu



Note: rounded to thousands

Photo: Jakub Rozboud

YSpace

The YSpace team was started by five students of the master's degree in Space Applications, which is taught at FEEC. The original idea was to develop a satellite mission that could be part of the Fly Your Satellite! of the European Space Agency. This would give the university and the students involved valuable experience in developing technologies for the space environment. The team is currently involved in other projects or activities to popularise science, and is also preparing various events for students, such as SpaceBeer.

Drone Research Center (BUT DRC)

BUT DRC is the newest student creative team at BUT (founded 14 June 2024). An innovative student group focusing on unmanned aerial vehicles - UAVs (drones), combining talents from all over BUT and based at the Department of Theoretical and Experimental Electrical Engineering. DRC's goal is to develop autonomous drones and software for their control. DRC collaborates with companies to solve projects and participates in international competitions.

Photo: Jakub Rozboud

Photo: Václav Končeb

Brno Mars Rover

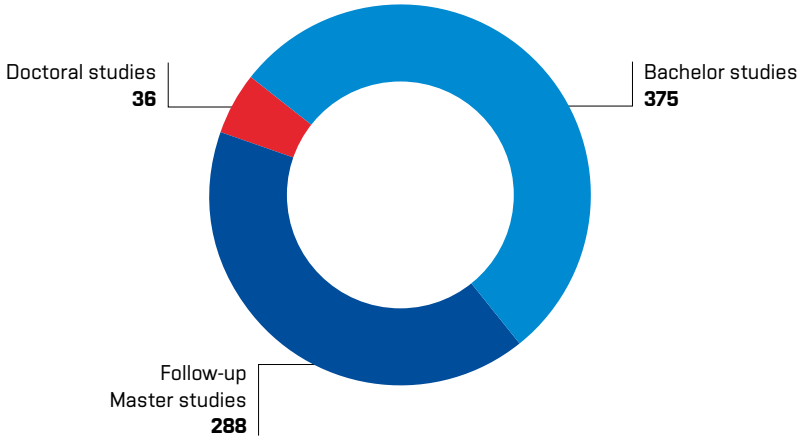
A team of students aiming to prepare a competition vehicle for participation in the European Rover Challenge. The Brno Mars Rover team also participates in various educational or popularisation events. The team is based at the Department of Control and Instrumentation.

Photo: Jakub Rozboud

Graduates

Number of graduates in 2024

(sum total 699)



FEEC graduates are in great demand on the labour market. They are employed in a wide range of professions and industries, for example, as experts in professional or managerial positions in various areas of low- and high-current electrical engineering, electronics, robotics and applied informatics, as well as in the production and administration of medical technology, in institutions providing cyber security, diagnostics and environmental protection, or as electronic engineers.

FEEC EMPLOYEES

Faculty of Electrical Engineering and Communication (FEEC) Management

Dean
Prof. RNDr. Vladimír Aubrecht, CSc.

Vice-Dean for Creative Activity, statutary representative of the Dean
Prof. Jaroslav Koton, PhD

Vice-Dean for Education
Prof. Jarmila Dědková, CSc.

Vice-Dean for External Relations
Prof. Tomáš Kratochvíl, PhD

Vice-Dean for Internationalization
Ing. Stanislav Klusáček, PhD
(from 1. 7. 2024)

Chief financial officer
Ing. Tomáš Rosenmayer, PhD

Note: Vice-Dean for Development and Strategic Planning Assoc. Prof. Petr Fiedler, PhD till 30. 6. 2024

Organisational Structure

DEAN'S OFFICE

- Organising Department
- Student Affairs Department
- Department of Science and International Relations
- Personnel Department
- Accounting and Finance Department
- Information Systems Administration Department
- Branch Facilities Management: Technická

ACADEMIC SENATE

Chairman

- Assoc. Prof. Miloslav Steinbauer, PhD, from 24. 9. 2024 Assoc. Prof. Lucie Hudcová, PhD

ACADEMIC STAFF CHAMBER OF THE SENATE

Chairman

- Assoc. Prof. Lucie Hudcová, PhD, from 24. 9. 2024 Assoc. Prof. Miloslav Steinbauer, PhD

STUDENTS' CHAMBER OF THE SENATE

Chairman of the Chamber

- Ing. Jiří Dvořáček

SCIENTIFIC BOARD

Chairman

- Prof. RNDr. Vladimír Aubrecht, CSc.

STUDY PROGRAMME BOARD

Chairman

- Prof. Jarmila Dědková, CSc.

DISCIPLINARY COMMITTEE

Chairman

- Assoc. Prof. RNDr. Edita Kolářová, PhD

ETHICS COMMITTEE

Chairman

- Assoc. Prof. Jana Kolářová, PhD

DEPARTMENTS AND RESEARCH CENTERS

- Department of Control and Instrumentation (UAMT)
- Department of Biomedical Engineering (UBMI)
- Department of Electrical Power Engineering (UEEN)
- Department of Electrical and Electronic Technology (UETE)
- Department of Physics (UFYZ)
- Department of Foreign Languages (UJAZ)
- Department of Mathematics (UMAT)
- Department of Microelectronics (UMEL)
- Department of Radio Electronics (UREL)
- Department of Telecommunications (UTKO)
- Department of Theoretical and Experimental Electrical Engineering (UTEE)
- Department of Power Electrical and Electronic Enginering (UVEE)

OTHER ACTIVITIES

- Trade Unions-ZO 2698
- Club "Elektron"
- Faculty interactive playroom "Elektrikárium"
- Multifunctional room for students "Studentárium"

Habilitation and appointment procedures

New FEEC professors appointed by the President of the Czech Republic in 2024

BIOMEDICAL ENGINEERING

→ Prof. Eric Daniel Glowacki, PhD

INFORMATION SECURITY

→ Prof. Jan Hajný, PhD

POWER ELECTRICAL AND ELECTRONIC ENGINEERING

→ Prof. Karel Katovský, PhD

New Associate Professors of FEEC appointed by the Rector of Brno University of Technology in 2024

ELECTRICAL ENGINEERING AND COMMUNICATION TECHNOLOGIES

→ Assoc. Prof. Tomáš Horváth, PhD

→ Assoc. Prof. Aleš Povalač, PhD

TECHNICAL CYBERNETICS

→ Assoc. Prof. Jakub Arm, PhD

→ Assoc. Prof. Václav Kaczmarczyk, PhD

Photo: MŠMT archive

Newly appointed Professor Jan Hajný and newly appointed Professor Karel Katovský on Tuesday, 10 December 2024, in the Karolinum, Prague.

Photo: Jakub Rozboud

Number of faculty employees in 2024

Number of faculty employees:	569 (421.1 recalculated number)
Number of academic and scientific staff:	451 (334.3 recalculated number)
Average age of FEEC employees:	44.2 ryears (as of 31. 12. 2024)
Ratio of women employees at the FEEC:	24.6 % (as of 31. 1. 2024)

DEPARTMENTS AT FEEC

Photo: Václav Koníček

Department of Control and Instrumentation (UAMT)

The Department of Control and Instrumentation continued the innovations of its laboratories in 2024. It also expanded its accredited test and calibration laboratory to include the tests required by the "Space Industry" partners – testing and measuring the effects of vibration and shock on satellite components, structural assemblies and transported cargo.

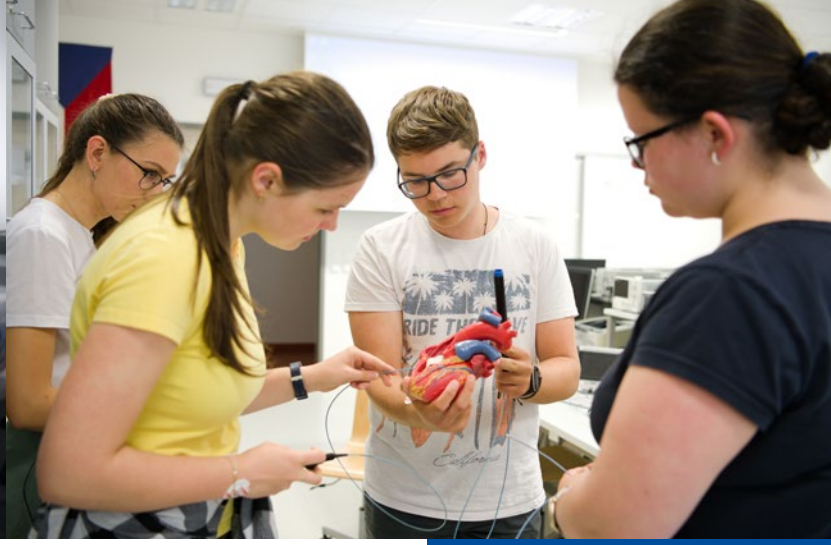
The UAMT staff participated in the preparation of the book Průmysl 4.0. – Základ ekonomické transformace ČR (Industry 4.0 – The Basis of Economic Transformation of the Czech Republic), which provides a comprehensive overview of the current state of P4.0 technologies and their relation to the social challenges faced by the Czech Republic, including education, impact on the labour market and others.

The Machine Vision Group was the principal investigator of the unique multi-year TACR project Multispectral 3D digitization with AI annotation using modern methods for digitizing large collections of museum objects.
In 2024, the first so-called double--degree PhD was obtained at UAMT thanks to a long-term collaboration with the prestigious Finnish University of Lappeenranta (LUT).

Two members of the core staff (Assoc Prof. Jakub Arm, PhD and Assoc Prof. Václav Kaczmarczyk) successfully habilitated. The department team was strengthened by Prof. Radomil Matoušek, PhD There was also a change in the position of the head of the institute.

Head:	Assoc. Prof. Václav Jirsík, CSc. (until 31 March 2024) Assoc. Prof. Petr Fiedler, PhD (from 1 April 2024)
Number of research groups:	5
Number of employees (calculated):	26.3
Average age of employees:	43.8 years

Photo: UBMI archive



Department of Biomedical Engineering (UBMI)

The Department of Biomedical Engineering is a scientific and educational workplace that connects modern technologies with medicine. Our mission is to educate professionals capable of creating innovative solutions for healthcare and contributing to the development of technical and natural sciences. Through close cooperation with industry and medical institutions, we provide students with a practically oriented education and opportunities to engage in cutting-edge research.

In 2024, we have established four research groups focusing on bioinformatics and systems biology, bioengineering and applied materials, biomedical signal processing, and biomedical imaging and image analysis. We have upgraded laboratories and innovated teaching tasks in microprocessor and imaging technology. Students now have the opportunity to work with the latest technologies and develop solutions that reflect current trends in biomedical engineering.

In addition to educational activities, we focus on popularizing science and technology among young applicants and the general public. We organize workshops, lectures, the Summer school of biomedicine being an example, and we also participate in events such as the Researcher's Night, which inspire new generations to discover the beauty of technical fields and bring modern technologies to all interested individuals.

Head:	Prof. Valentine Provazník, PhD (until 31 March 2024) Assoc. Prof. Radim Kolář, PhD (from 1 April 2024)
Number of research groups:	9
Number of employees (calculated):	30.2
Average age of employees:	40.9 years

Photo: UEEN archive

Department of Electrical Power Engineering (UEEN)

The Department of Electrical Power Engineering is involved in the teaching of electrical power engineering in bachelor's, master's and doctoral degree programmes. Financial donations to support education in electrical power engineering and communication technologies in the amount of CZK 2.5 million have been received for scholarships and laboratory equipment.

A new study programme Nuclear Power Engineering was started and the related Laboratory of nuclear power engineering and ionizing radiation was completed and inaugurated in the course of the year.

In research, the Department focuses on the generation, transmission, distribution and use of electricity. In 2024, the most important activities addressed included power grid safety, fault localization in power grids, testing and optimization of inverters for connecting dispersed energy sources, research on accelerator-driven nuclear reactors, light pollution research and development of a brightness analyser. A test facility for inverter compliance verification was completed and accreditation for testing was achieved. An international project on Real-time data fusion for energy management in emerging electricity networks was initiated.

Head:	Prof. Petr Toman, PhD
Number of research groups:	8
Number of employees (calculated):	37.7
Average age of employees:	41.2 years

Department of Electrical and Electronic Technology (UETE)

The Department of Electrical and Electronic Technology provides teaching of the courses on electrical materials, production processes, diagnostics, testing or reliability management and quality control. In addition to material--oriented subjects, the Department also teaches subjects on alternative energy sources, energy storage and ecology in electrical engineering. The courses are taught both in the accredited bachelor's degree programme "Microelectronics and Technology" and in the accredited master's degree programme "Electrical Manufacturing and Management", in both full-time and combined forms of study. The inter-faculty courses of the bachelor's degree programmes include, for example, the courses "Technical Documentation", "Materials for Electrical Engineering", or "Introduction to Materials for Electrical Engineering", which are organized for first-year students of most of the accredited bachelor's degree programmes in both full-time and combined forms of study.

The department is professionally focused on electrical and electronic materials, their components, technology, diagnostics and prognostics, electron microscopy and electrochemical current sources. It deals with lead and alkaline batteries, development of new materials in lithium-ion batteries, electrocatalysts and ion-exchange membranes for fuel cells, thin-film electrodes for electrochromic systems. It also covers photovoltaic systems, non-destructive defect and quality diagnostics, reliability and solar cells lifespan, signal electron detection and environmental scanning electron microscopy and atomic force microscopy methods, lead-free soldering, quality and reliability assessment of solder joints, degradation and diagnostics of dielectric systems.

Head:	Assoc. Prof. Petr Bača, PhD
Number of research groups:	5
Number of employees (calculated):	25.0
Average age of employees:	44.4 years

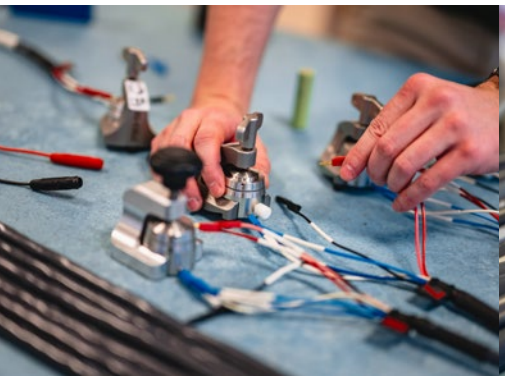
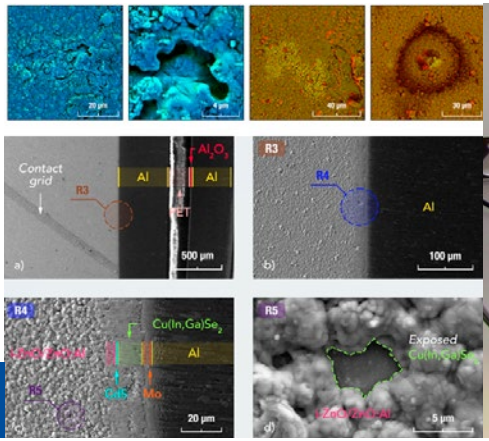


Photo: Jakub Rozboud

Department of Physics (UFYZ)

The Department of Physics provides teaching of basic physics courses and other physics subjects in bachelor's, master's and doctoral full-time and combined studies not only for FEEC, but also for the FIT, the Centre of Sports Activities and the Faculty of Arts of Masaryk University. All courses are also taught in English for international students. As part of the TACR project, the Department is developing a modern interactive teaching tool e-INVYSYS 4.0 for students of civil engineering. In research, the institute focuses on basic and applied research on physical parameters of semiconductor and dielectric materials and components and nanosensorics. The main interests are mechanisms of electric charge transport, noise spectroscopy, local characterisation with nanoscale resolution, design of quality and reliability indicators for components and acoustic and electromagnetic emission methods. The Department also collaborates with industrial partners to produce devices enabling monitoring and control of manufacturing processes. Projects addressed in 2024 included the development of a prototype for monitoring drug dispensing and control, the preparation of graphene layer-based sensors, the development of a system for telemetric monitoring and measurement of blood flow through vascular prostheses, and the characterisation and synthesis of nanocomposite materials and structures for generating and storing electrical energy.

Head:	Assoc. Prof. Vladimír Holcman, PhD
Number of research groups:	3
Number of employees (calculated):	19.1
Average age of employees:	42.2 years



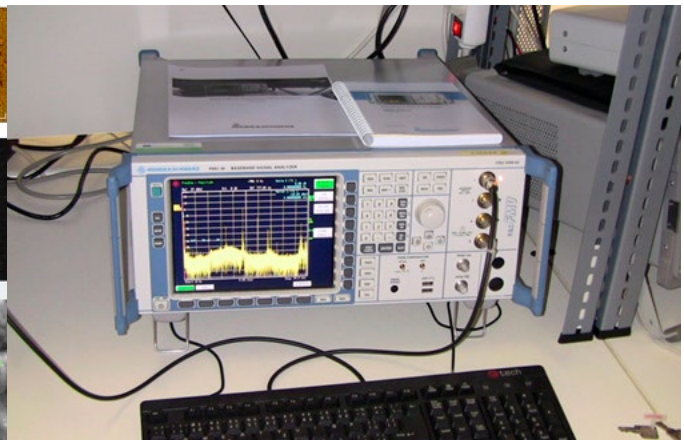


Photo: UFYZ archive

Photo: Jan Prokopius

Department of Foreign Languages (UJAZ)

In teaching for the three faculties of BUT, namely FEEC, FIT and FBM, the Department of Foreign Languages was responsible for guaranteeing and teaching English, German, French, Spanish and Italian. In 2024, we have innovated the content of several courses, and we are constantly improving and updating our study materials and teaching methods. Teaching Czech to foreigners has become a stable part of the Department's offer, and its popularity among foreign students continues unabated. Also, elective courses in law, economics (accounting, taxation, financial services), psychology, pedagogy and soft skills have continued to attract the interest of students who, in addition to technical education, have appreciated the preparation for other aspects of their future careers.

The new practical study programme „English for Practice in Electrical Engineering and Communication Technologies", accredited in 2023, attracted increasing interest from new students in 2024 and successfully launched cooperation with companies providing student internships. As part of its focus, the Department of Foreign Languages has also contributed to the development of internationalisation, be it through the active participation of some members in the EULiST Language Services Working Group or by ensuring that the language level requirements for Erasmus+ student exchanges are met.

Head:	Ing. Martin Jílek (until 31 March 2024) Mgr. Petra Zmrzlá, PhD (from 1 April 2024)
Number of research groups:	3
Number of employees (calculated):	17.9
Average age of employees:	53.5 years

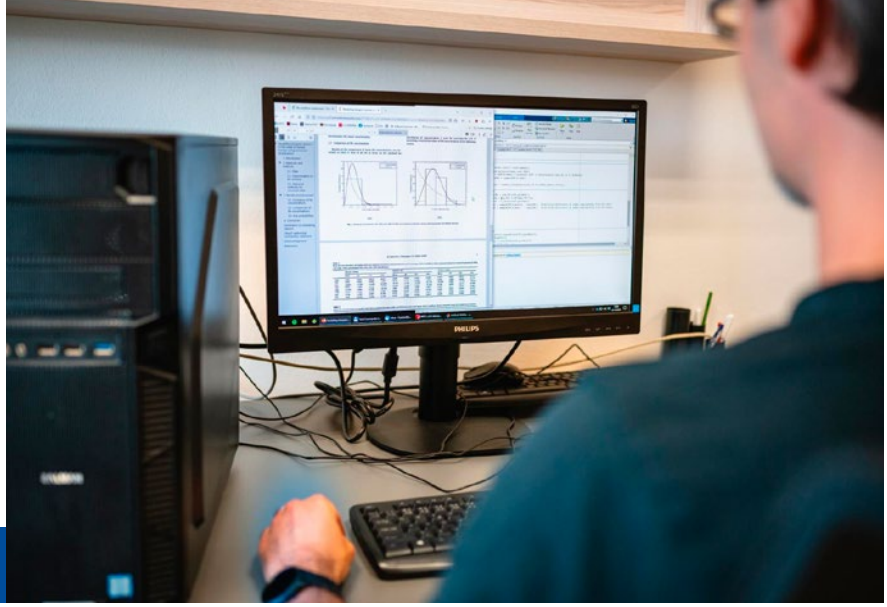


Photo: UMAT archive

Department of Mathematics (UMAT)

For the Department of Mathematics, the year 2024 was traditionally marked by extensive teaching activities (not only for FEEC, but also for FIT, CESA and IFE) and activities aimed at reducing student failure rate. Two experienced secondary school mathematics teachers with many years of experience became part-time members of the Department in September. At the MITAV 2024 conference, co-organized by our faculty, Department members exchanged experience with secondary school teachers. At the end of the year, we also renewed the tradition of lectures organized for students at secondary schools onsite. The research activities of the Department were focused on fundamental research, and in particular on the investigation of the existence, controllability and stability of solutions of delayed dynamical systems, including nonlinear complex systems in the neighbourhood of a singular point. The qualitative behaviour of solutions of Schrödinger-Poisson partial differential equations was also analysed. We also focused on the design of numerical methods for solving fractional control systems based on the fractional Laplace transform. The Department members visited their colleagues at universities in Montenegro, Italy, Hungary, Norway and Slovenia. In turn, the Institute hosted colleagues from Lithuania, Poland, Romania and Slovenia, who introduced their ongoing research.

Head:	Assoc. Prof. RNDr. Michal Novák, PhD
Number of research groups:	3
Number of employees (calculated):	15.2
Average age of employees:	57 years

Department of Microelectronics (UMEL)

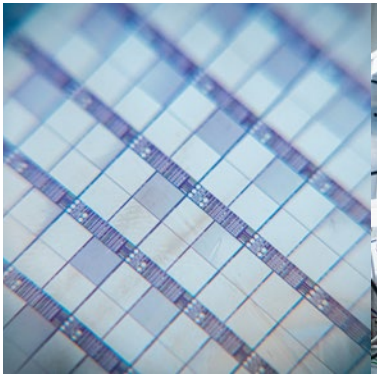
In 2024, the Department of Microelectronics continued its trend of being a major player in the field of semiconductor technology. It has been very intensively involved in leading and expanding the activities and membership base of the Czech National Semiconductor Cluster, a professional organisation representing all stakeholders (universities, research organisations, companies, regional development agencies) in the semiconductor value chain in the Czech Republic. BUT is thus actively influencing the developments around chips and semiconductors, both at the European level, thanks to the cluster's membership in Silicon Europe, and in cooperation with Taiwanese partners.

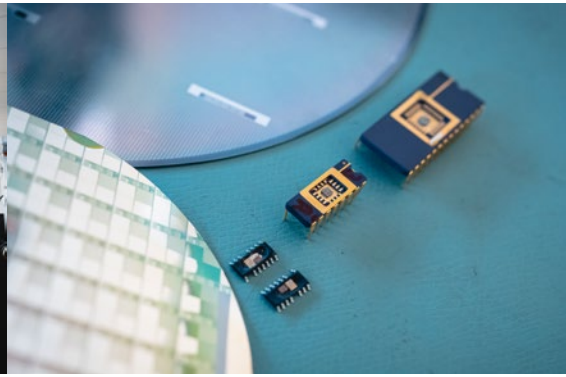
Therefore, the cooperation with universities and companies in Taiwan continued, including the representation of BUT at the stand of Semicon Taiwan, and the range of partners across Europe was also significantly expanded, thanks to the active participation in the European Universities EULiST project and the newly launched Chips of Europe project. In the course of the year, a project was submitted within the EU Chips JU to establish a National Centre of Competence for Semiconductors (Czech Semiconductor Center) for the integrated development of research, education, promotion and other activities in the field of semiconductor technology, which was approved for funding by the Commission and whose activities will begin in April 2025. In the field of education, new study programmes were accredited in the bachelor's and master's degree programmes called "Chip Design and Modern Semiconductor Technologies".

In the research field, the Department focused not only on semiconductors and chip design, but also on other topics, especially applied research on electronic systems for space applications, embedded systems, sensors and micro- and nano-technologies. Projects and direct economic contracts addressed areas of current interest such as smart access systems, electronics for lunar landers, COVID-19 rapid detection issues, and others.

Head:	Assoc. Prof. Jiří Háze, PhD
Number of research groups:	4
Number of employees (calculated):	23.4
Average age of employees:	48.1 years

Photo: Jakub Rozboud





Department of Radio Electronics (UREL)

In 2024, the Department continued to focus on the areas of communications, sensing, localization and navigation, in which advanced technologies, such as the use of new materials, chip-level circuit design, implementation of machine learning and artificial intelligence, were applied. Furthermore, the strategic focus on automotive and, in particular, space applications was reinforced by several projects with the European Space Agency (ESA). Closer cooperation with the German Aerospace Center (DLR) was also established with the addition of Juraj Poliak, the head of the research group "Optical Technologies for Satellite Link" at DLR, to the team. The YSpace student association was very active. They presented their activities at Meltingpot at the Colours of Ostrava, and they gave a tour of the UREL laboratories to a delegation from the Space Technologies of the Ministry of Transport and even to the President Petr Pavel. The association succeeded in the challenge "Fly Your Satellite! Design Booster" with the CIMER mission, on which they collaborated with the researchers from Mendel University in Brno. In collaboration with the University of Defence, the Department has developed a modular system for mimicking the behaviour of memory elements, which has a great potential for use in many industries. In addition, UREL researchers have proposed a new method for topological optimization of electromagnetic structures that contributes to more efficient design of antennas and other microwave components. In education, the Department caried on in organizing lectures and seminars for students and professionals. This year, for the first time, a series of afternoon STEAM club meetings was organised for secondary school students to introduce various aspects of electronic systems design and analysis and thus motivate them to study engineering.

Head:	Prof. Aleš Prokeš, PhD
Number of research groups:	6
Number of employees (calculated):	35.6
Average age of employees:	44.9 years

Photo: YSpace archive, Václav Koníček

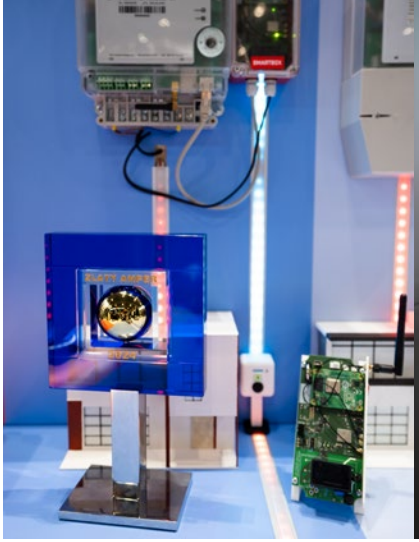


Photo: Nikola Číková, Jakub Rozboud

Department of Telecommunications (UTKO)

The Department of Telecommunications continued to innovate its laboratories and products in 2024. The construction of a private 5G SA network in the premises of #VodafoneUniLab or the launch of a cloud version of the educational platform BUTCA 2.0 (Brno University of Technology Cyber Arena) are particularly notable.

In science and research, our scientists are increasingly participating not only in national project calls, but also in international calls such as Horizon Europe and Digital Europe. There is a continuous cooperation with small, medium and large enterprises, especially in applied research. In education, the Department is actively involved in teaching programmes taught in both Czech and English and keeps updating selected areas in ICT in accordance with current trends.

We regard it as very noteworthy that we received the GOLD AMPER 2024 award in the prestigious competition for the most beneficial exhibits at the AMPER 2024 fair, where we exhibited a unique technical solution for smart metering and load management in power networks – Smartbox – together with EG.D.

Head:	Prof. Jiří Mišurec, CSc.
Number of research groups:	8
Number of employees (calculated):	92.1
Average age of employees:	38.4 years

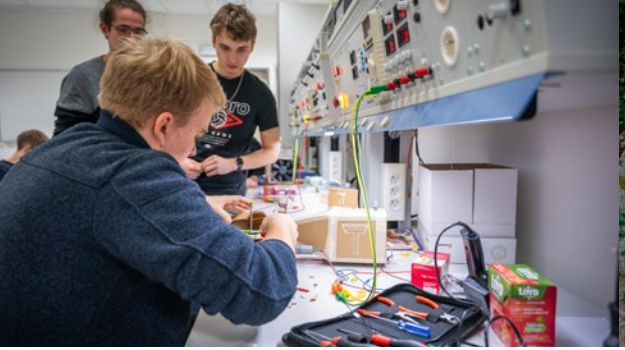


Photo: UTEE archive

Department of Theoretical and Experimental Electrical Engineering (UTEE)

The Department of Theoretical and Experimental Electrical Engineering underwent a major space optimization in 2024. The main objective was to build the laboratories of the newly established BUT Drone Research Center. The labs provide space for research activities for our group and also for students across the university to work on their student projects. Other laboratories, such as low-level measurement, electrical impedance tomography, and teaching laboratories, have also been given proper space, while activities related to the setting up of a new laboratory on low-pressure plasma research have been initiated. The researchers also continued their collaboration with industry (Fly4Future s. r. o., Workswell s. r. o, SpaceLab EU, SE, PlasmaSolve s. r. o.), and cooperation with Thermo Fisher Scientific s. r. o. was established. In research, we cooperate with the University of Defence on research on unmanned aircraft, St. Anne's University Hospital Brno and the Faculty of Science of Masaryk University on research on the influence of surface conditions in cave environments.

In education, the Department has modernised the way students are tested on safety regulations, which is now conducted online. In this area, the Department has also developed a new course for obtaining a certificate of competence for safety operation on electrical equipment, which is open to all those interested in lifelong learning. As part of the modernisation, new facilities have been prepared for the electronic circuits laboratory, where the teaching of electrical circuit design will be further developed and introduced also to secondary school students in competitions.

In industrial cooperation, a series of expert seminars called diskUTEEr has been launched, effectively linking a tripartite of students, academics and industry representatives. Thank to strong interest from industry, this activity will continue in 2025.

Head:	Prof. Pavel Fiala, PhD (until 31 March 2024) Assoc. Prof. Jan Mikulka, PhD (from 1 April 2024)
Number of research groups:	7
Number of employees (calculated):	18.0
Average age of employees:	46.5 years

Photo: Nikola Čížková

Department of Power Electrical and Electronic Engineering (UVEE)

In 2024, the Department staff intensified international cooperation with LUT University, JKU Linz, LCM, TU Delft, Politecnico di Torino, University of Kragujevac and Wrocław University of Science and Technology through personal visits and requested lectures. Furthermore, the cooperation in the doctoral studies with LUT University has been extended. In partnership with other departments of FEEC, FME, and FCH we accredited a new study programme E-mobility and Sustainability. The new programme responds both to the demand of technology companies and to the current trends of transport digitalization and electrification. In power electronics, the development of a fast charger with a single-stage three-phase AC/DC converter (100 V, 200 A, 20 kW) with PFC function, soft switching, galvanic isolation and full DC output controllability (for the battery of an electric excavator) was successfully completed within the European project "TRANSFORM". The results of this project were successfully published in the impacted journal OJPEL (Q1). As part of the preparation of a new degree programme (Advanced Automotive Engineering), the course "Power Electronics" was created.

In electrical machines, staff presented several papers at the ICEM international conference and published a research paper in the IEEE Transaction on Energy Conversion (Q1) dealing with rotor 3D printing. In addition, a patent was obtained for a full rotor with pressed copper on the surface. Research continued within the European R-PODID project and the K2 Center in collaboration with foreign partners. The electrical instrumentation group worked with ABB to develop high voltage switchgear for higher power loads.

Head:	Assoc. Prof. Ondřej Vítek, PhD
Number of research groups:	8
Number of employees (calculated):	27.9
Average age of employees:	41.6 years

RESEARCH AND DEVELOPMENT AT FEEC

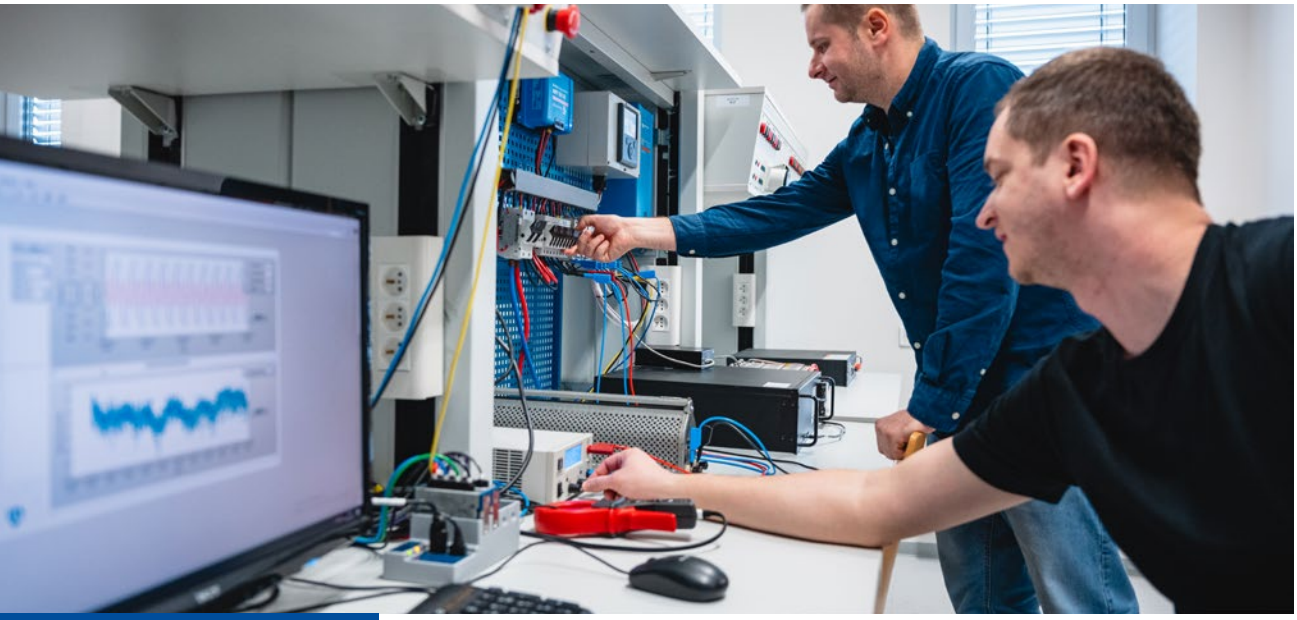


Photo: Jakub Rozboud

Projects

The Faculty of Electrical Engineering and Communication is a unique workplace dedicated to the research in areas ranging from nanoelectronics to energy, electrical and electronic engineering, information security and communication technologies. It achieves significant results in information security, space applications, and biomedical and materials engineering.

Research in the field of electrical energy storage and e-mobility is also gaining prominence. The faculty is also actively involved in international projects and consortia supported by European Union programmes in collaborative research with both universities and industry, enabling rapid knowledge transfer for the benefit of the wider public.

Research areas

The faculty is committed to 7 strategic areas, to which more than 30 research teams operating in twelve departments contribute their scientific research activities. Through basic or applied research and experimental development projects, carried out in collaboration with our partners from academia and industry, these teams achieve extraordinary results that fulfil the vision and mission of the faculty.

Research Teams:

- AUTOMATION, ROBOTICS AND SENSORICS
- MICRO- AND NANOELECTRONICS
- BIOMEDICINE AND SIGNAL PROCESSING
- RADIOELECTONICS AND COMMUNICATION TECHNOLOGY
- ELECTRICAL AND ELECTRONIC TECHNOLOGY
- TELECOMMUNICATIONS AND INFORMATION ENGINEERING
- INFORMATION AND CYBER SECURITY
- POWER ELECTRONICS AND ELECTRICITY

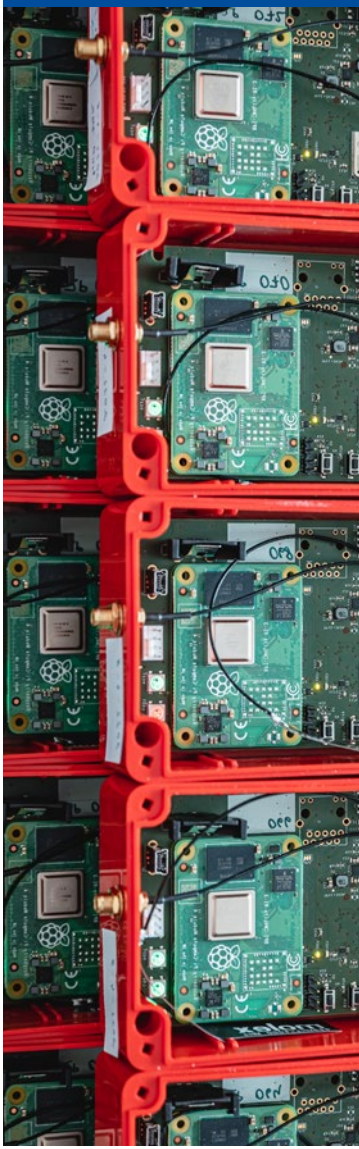


Photo: Jakub Rozboud

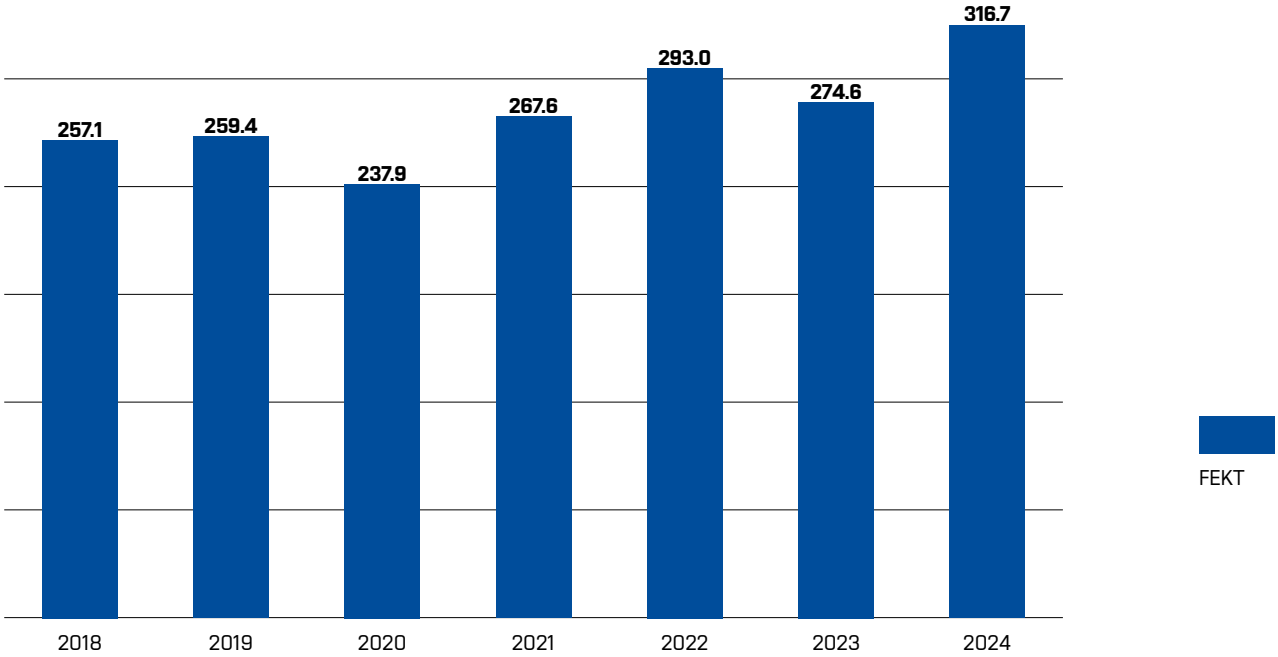
Research and development in 2024

In 2024, researchers from the FEEC worked on more than 160 projects in cooperation with industrial and foreign partners, with the total value of special-purpose support exceeding CZK 316 million. The main providers of financial support for basic or applied research projects are the Technology Agency of the Czech Republic (TACR), the Ministry of the Interior of the Czech Republic (MV CR), the Czech Science Foundation (GACR) and the Ministry of Industry and Trade (MPO CR). Within the framework of the largest grant projects, the FEEC scientists continue to research and develop, for example, predictive systems for diagnostics of electrical station equipment, distributed opto-fibre sensor systems, or tools for forensic data analysis.

We are also extensively involved in projects within international consortia supported by the European Union. Attention is paid to the area of cybersecurity of high-speed data and industrial networks, development of power modules and devices for industrial applications, human-robot interaction in health monitoring, and wellbeing.

Targeted R&D support

(CZK million)



Contract research

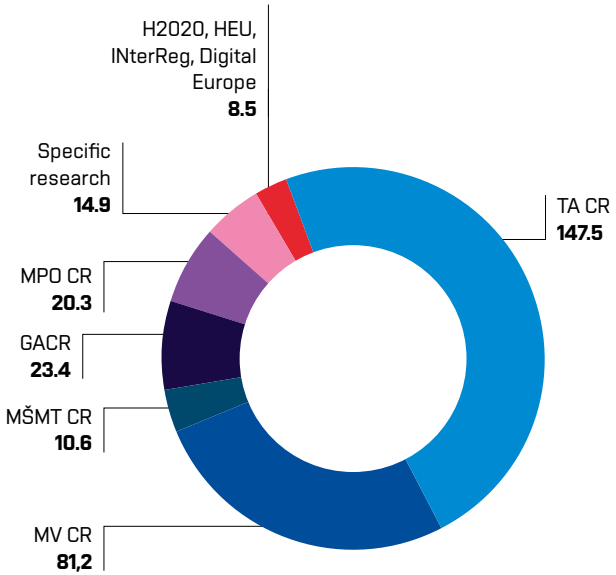
Financial revenues from contract research orders using our research infrastructure amounted to almost CZK 30 million for FEEC in 2024. Contract research was carried out on the basis of direct economic contracts as well as within the framework of our students' theses and dissertations.

Number of final theses with a topic from industry for the year 2024:

Bachelor's theses:	33
Master's theses:	62

Main providers of targeted R&D support in 2024

(CZK million, altogether 306.4)



Transfer of knowledge

Project activities focused on applied research and experimental development with industry bring results that are transferred into practice. In 2024, the faculty received CZK 1,095 thousand in revenue from profit sharing or licence sales.

Photo: Jakub Rozboud

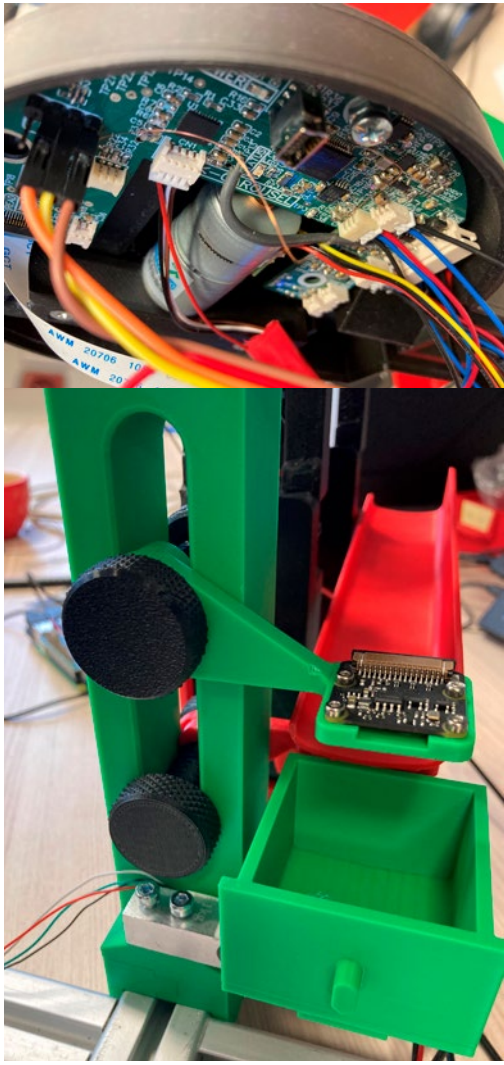
Major projects

MoMed medication dispensing and control system (UFYZ)

The main objective of the project is to develop a prototype of the MoMed® intelligent drug dispensing and control system, which will be protected as a utility model. This system will store and dispense medicines in a controlled manner. It is suitable for the storage of medications in specific conditions and provides online data transmission and processing. The outputs of the project can be used for remote patient monitoring, smart home care and as an innovative tool in e-health services.

Provider:	TACR
Principal investigator:	Assoc. Prof. Vladimír Holcman, PhD
Project start date:	1 January 2023
Project end date:	30 June 2026
Total project cost:	CZK 6,641,800

Photo: UFYZ archive



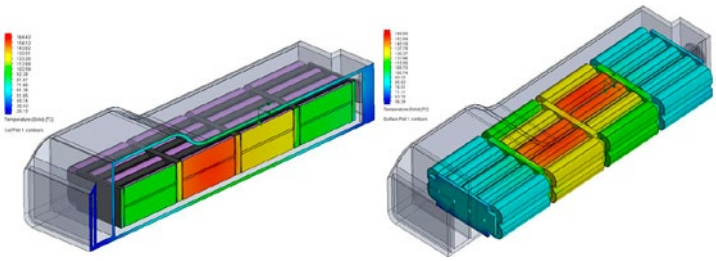
Rameno váhy, vážení léků.

Application of frequency fast scanning electron spin resonance spectroscopy in nuclear magnetic resonance systems (UTEE)

The aim of the project was to develop an electron spin resonance (ESR) spectrometer at a frequency of 329 GHz, equipped with a dynamic nuclear polarization (DNP) function. This spectrometer can simultaneously measure both ESR and nuclear magnetic resonance (NMR) of liquids. This dual function is enabled by the use of a magnet NMR spectrometer, which simplifies the equipment and reduces costs. In addition, the spectrometer scans at rates of up to 10^{16} measurements per second, offering unparalleled speed and accuracy when studying electron spin relaxation properties at microwave frequencies. These parameters represent a significant leap forward in scientific instrumentation. The project leader and responsible investigator is Petr Neugebauer (CEITEC BUT), the critical NMR/EPR probe was designed by Jan Dubský (CEITEC BUT), Petr Drexler and Martin Čáp (both FEEC).

Provider:	GACR
Principal investigator:	Brno University of Technology/ Central European Institute of Technology
Project start date:	1 January 2021
Project end date:	31 December 2025
Total project cost:	CZK 43,100,000 Kč

Photo: UTEE archive



Energy conversion and storage Eco&Stor (UETE)

At the beginning of 2024, the UCT, BUT, CTU Prague, Charles University in Prague and the Heyerovský Institute of Physical Sciences of the CAS jointly started the OPJAK project – excellent research, which focuses on the key challenge of contemporary society: environmentally acceptable energy security supporting its future existence. The Department of Electrical and Electronic Technology is leading the research activities VA1.1 and VA5.2. VA1.1 focuses on research on anode and cathode materials for higher capacity Li-ion batteries. The project also includes the study of electrolytes for these types of batteries and the use of advanced in-situ analysis. At the same time, we are co-investigators of VA1.2 focusing on post lithium-ion batteries mainly Li-S and Na-Ion, and we are also co-investigating VA1.5 focusing on battery recycling and second life batteries. VA5.2 focuses on understanding and mitigating degradation processes, subtasks include: physical degradation models, test protocols and sensors for energy storage/transfer systems, data-driven degradation models and virtual ageing models, model predictive control of energy storage/transfer systems. We will also co-administer VA5.3, which focuses on thermal management of battery systems.

Provider:	Ministry of Education, European Structural Funds
Principal investigator:	UCT Prague, for BUT UETE FEEC Assoc. Prof. Tomáš Kazda, PhD (VA1.1) and Assoc. Prof. Petr Vyroubal, PhD (VA5.2)
Project start date:	1 January 2024
Project end date:	31 December 2027
Total project cost:	CZK 488,822,126.65

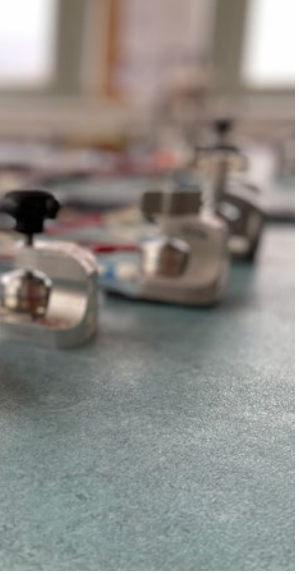


Photo: UETE archive

CHESS – Cyber-security Excellence Hub in Estonia and South Moravia (UTKO)

The Cyber-security Excellence Hub in Estonia and South Moravia (CHESS) consortium will bring together leading institutions working on cyber security in the regions of South Moravia and Estonia. The project includes a number of activities - staff exchange, mutual learning, training, technology transfer, raising awareness of cybersecurity. Specific research initiatives and demonstrations focusing on important societal challenges related to cybersecurity are also included in order to increase cooperation in research and innovation and to demonstrate the viability of research results. The focus is on six problem areas: the Internet of Secure Things; Security Certification; Trustworthy Software Verification; Blockchain; Post-Quantum Cryptography; and Human-centric Aspects of Cybersecurity.

Provider:	European Union
Principal investigator:	Prof. Jan Hajný, PhD
Project start date:	1 January 2023
Project end date:	31 December 2026
Total project cost:	EUR 5,000,000

Photo: UTKO archive

The analysis of discrete and continuous dynamical systems with regard to the identification issue (UMAT)

The project focuses on the solution of identification and qualitative analysis of linear and nonlinear discrete and continuous dynamical systems. This involves research on new methods of discretization and numerical solution of systems, study of stability, identification of limiting solutions behaviour of delayed systems, study of systems with weak feedback and application of delay matrix functions in solving controllability problems. The research also aims to propose a method for estimating nonlinear models in Bayesian terms by adopting a non-iterative learning scheme based on the global distribution approximation technique. The incomplete parameter evolution model will be compensated by selective forgetting, which will be automatically adjusted to reflect the degree of variability of the system. The outputs consist of new procedures for the identification and qualitative analysis of nonlinear dynamical systems.

Provider:	GACR
Principal investigator:	Prof. RNDr. Josef Diblík, DrSc.
Project start date:	1 January 2023
Project end date:	31 December 2025
Total project cost:	CZK 7,038,000

Photo: UREL archive

R-PODID (UVEE)

The aim of this project is to develop automated, short-term fault prediction for electric drives, power modules and power devices that can be integrated into power converters. The research team, led by Jan Bárta at the Department of Power Electrical and Electronic Engineering, is focusing on the control of up to a nine-phase asynchronous machine with the possibility of electronic pole switching. The higher number of phases allows the motor to run even in the event of a partial equipment failure ("fault-tolerant" system).

Provider:	European Union
Principal investigator:	Prof. Pavel Václavek, PhD
Project start date:	1 September 2023
Project end date:	31 August 2026
Total project cost:	EUR 23,700,000

Photo: UVEE archive

New generation of airport multilateration system MSS-5 PDT (UREL)

The aim of the project is to develop a new system for tracking the position of aircraft at airports. The system will accurately identify the position of aircraft using signals from on-board transmitters (transponders) and provide this data to air traffic control. Compared to existing systems, it will achieve much higher reliability and detection accuracy, which will significantly improve the safety and continuity of air traffic.

Provider:	Ministry of Industry and Trade
Principal investigator:	ERA a.s., for FEEC Ing. Michal Kubíček, PhD
Project start date:	1 January 2024
Project end date:	31 December 2026
Total project cost:	CZK 38,967,365

Horizontal gene transfer in the chicken gut microbiome: detection and prediction of antibiotic resistance and mobilome (UBMI)

In commercial farms, antibiotics have been administered as a preventive treatment to newly hatched chickens for decades because of their susceptibility to invasive pathogens in the first days of their life. This has resulted in a selection pressure on commensal bacteria, which have adapted to these changes by acquiring antibiotic resistance genes (ARGs) through a horizontal transfer mechanism. The gut microbiota is characterised by intense gene exchange between bacteria and is therefore considered a reservoir of ARGs.

The main objective of this proposal is to characterize key mobile elements of the chicken gut microbiota, antibiotic resistance genes and plasmids, using a combination of genomic and current metagenomic approaches. We will also determine which bacterial taxa are associated with the spread of mobile genetic elements. We will also discover novel antibiotic resistance genes through systematic cloning of metagenomic DNA followed by phenotypic screening and sequencing.

Provider:	GACR
Principal investigator:	Mgr. Bc. Darina Čejková, PhD – BUT; Assoc. Prof. RNDr. Monika Dolejská, PhD – The University of Veterinary Sciences Brno, CEITEC – Central European Institute of Technology, University of Veterinary and Pharmaceutical Sciences Brno
Project start date:	1 January 2022
Project end date:	31 December 2024
Total project cost:	CZK 10,089,000

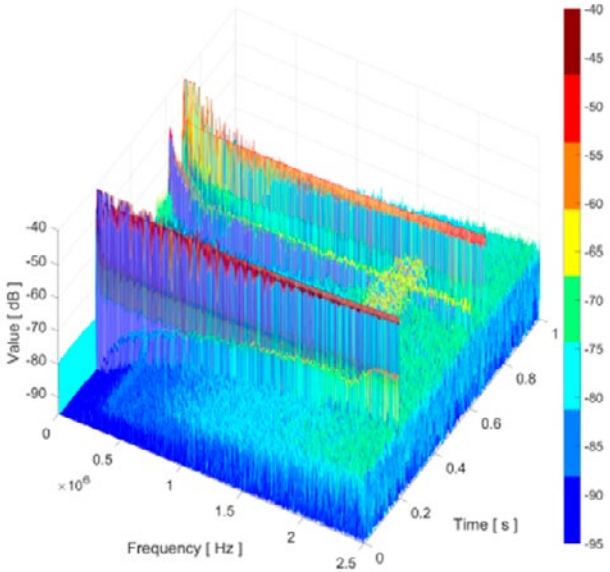
Photo: Darina Čejková archive

Advanced fault detection in DC power networks of electric aircraft (UAMT)

The aim of the project is to develop an advanced digital detection system for application in aircraft power systems using DC supply voltage.

The system developed in the project should be able to detect faults as deviations from normal operating conditions, but also to prevent faults. The project will promote the use of emission-free transport within the More electric aircraft and All-electric aircraft approaches, thus responding to the trend of increasing electrification in air transport as a way to reduce the negative environmental impact of transport.

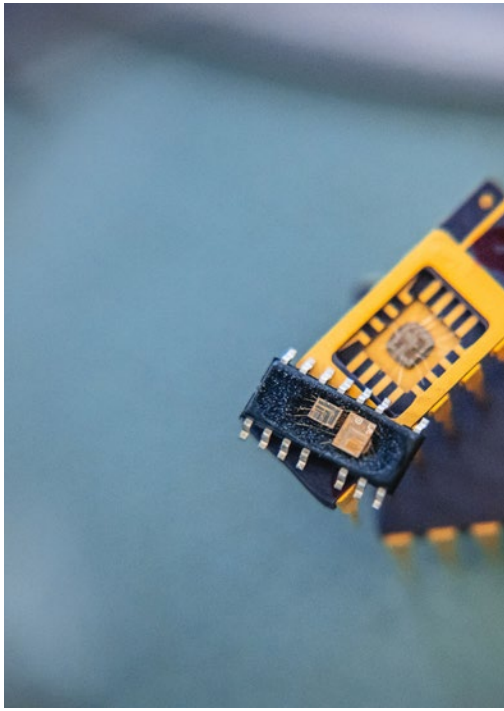
Provider:	TACR + NPO
Principal investigator:	Eaton European Innovation Center, Prague, for BUT Assoc. Prof. Zdeněk Bradáč, PhD and Ing. Miroslav Jirgl, PhD
Project start date:	1 January 2024
Project end date:	30 June 2026
Total project cost:	CZK 32,077,000

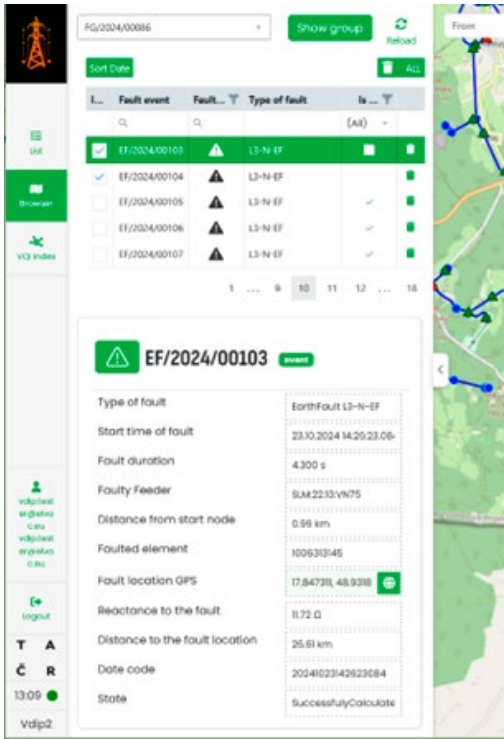


Advanced Chip Design Research Center (UMEL)

One of the main objectives of the project is the promotion of semiconductor development activities in the Czech Republic, especially in research, but also in education, mostly as seminars or summer schools. The project covers the following main areas of expertise: Hardware implementation of on-chip cyber keys, Wide band-gap semiconductors, Chips for biomedicine, Chip design programs and Artificial intelligence for cars. The project is divided into several sub-activities, which are always addressed by at least one Czech partner (BUT, CTU Prague, MU Brno) and one partner in Taiwan (e.g. National Taiwan University, National Central University, National Yang Ming Chiao Tung University, National Chung Hsing University, Jmem Tek ltd., Light Momentum ltd. and others). Last but not least, another objective is also to facilitate the resettlement of Taiwanese corporate partners of the project in the Czech Republic.

Provider:	NARLabs, Taiwan
Principal investigator:	Cybersecurity Hub – Prof. Tomáš Pitner, PhD, UMEL – Assoc. Prof. Jiří Háze, PhD
Project start date:	1 June 2024
Project end date:	31 December 2027
Total project cost:	USD 9,500,000/USD 3,320,000





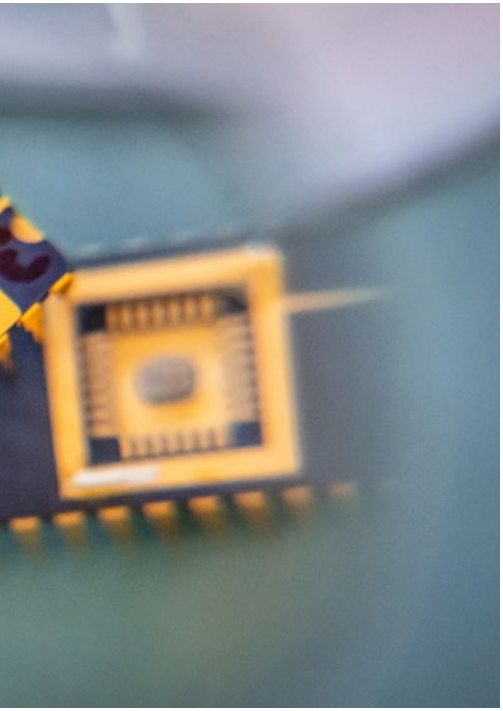


Photo: Jakub Rozboud

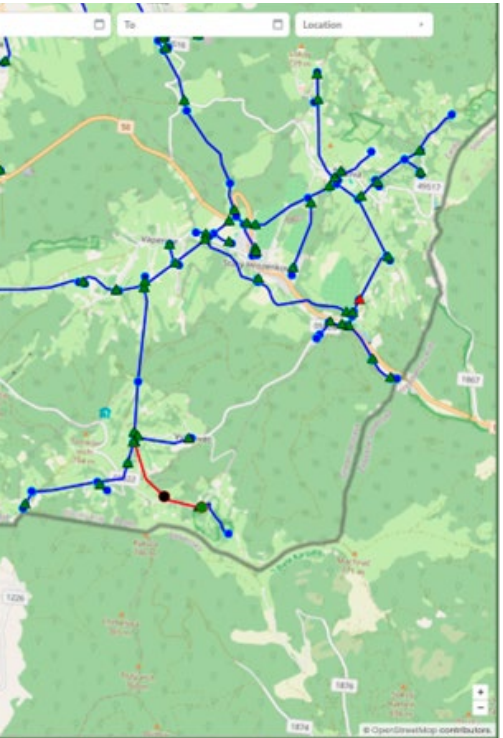


Photo: UEEN archive

Development of the 2nd generation Vdip fault localization system (UEEN)

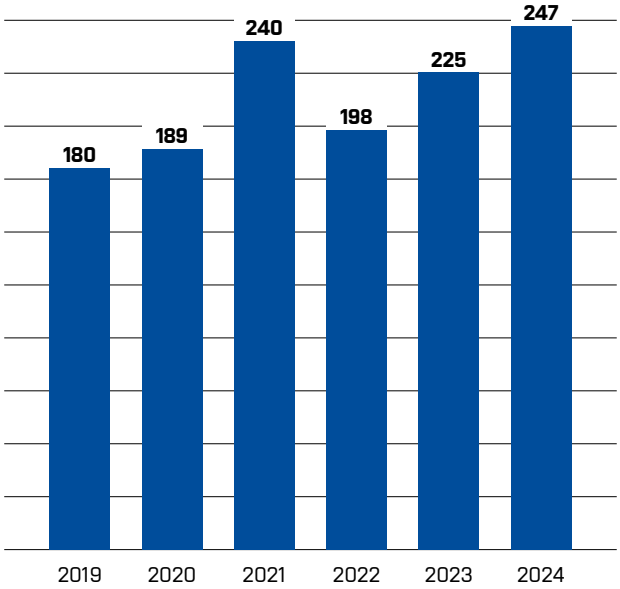
Within the project, the 2nd generation Vdip system (Vdip2) for localization of asymmetrical faults in high voltage (HV) systems was developed.
The Vdip2 system is unique in its ability to localize especially single-pole faults, which are very difficult to trace in large HV systems and, what is more, they can jeopardize people by touch or step voltage. The use of the Vdip2 system by distribution system operators will thus contribute to faster tracking of all types of faults and thus to the subsequent restoration of electricity supply.
Fault records from low-voltage monitors installed in distribution transformer stations are used to locate ground connections and short circuits. These monitors are also used for aggregated voltage quality assessment using the proposed VQI index, both at the level of individual distribution transformers and individual HV outlets. Using the VQI concept, the system will allow operators to optimize the distribution system in order to minimize the risk of exceeding power quality standards in the areas included in the Vdip2 system.

Provider:	TACR
Principal investigator:	for BUT Assoc. Prof. David Topolánek, PhD, Principal Investigator for the project: Jan Grossmann (ELVAC a.s.)
Project start date:	1 January 2022
Project end date:	31 December 2024
Total project cost:	CZK 25,829,000

PUBLICATIONS

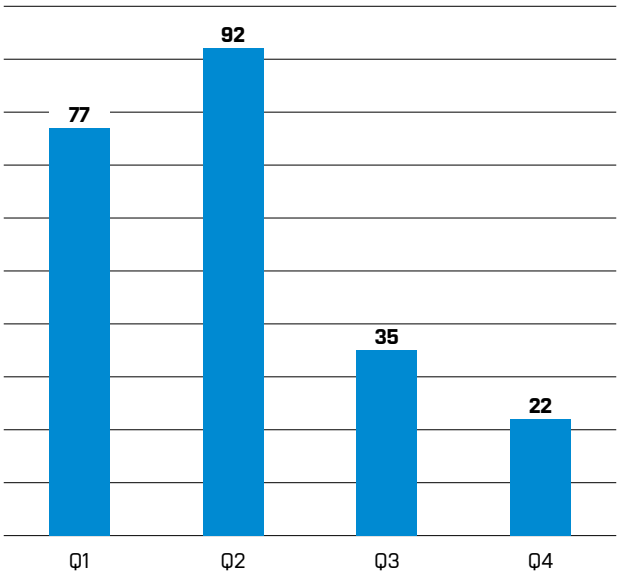
Number of journal publications in WoS

(Without quartile differentiation)



FEEC publication profile in 2024

(Number of journal publications in WoS divided into quartiles)



Note: unsorted publications (21 ks) not included

10
academic books or chapters in a book

247
papers in the Web of Science Core Collection (WoS)

221
papers in proceedings registered in WoS or Scopus

46
Prototypes, software or functional samples

ORIGINATED AT FEEC

Utility or industrial designs in 2024

- Energy unit and load management system at the point of consumption
- A system for the real-time indirect monitoring of objects
- Discharge indicator for MV cables and gas-insulated switchgear
- Electroporation system
- An equipment for the dynamic luminance measurement on roads

Patents in 2024

MANUFACTURING METHOD OF ASYNCHRONOUS MOTOR ROTOR

Document number:	310047
Originators:	Assoc. Prof. Ondrůšek Čestmír, CSc.; Ing. Martin Mach, PhD; Assoc. Prof. Jan Bárta, PhD
Patent owner:	BUT (100%)

RESOLVER WITH NON-SYMMETRICAL WINDING

Document number:	310051
Originators:	Ing. Martin Mach, PhD; Assoc. Prof. Ondřej Vítek, PhD
Patent owner:	BUT (100%)

MATERIAL FOR THE MANUFACTURE OF A BURN-UP ABSORBER FUEL ROD AND A BURN-UP ABSORBER FUEL ROD MADE OF THIS MATERIAL

Document number:	310116
Originators:	Prof. Karel Katovský, PhD; Ing. Peter Mičian
Patent owner:	BUT (100%)

INTERNATIONAL RELATIONS AND FEEC

A number of bachelor's, master's and doctoral students successfully went abroad on their short-term study stays and internships abroad in 2024. The total number of student mobilities and trips reached more than 70, mainly in the ERASMUS+ and Free Mover programmes. Academic and non-academic staff then completed more than 40 study and teaching stays abroad.

In 2024, activities are underway within the EULiST project consortium (https://eulist.university/), which has received significant funding from the ERASMUS+ programme under the "European Universities" call. The consortium consists of ten EU partners (Austria, Czech Republic, Finland, France, Germany, Greece, Italy, Slovakia, Spain, Sweden) and is coordinated by Leibniz Universität Hannover, Germany.

Canadian electrical engineer Todd Freeborn brings American students to BUT

Unlike the average Czech student, American students often do not look beyond the borders of their country, state or even hometown. Todd Freeborn, an electrical engineer and technical education enthusiast, is trying to change that by bringing another group of students from the University of Alabama to FEEC to spend the summer working with Czech experts to develop fractional-order circuits and systems while deepening their cross-cultural understanding. Todd Freeborn comes from Calgary and describes himself as a passionate Canadian. "I have a hard time not saying I'm a Canadian. I usually can't contain myself, so you find out within five minutes." Like the nine students he brought to Brno, he never dreamed of leaving his hometown until he got hooked on international research. That led him to the University of Alabama, where he has been a professor for the past nine years. And it wasn't his last international experience.

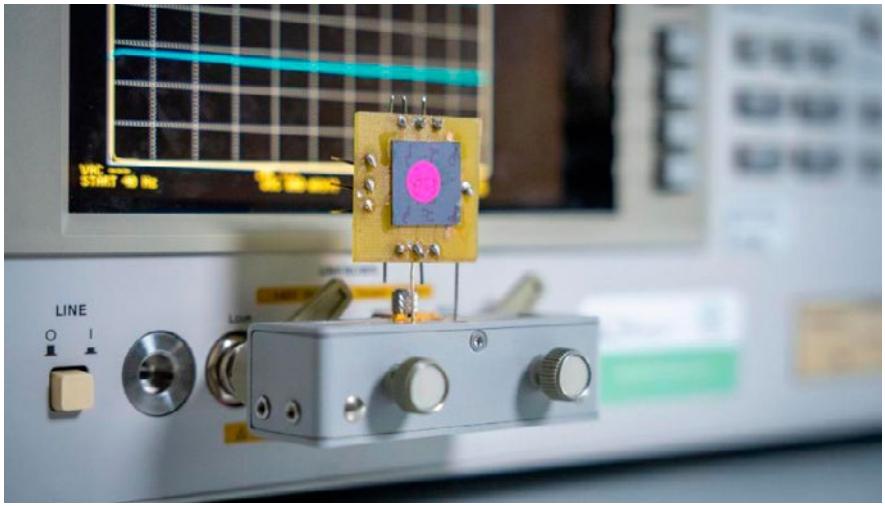


Photo: Václav Kaničák

He first encountered BUT in 2016. Back then, the collaboration was mainly on the level of joint work and research until the idea for an internationalisation project was born. "The National Science Foundation, which funds this project, has a specific mission and money for what they call ‚international research experience for students', which went

perfectly well together with my idea for research on fractional order systems in Brno."

BUT itself was an imaginary ace up his sleeve in convincing the National Science Foundation: "BUT is a world leader in the field of fractional order systems and their development and is quite unique in this field." And so everything fell into place at the right time. Freeborn appreciates that the university has an entire team at the Department of Telecommunications dedicated to this area. "There are posters hanging in the hallways with these topics. Students see them, they know they are involved in them, and it is therefore perfectly normal that everyone here knows these topics. I say that nowhere else in the world would it work." The project looks at the fractional-order circuits and systems found in things we use every day, such as mobile phones, cars and household appliances. A unique aspect of this research is then the application of fractional calculus, an older branch of mathematics. While traditionally theoretical and abstract, this mathematics provides innovative ways of approaching and solving engineering problems. "We are interested in designing circuits that use this mathematics in completely new ways and that can provide a unique and more flexible approach to a problem," Freeborn explains. According to Freeborn, experience in an international environment is essential for students to improve their communication skills. It forces them to look at the material they know from a different perspective. "I encourage them to be better communicators because how do you talk to your mentors who are experts in science and research but don't have the same level of lingo?"

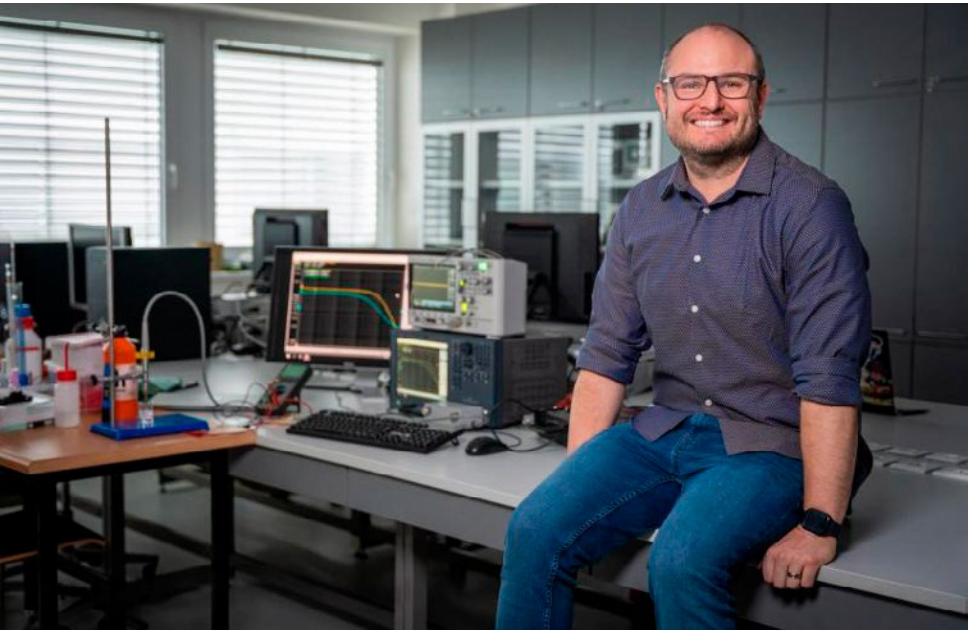


Photo: Václav Koníček

Many of his students have never left the United States, so these international opportunities are crucial for their development. "They have to work internationally, they have to learn what it's like. Many of these students have never left the United States."

Freeborn makes sure that the project is not only focused on the technical aspects. Students have the opportunity to see Brno and immerse themselves in Czech culture. "All students have to download Duolingo so that when we come here they know at least the basic words, sounds, phrases and understand what is going on. We also take them to museums, historical sites and other places like Prague and Lednice."

Freeborn hopes to continue the project in some form. "We hope the program will grow because it's been amazing here. I keep joking about bringing more and more students here because it's such a great experience for everyone involved."

Photo: Jana Němcová

As part of the international summer school, 22 microcontroller enthusiasts visited FEEC

From Monday, August 12, 2024, the International Summer School of Microcontroller Programming was held at the faculty in cooperation with FEEC and the University of Applied Sciences Technikum Wien. The classes were led by Thomas Fischer, an expert in software design for microcontrollers. The summer school included both a theoretical part and a main practical part, which resulted in group projects that the students worked on from 19 to 21 August.

Summer research programme at BUT inspired American students to pursue PhD

Another group of electrical engineering students from The University of Alabama (UA) spent three months at FEEC to work on projects in the area of fractional order systems under the mentorship of BUT experts and Todd Freeborn from UA. Rowan Aldridge and Simon Colburn share how they got into electrical engineering, what they appreciate about research, and what they'll take from their experience.

What made you want to participate in this programme?

Simon: I saw it as an opportunity to not only expand my knowledge in cutting-edge electrical engineering research, but also to experience different cultures, different lifestyles and, overall, to try and better myself.

Rowan: I had a couple of reasons. I was looking into going to graduate school and doing research when I graduated, and I wanted a taste of that before I got to it to make sure that it's really the path that's right for me. I also really like travelling. I've been to Ireland previously and I wanted to see more of Europe. I also had Dr Freeborn as a professor and I liked the way he taught, so I figured his programme was probably pretty good.

What is your focus in the fractional order systems area?

Rowan: In electronics, you have filters, which are often used in audio. They can be for example in microphones for filtering audio, getting rid of noise, getting rid of signals you don't want. Typically, you would only use filters in integer order, which are whole number ordered – first order, second order. My research is to see how we can use fractional order in one-and-a-half-order filter or two-and-a-half-order filter. There's already been some research, but I want to expand on it and make it a lot easier to use for application.

Simon: I am trying to create a physical device that would mimic a fractional order capacitor across multiple frequency bandwidths. The goal is to reduce the strain on researchers who don't necessarily have the resources to test a constant phase element or a fractional order capacitor at a specific phase. The work is very general and exploratory, a lot of it is simply exploring different avenues to see what is and what isn't working. The aim is to help others in the future.

Have you always wanted to be electrical engineers?

Simon: I initially wanted to be a surgeon and went through all of high school believing that. Then I got into college and realised that it isn't for me. By the time I got there, I had already built my own

computer, and so I thought, well, this is something I'm really interested in. In the end it was kind of a no-brainer. The more I learned about computers and how they worked, the more I realised that this is something I'm really passionate about.

Rowan: I had no idea what I wanted to be as a kid, but I've always had this perspective that I could probably enjoy whatever I'm doing as long as it's meaningful or I feel like it's contributing. I think I ended up on the engineering path because I was really good at math and science as a child. When I started at UA, I originally wanted to do chemical engineering, which I got talked out of, and then mechanical engineering, which I didn't like, and ended up in electrical engineering. The fact that I'm still here and that I am on this programme shows that it was probably the right choice. I'm enjoying what I'm doing and I feel like I'm contributing.

What is your favourite thing about being researchers?

Photo: Václav Koníček

Simon: Coming into this, I had no research experience. This whole summer, a lot has changed. Looking at it in retrospect, I'm so happy I did it. I think the best thing about research is the freedom that it gives you and the ability to just be yourself and explore what you really want to follow.

Rowan: My favourite part is that it's not a waste of time to do something that doesn't ultimately work. We've both worked in industry, and you get chided there if you do something that is a waste of time and money, something that ends up not working. Part of the point of research is being able to say, hey, this doesn't work. That's still a contribution to knowledge.

What are the biggest differences between UA and BUT?

Simon: I love being able to just easily take the tram into the city. It's very accessible. I did my freshman year in Alabama during the pandemic, and I didn't meet anyone. It's kind of hard getting out and doing anything when you're stuck on campus. But here it's so natural, it seems so easy.

Rowan: I love that European universities, and BUT especially, are made for a person to get around and for a person to exist in a space and not travel through it in a car. There's also much more green space, the walking paths are wider, and there's far less traffic buzzing past you, making noise.

What will you take from this experience when you go home?

Simon: How do I say this without sounding cheesy? (laugh) This was probably some of the most fun I've ever had. Not only was I able to work with super intelligent people, but I also got to explore wildly different places, see all these beautiful structures and meet all these wildly interesting people. And it definitely gave me a new perspective on my future career. Going into this, I wasn't even sure I wanted to do research, but now I know that I really want to get my PhD.

Rowan: From a pragmatic perspective, I definitely think that it made me realise that research is something I can do, which was one of the main goals of the summer. It helped me decide that, yeah, I'm probably going to try to go down the path of getting a higher education and going into this field if I can.

BUT has strengthened cooperation with Taiwanese universities by signing two memoranda

As part of deepening international cooperation, representatives from 12 Taiwanese universities forming the UAAT (University Academic Alliance in Taiwan) visited Brno University of Technology (BUT) on Friday, 8 November. The delegation included 33 members. A Memorandum of Understanding was signed between BUT, National Sun Yat-sen University, and National Taipei University of Technology, focusing on education, research, and the mobility of students and faculty. Friday's visit strengthened existing cooperation, with a focus on semiconductor technologies, an area where Taiwanese universities, research organizations, and companies are global leaders.

At the BUT Rectorate, the delegation was welcomed by Vice-Rector for Internationalization and External Affairs Iveta Šimberová, who highlighted previous collaborations between BUT and Taiwanese universities. "We have signed eight cooperation memoranda, which will be joined by two more today. This gives us space to discuss specific opportunities for collaboration, exchange programs for students and staff, and to prepare additional educational, research, and innovation projects." She continued, "Brno University of Technology is the second biggest university in Brno and one of the oldest universities in the Czech Republic. Brno is the second largest city in the Czech Republic, often called the Silicon Valley of Europe. BUT is an international, research-oriented, sustainable, and digital university, and we are especially proud of our good relations and cooperation with universities around the world. Our partners are not only from Europe but also from the USA and Taiwan."

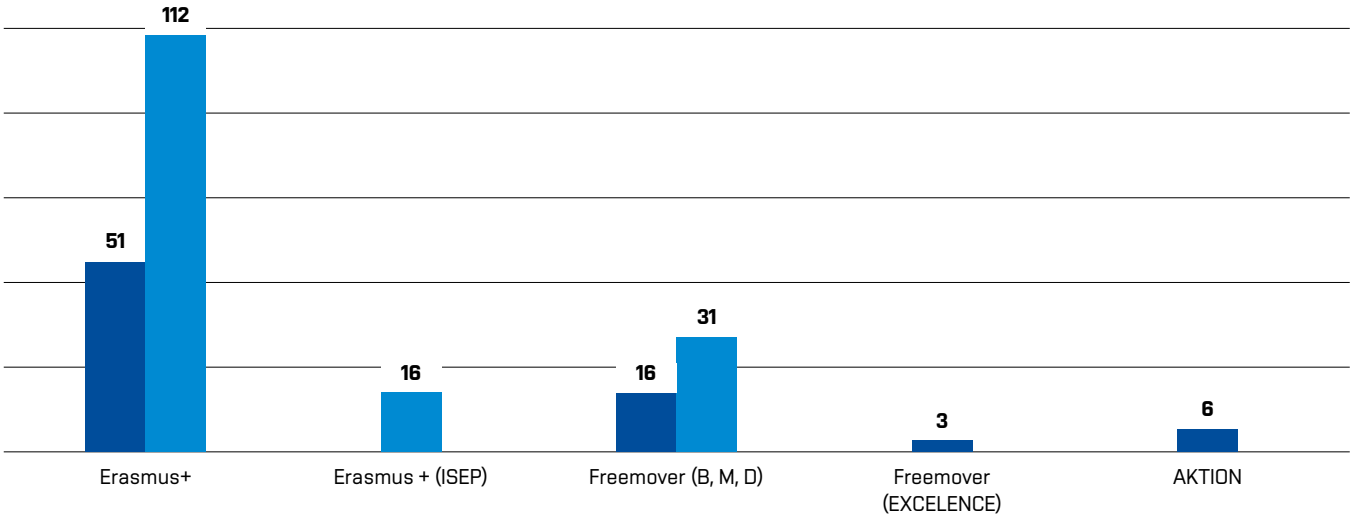
Photo: Václav Končeák

If Brno is Europe's Silicon Valley, then BUT is its center. Brno University of Technology is an essential part of the semiconductor value chain and coordinates the preparation of the National Competence Center for Semiconductors and Chips, which aims to support the "Chips for Europe" initiative and join the emerging network of European competence centres. The discussion, following a formal introduction of the universities and members of the delegation, was focused primarily on strengthening mutual cooperation in the field of semiconductor technologies.
The production of chips, one of the most complex industrial sectors, has dominated Taiwan's economy since the 1980s when the country shifted its focus to innovation. The significance of Taiwanese chips became evident during the pandemic when disruptions in semiconductor supplies impacted global industries.
The European Union responded to the crisis with the European Chips Act, aimed at strengthening Europe's resilience in this field. In recent years, discussions between European and Taiwanese partners have intensified – Europe wants to bolster its semiconductor industry, while Taiwan has the expertise but needs thousands of specialists worldwide.

Following the signing of two Memoranda of Understanding between Brno University of Technology and National Sun Yat-sen University and National Taipei University of Technology, the group moved to the Technology Park, which is owned by BUT. The Technology Park has a strategic location and offers ideal opportunities for developing activities. Direct cooperation with colleagues from Taiwan was also established by individual BUT faculties.
The delegation visited the Faculty of Electrical Engineering and Communication, Faculty of Mechanical Engineering, and the Central European Institute of Technology (CEITEC). Later, from 2:30 to 4:30 PM, the Taiwanese University Fair took place at the Faculty of Business and Management, where collaboration opportunities in mobility, science, research, and scholarships were presented.

Number of FEEC mobilities in 2024

Out going and incoming students by programmes

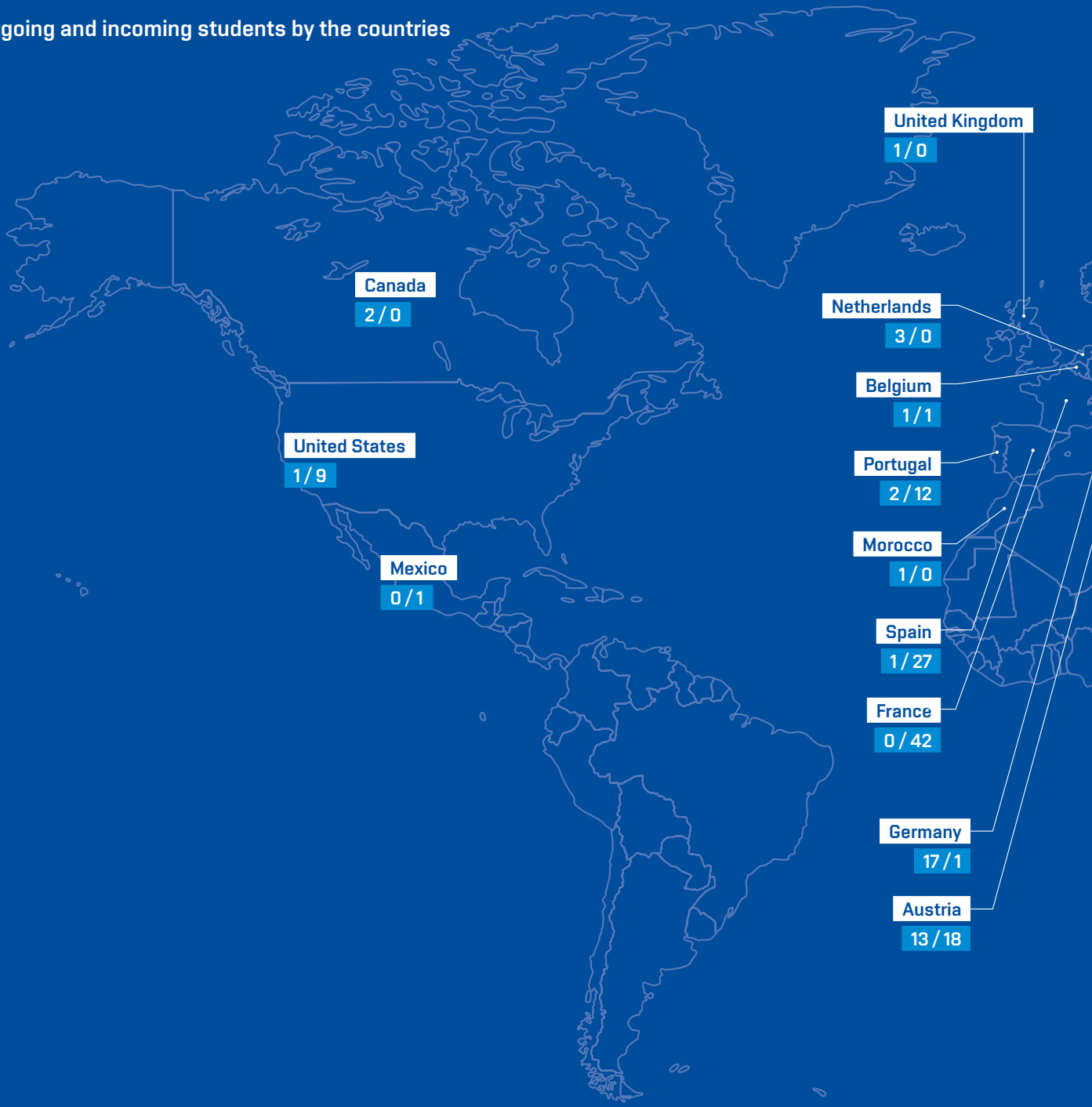


Number of outgoing students:	76
Number of incoming students:	159
Number of outgoing academic and research staff:	41
Number of incoming academic and research staff:	45

Number of outgoing students

Number of incoming students

Outgoing and incoming students by the countries




Norway
4 / 0
Finland
22 / 1
Sweden
1 / 0
Lithuania
1 / 2
Denmark
4 / 1
Poland
1 / 0
Slovakia
0 / 2
Corea
0 / 3
Romania
0 / 7
Bulgaria
1 / 0
Taiwan
0 / 2
Turkey
0 / 10
Greece
0 / 15
Italy
0 / 5

COOPERATION WITH CORPORATE PARTNERS

"With advanced applications, we create innovations that make everyday life easier. At the same time, we seek solutions to the current challenges that society is facing today, thus fulfilling the university's responsibility towards society. New ideas and unexpected impulses are often the ones that can create suitable solutions. However, their implementation and chances of success require not only diligence, but also financial resources and often a supportive partner from practice. This is where opportunities for cooperation with the corporate sector open up."

Vice-Dean for External Relations
Prof. Tomáš Kratochvíl, PhD
tel.: +420 54114 6538
email: kratot@vut.cz

Levels of partnership

STRATEGIC PARTNERSHIP

Represents the highest level of faculty-company collaboration. The Strategic Partner is guaranteed participation in the most prestigious faculty events and the mutual opportunity to present as a partner is an integral part of this level of cooperation.

PARTNER or **SME PARTNER**

Varies in the number of faculty events that can be joined and the amount of marketing support from the faculty.

STARTER PACKAGE

For new partners, we are able to offer selected services on a trial basis for an agreed period of time.

Why be a PerFEKT partner

Our faculty achieves excellence in education, science and research throughout the Central European region. We have state-of-the-art teaching and research facilities at the BUT campus Pod Palackého vrchem. The faculty's cooperation with industrial partners brings benefits to all stakeholders. Thanks to partner companies, students have the opportunity to work on real projects, the faculty opens the door for more ambitious research, and corporate partners are close to the highly qualified graduates that are in such high demand nowadays.

Příklady možností spolupráce

- Application and research projects
- Collaboration in teaching, thesis supervision
- Joint grant preparation
- Contract orders
- Support of faculty events
- Support of student competitions (e.g. Merkur perFEKT Challenge, Microcontrollers fly)
- Participation in the PerFEKT JobFair
- Participation in the student science conference and competition STUDENT EEICT
- Participation in the Open Day
- Promotion of the partner in the faculty premises
- Branding of a lecture room

We treat each corporate partner individually, taking into account their needs and respecting our employees and students. If you are interested in collaboration opportunities, please visit our website where you will also find a complete list of our partners or contact the Vice-Dean for External Relations.

Strategic Partners

ČEZ, a. s.

ČISTÁ ENERGIE ZÍTŘKA

The faculty develops a broad cooperation with ČEZ Group in the field of nuclear energy. FEEC acts as a link between secondary schools and employers, organising joint meetings and lectures with ČEZ, for example on the construction of new nuclear units and professional seminars focused on nuclear energy.

Photo: Jakub Rozboud

ČEZ Group supports students through scholarships and also through the Summer University internship at the Dukovany Nuclear Power Plant, where the selected students gain practical experience. It also supports the Students for Students association.

Strategic Partners

EATON ELEKTROTECHNIKA s.r.o.

The partnership between the technological company Eaton and FEEC developed in two main directions in 2024. Since January, a major research project "Advanced fault detection in DC power supply networks of electric aircraft" has been running with a budget of 32 million CZK, whose principal investigator is Eaton European Innovation Center in

Photo: Jakub Rozboud

cooperation with the UAMT. The project supports the electrification of aviation and the reduction of environmental burdens. The cooperation continued during the 18th IFAC International Conference on Programmable Devices (PDeS), which the UAMT hosted on 19-21 June. Eaton actively participated in this conference, contributing to discussions on the latest trends in applied electronics.

E.ON ČESKÁ REPUBLIKA, s.r.o.

The successful cooperation with the E.ON energy group was reflected in two important activities in 2024. On 8 October, A Day Full of Energy took place at FEEC for the first time. A small town made of stands grew up in front of the T12 building. In a heated tent, students and faculty experts discussed cybersecurity, smart charging or energy sharing with E.ON experts.

Photo: Jakub Rozboud

The joint project of the faculty and EG.D (from the E.ON group) called Smartbox – an innovative solution for smart metering and load management in power grids, which won the prestigious GOLDEN AMPER award at the AMPER 2024, was also a major success.

HONEYWELL, spol. s r.o.

Honeywell has become an important partner of the faculty by signing a Memorandum of cooperation on the popularization of technical education in the South Moravian Region. The technology company has thus joined an initiative to increase the number of students in STEM fields by 30% within five years, helping to meet the long-term demand for professi-

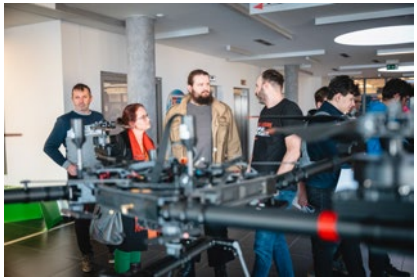


Photo: Jakub Rozboud

onals and experts in engineering and science disciplines. Honeywell regularly participates in professional roundtables organized by the BUT Rector's Office and follow-up workshops aimed at promoting technical education. The company supports the Merkur perFEKT Challenge competition.

SME Partners

ŠKODA AUTO a.s.

Thanks to the cooperation with Škoda Auto we could organize two important events. The highlight of the colloquium "Technical Challenges and Visions for Future Mobility" was the Electromobile Afternoon held on 14 May, which offered test drives in Škoda Enyaq cars. Later, on 10 October, we organised an Open Science Day together with a Meeting with School

Photo: Jakub Rozboud

Directors, which included test drives. Škoda supplied a varied fleet of electric vehicles for these events, including the Enyaq Coupé LK 85x, Enyaq Coupé RS 82 kWh, Enyaq iV 80x 82 kWh, Enyaq iV 80 Sportline and Enyaq Coupé RS.

THERMO FISHER SCIENTIFIC BRNO s.r.o.

FEEC and Thermo Fisher Scientific cooperate closely on educational activities. The company regularly participates in the Open Days of the faculty, where it presents its technologies to prospective students. Thermo Fisher Scientific acts as a general partner of the Merkur perFEKT Challenge student competition, donating attractive prizes for participants. As part

Photo: Jakub Jiřikovský

of the accompanying programme of this competition, it also organizes visits to the production centre for secondary school teachers, thus contributing to expanding the teachers' professional knowledge and familiarizing them with modern industrial technologies.

NXP SEMICONDUCTORS CZECH REPUBLIC s.r.o

TIETOEVRY CZECHIA s.r.o.

Starting package

KV2 AUDIO INTERNATIONAL spol. s.r.o.

FACULTY OF ELECTRICAL ENGINEERING AND COMMUNICATION

Annual report of the Faculty of Electrical Engineering and Communication Brno University of Technology for the year 2024

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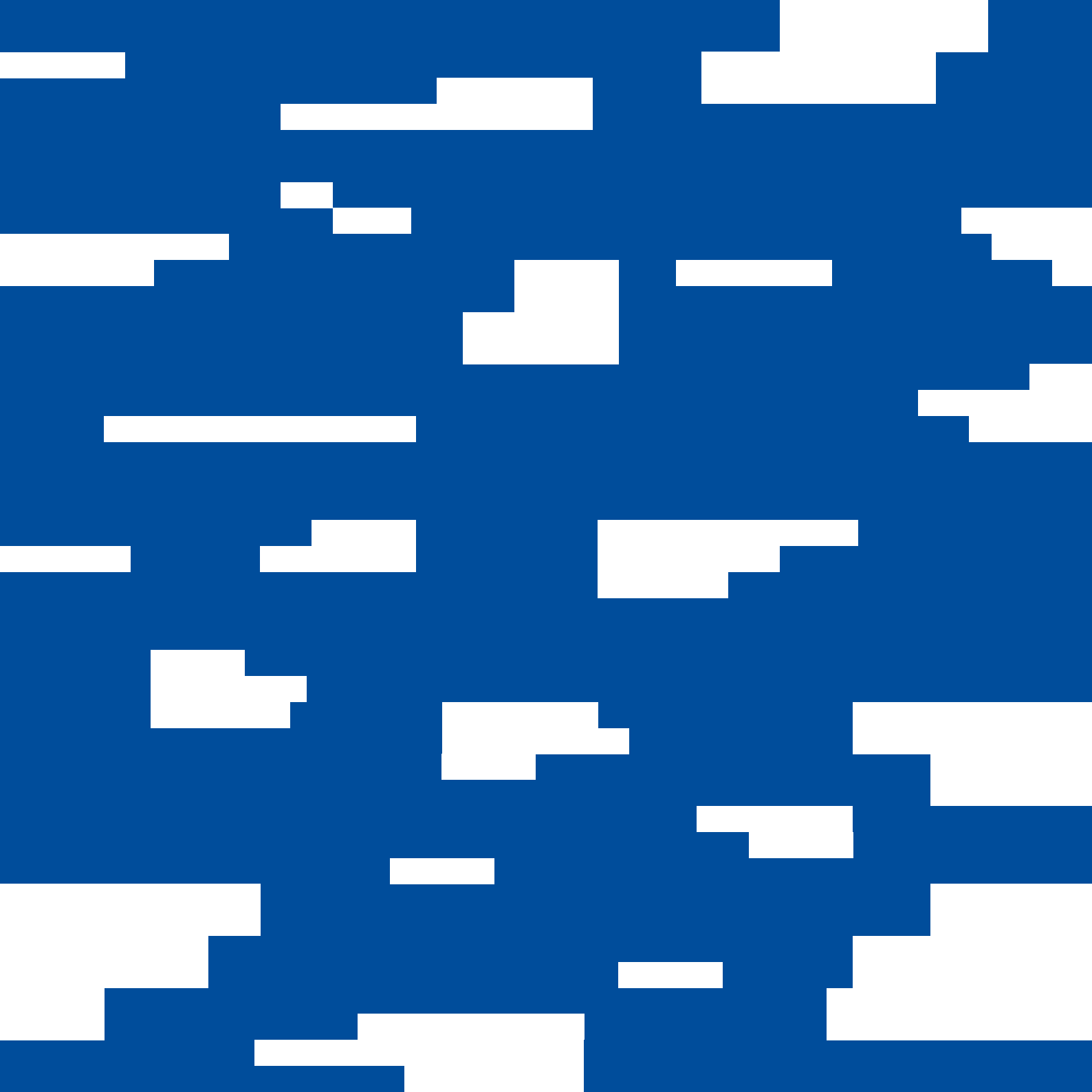

www.feec.but.cz