NEWS AT BUT

2019/2020

120 1899–2019 BRNO UNIVERSITY OF TECHNOLOGY

We've been around for 120 years already!

Brno University of Technology has been bringing talented students to the world since 1899

BRNO UNIVERSITY OF TECHNOLOGY

NEWS AT BUT

English Yearbook
published by the Brno University of Technology ID 00216305, VUTIUM Press Reg. no.: MK ČR E 7521, ISSN 1211–4421.

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Printed by Helbich, a. s., Brno

Issue 4 I 2019/2020
Issued on 11 October 2019

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NOT FOR SALE!

Photo Igor Šefr

Dear readers,

This is a magazine offering selected events from the life of Brno University of Technology in the academic year 2018/2019. Within the Czech Republic our university is a strong partner of the City of Brno and the South Moravian Region. Experts from the faculties and institutes of BUT and students are involved in finding solutions to everyday problems and long-term visions of the city's management. This magazine cannot cover the whole mosaic of interesting events that happened at BUT in the academic year 2018/2019, so if some of the articles capture your attention do not hesitate to visit our website, social networks or contact directly the authors for further information.

Our university is open to cooperation with foreign countries in the areas of education, science and research, collaboration with students from the research and academic environment. Brno University of Technology regularly undergoes evaluation by the Association of European Universities (EUA), and actively works on building its good name in the world. Interest by other parties in collaboration with us is confirmed by hundreds of signed memoranda and by visits from abroad. This year this involved, for example, the ambassadors of France, Japan, Canada, India, Ukraine, a numerous delegation of students and academics from Oman, representatives of universities from China, Korea, Germany, Albania, Russia, Japan and Israel.

I hope that reading our yearbook brings you information, inspiration and, possibly, ideas for collaboration with BUT.

Jiří Hirš
Vice-rector for Foreign Relations
Brno University of Technology

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Jana Drbohlavová spends most of her time in Brussels where she is tasked with the safety of nanomaterials but she still manages to find time for example to measure the oxygen deficit in Czech ponds.

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The head of a successful company that produces official hockey pucks for the IIHF championships is the graduate of the Faculty of Business and Management, Kateřina Zubíčková.

At university Marie Illeová did not want to hear about mechanical engineering technologies, but later she changed her mind and today she works in the management of Airbus Hamburg.

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Switzerland's CERN employs six Czechs on a long-term contract. One of them is graduate of Brno University of Technology David Bělohrad, who highly recommends this experience.

NEWS

HONOUR

Photo archive of Miloslav Druckmüller

Minor planet named after Miloslav Druckmüller

Miloslav Druckmüller from the Institute of Mathematics at the Faculty of Mechanical Engineering BUT has been greatly honoured for his life-long work when the International Astronomical Union approved the proposal that Minor Planet (6263), discovered on 6 August 1980 by the astronomer Zdeňka Vávrová at the observation on Kleť, was named after him.

Information about the naming appeared in Minor Planet Centre No. 110621 of 11 July 2018. The origin of the approved name in the case of Minor Planet (6263) Druckmüller was described by the following text: Miloslav Druckmüller (1954) is a Czech mathematician, astronomy populariser and photographer, who developed an innovative method to visualise the solar corona during total eclipses of the Sun. He has stretched the limits of scientific astrophotography, leading to a variety of discoveries.

Although the mathematician from BUT is well aware that he will never see the asteroid with his own eyes, he is immensely proud of this honour. "The idea that somewhere at the distance of Mars an asteroid bearing my name is orbiting the Sun is a joy for anyone who has been interested in the universe for all his life," stated Miloslav Druckmüller.

(ed)

COLLABORATION

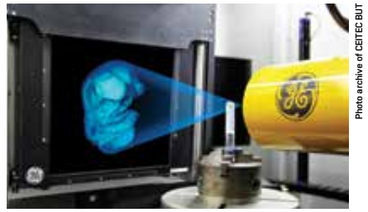

Photo archive of CEITEC BUT

CEITEC BUT researches into the role of signals in shaping the face in vertebrates

Scientists from the laboratory of X-ray computer micro- and nanotomography in CEITEC BUT have been co-operating since 2012 with a Swedish group of evolution biologists trying to explain the mechanism of face formation in vertebrates. Last year in summer they came up with an interesting discovery – a description of the signalling paths which are directly responsible for building various anatomical structures in the facial section.

The whole research team collaborated in a series of genetic experiments where the scientists observed mutations of various genes and different evolutionary stages in mice embryos. The team from the laboratory of tomography was responsible for 3D visualisation and the evaluation of digitised 3D models. They were able to precisely calculate which parts of the cartilage are impacted most and how they differ from one another. In addition, the method of X-ray computer microtomography made possible the displaying of other soft tissues, such as the cerebral cortex or the olfactory epithelium. It is exactly these two structures that were later shown to be crucial in generating signals shaping the future face of vertebrates.

The research was published in eLife, being the second article in two years in this prestigious magazine.

(ed)

HONORARY TITLE

Photo Igor Šerf

Honorary doctorates for two world scientists

As part of the celebrations of the 120th anniversary of its founding Brno University of Technology conferred two honorary doctorates on Sebastian Díaz de la Torre and Arvid C. Johnson who received the scientific title from the hands of BUT rector Petr Štěpánek during a festive ceremony on 19 June 2019.

Sebastian Díaz de la Torre from Mexico is a renowned expert in the field of materials science and engineering. He works as director of the CIITEC-IPN research centre in Mexico and is connected with Brno University of Technology via collaboration with CEITEC BUT, the Faculty of Civil Engineering and the AdMaS research centre. Arvid C. Johnson, who is rector of University of St. Francis in the state of Illinois and widely recognised expert in the area of operational research, has been a long-term MBA study collaborator with the Faculty of Business and Management BUT.

The honorary academic title doctor honoris causa has so far been received at Brno University of Technology by 67 prominent figures from all areas of science.

(ed)

BUT celebrates 120 years of its existence this year

Students of the Technical University in Brno in 1901 and Brno University of Technology today

Brno University of Technology is the oldest university in Brno and the oldest technical university in Moravia. Its beginnings date back to 1899 and it celebrates its 120th anniversary this year. On the occasion of the celebrations the university organized a number of events which filled up nearly all of the calendar year and there is still a lot to choose from on the www.120letvut.cz website.

Radana Koudelová
Photo Archive of Brno University of Technology and Igor Šefr

The festivities culminated with the Let's Go and Celebrate festival for students, graduates, staff and all supporters of Brno University of Technology taking place on Saturday 25 May 2019 in the campus at Pod Palackého vrchem. At 10 am the Golden Graduation Ceremony in the assembly hall of the Faculty of Electrical Engineering and Communication reminded graduates from 1969 how they acquired a university diploma fifty years ago. A total of 120 graduates of three faculties existing at that time – the Faculty of Civil Engineering, the Faculty of Mechanical Engineering and the Faculty of Electrical Engineering arrived and received a commemorative diploma. Between 11 am and 3 pm all the faculties and institutes of Brno University of Technology opened their doors to graduates and the general public who could take a look into the laboratories or attend captivating lectures. In the afternoon a music programme started in the open space next to the Faculty of Electrical Engineering and Communication with headliners Richard Müller, N.O.H.A. and Barbora Poláková and a host of student and employee bands. The festival where visitors could stop at the stands of the individual faculties was attended by roughly five thousand people who came together to celebrate the anniversary of the oldest technical college in Moravia.

Graduates from 1969 attended the Golden Graduation Ceremony during which 120 former students of the oldest faculties received a commemorative diploma.

In June Brno University of Technology hosted the Czech Academic Games. The main organiser was the Centre of Sporting Activities of BUT. Between 23 and 28 June 2019 hundreds of sporting talents from universities and colleges arrived in Brno to compete in the 18th edition of this sporting event. The Czech Academic Games were formally opened in the courtyard of the rector's office and the festive mood was augmented by

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the performance of the Vox Iuvenalis choir.

Together with BUT the 120th anniversary of its founding is also celebrated by the Faculty of Civil Engineering which is the oldest faculty at BUT. The celebrations took place on 25 September 2019 in the Brno City Theatre and included a ceremony of awarding commemorative medals on the occasion of the 120th anniversary of the faculty. September is also the month of BUT's "birthday", as it was founded by a document dating from 19 September 1899. And it was on this day that a special issue of the Události university magazine was published.

The birthday of Brno University of Technology falls in the month of September as the Czech Technical University in Brno was founded by a decree dated 19 September 1899.

The ceremonial 20th Academic Assembly of Brno University of Technology held in November will commemorate the events of November 1939 and 1989. Medals and Awards of the Rector will be awarded in the Brno City Theatre, followed by a performance of the musical Mamma Mia! On the same day, 14 November 2019, members of the Scientific Council of BUT will conferre honorary doctorates upon prominent persons from the field of science and research. The end of the year is traditionally given over to the Ball of Brno University of Technology, taking place on Friday 6 December at the Brno Trade Fair. Last year with 3,600 guests the event broke the record for attendance and became the largest ball in the republic.

This year's celebrations are accompanied by a special BUT logo where the stylised letter T has been temporarily replaced by the all-explaining number 120. Students and staff of BUT came face to face to face with the new logo starting from January when the restored relief portrait of Antonín Rezek was unveiled during a ceremony. It now decorates the courtyard of the rector's office and reminds us of the credit Rezek has in the founding of a Czech Technical University in Brno.

Interestingly, the foundation decree of Brno University of Technology itself, signed by Emperor Francis Joseph I, cannot be found at BUT. The oldest archive document in the archive of BUT related to the origins of the university is a letter received a few days later from the Governor's Office dated 30 September 1899. "The search for the foundation decree has so far been unsuccessful, although in the past we also turned to the Austrian State Archive in Vienna," stated the archivist Alžběta Blatná.

Even without the most important document for the university, over the 120 years of its existence Brno University of Technology has become a college of some renown. "The first Czech university in Brno was a technically-oriented school, today's BUT. This is inarguable evidence that technical education has always been crucial for the Czech lands and not just in relation to the development of industry. The technical university in Brno continued the tradition of technical education in the Moravian metropolis established 50 years earlier by the Technical School in Brno. BUT is the oldest university in Brno and by the number of students the largest technical university in the whole republic. Let us take the occasion of the celebrations of the 120th anniversary to commemorate our predecessors who never gave up their fight for the first Czech technical university in Moravia," appealed BUT rector Petr Štěpánek. ■

The foundations of Brno University of Technology were laid by the first four professors: Karel Zahradník (mathematics), Jan Sobotka (descriptive geometry), Jaroslav Jiljí Jahn (mineralogy and geology) and Hanuš Schwaiger (drawing).

In the beginning the technical university struggled with a lack of finances: initially it did not even have a building of its own, and the first secretariat of the rector was in a rented room in the Slavia hotel in the centre of Brno.

The first recorded official building of the technical university was the Women's Educational Society Vesna in the centre of Brno – today's Jaselská St. A small room with two windows on the ground floor was the rector's office, rector's secretariat and Karel Zahradník's study room all in one. The two-metre-wide corridor was used by the laboratory staff. The only lecture room was on the left side facing the street and the only drawing room and studies of the professors and their assistants were on the first floor.

The Technical University in Brno changed its name several times. The school was established as the Imperial and Royal Czech Technical University in Brno, later the Imperial and Royal Technical University of Francis Joseph in Brno, at the end of the 1930s it was the Technical University of Dr Edvard Beneš in Brno, in the 1950s it was reduced to the University of Civil Engineering in Brno and since 1956 it has been Brno University of Technology.

FAMOUS PEOPLE

Vladimír Šlapeta: Czech contemporary architecture lacks the strong identity it possessed during the first republic

Vladimír Šlapeta's relationship with Brno has been forged since his childhood. It has been influenced by many factors and peripeteia enough to fill a captivating book of memoirs. We met with the emeritus dean of the Faculty of Architecture of Brno University of Technology and a leading expert in Czech functionalism in the Villa Stiassni. Apart from being one of the listed heritage monuments of Brno's modern architecture, the reason for this choice was the fact that Vladimír Šlapeta had decided to donate his architectural library to the Centre for Renovation of 20th Century Architectural Heritage established a few years ago on the premises of the Villa Stiassni.

Jana Novotná
Photo Igor Šefr and archive of Vladimír Šlapeta

What memories do you have of a childhood in Olomouc under the influence of your architect father?
An interesting aspect of my childhood was the polarity between the modernity of our house, where father did not leave a thing to chance and even designed the piano later made by Petrof company, and the historical architecture of Olomouc. After 1948 father was not saved from serious existential problems, and we were very lucky that our apartment was not very large and that we rented it so we could stay there. The parents tried to give us the best, father listened to the news from Vienna radio, we had visits from interesting people, mainly musicians and artists, and that was a blessing.

What influenced you the most from that period?
I was interested in art, but until I was fifteen I knew nothing but sports. The turning point came at grammar school, I learned well so there was no reason why I should not go on to study architecture.

Was it expected of you?
No, it was expected of my elder brother who, however, saw the vain efforts of my father in the politically difficult time, and he preferred to study camera instead. He became part of the Czech new film wave and made 42 feature films. I went to university nine years later. Brno was out of the question, at that time the installed rector at Brno University of Technology was Vladimír Meduna, a promoter of socialist realism of the Stalinist type, who was responsible for dismissing Professor Fuchs and Professor Rozehnal, so I went to study in Prague.

You worked only two years as an active architect. When did you begin to take an interest in the history of architecture?
During the final years I already jobbed as an auxiliary assistant researcher at the Department of the History of Architecture and I came first in the national student competition in Brno with the subject of enumerating buildings by foreign architects in Czechoslovakia. It included the Tugendhat Villa which was not publicly talked about in those days. I actually compiled the first list of these buildings. When I was finishing my study, Bohuslav Fuchs was preparing an exhibition of his teacher, Professor Jan Kotěra, and he invited me to help him. He had the idea that he would recommend me as an assistant lecturer at the Faculty of Architecture of Brno University of Technology and alongside that I could write a monograph on Fuchs for a publisher from West Germany, the prestigious Bauhaus Archive. Unfortunately, he died shortly afterwards. But he managed to alert me that there would soon be a free position as the head of the architectural department at the National Technical Museum in Prague and I got the job as the museum people did not know I came from an undesirable bourgeois background. So I became the administrator of the largest architectural collection with drawings by Zítek, Hlávka, Kotěra, Gočár, Roškot and others – and that was an enormous challenge. For 18 years I worked on developing exhibition projects which gradually made its way abroad, first Poland, followed by Austria, Switzerland, Germany, England and, in the end, the USA.

How was it possible to export Czech functionalism abroad then?
It was not possible. Furthermore, when I wrote an article they always crossed out the name Šlapeta, so that in the 1970s I published around 40 articles that were not signed. But I was not fond of publishing under initials which would signify a considerable loss of prestige. As a result I started to send articles abroad by post and surprisingly leading architectural magazines around the world would print them. The then head of the Union of Architects wrote to the director of the National Technical Museum saying that I was damaging the country's cultural policy and that he should reconsider my further activities in the museum. Fortunately, the director was able to sense that there was something personal behind that and I was only reprimanded for unauthorised publication abroad, so I managed to overcome the critical moment. A breakthrough arrived in 1983 when I succeeded in exporting an exhibition of Brno's architecture to Finland. The whole story could make the plot of a novel.

Please, tell us more.
The exhibition had been properly planned, but all of a sudden I was told it had been banned as the money for my journey had been used by the deputy director for the disassembly of another exhibition in Dubrovnik, so that he could bathe in the sea. Another odd thing was that I was arranging an exhibition about Brno from Prague. At that time I did something that was against the rules. On the same afternoon I sent off part of the exhibition in photographs to Helsinki and on the next day I told the director that the exhibits had already been sent there, so that it would be difficult to cancel the exhibition. In addition, in those days the ambassador to Finland was Jan Husák, son of the president of the Czech Republic. The director therefore decided that the exhibition would be held after all, but without me. I was just on a trip to Ljubljana and I sent a message to Finland from there describing what had happened. The Finns bought me a train ticket from Prague via Moscow to Helsinki, so that I spent two-and-a-half days on the road but I did an exhibition about Brno including an extensive Finnish-English catalogue. Somehow the catalogue made its way to London and four years later I was invited through Jan Kaplický to the Architectural Association in London to do an exhibition about Czechoslovak functionalism. And that was also my flight ticket to America.

Could you attempt to explain your passion for Czech functionalism?
Firstly, I grew up as part of it, and secondly I saw how its creators were persecuted – Rozehnal imprisoned, Fuchs got a suspended sentence and my father could not be published. So I said to myself that I have to keep the memory alive. Thanks to that functionalism reclaimed the prestige it enjoyed years ago and it has remained a subject of interest to this day. It was not strictly Czechoslovak architecture – I included the whole of Central Europe. For example, last year I was invited by the German ICOMOS to present the key speech at a congress about Berlin at the time of the Iron Curtain and to compare architecture from West and East Berlin.

For the first time in Brno in September 1958

Thanks to your contacts abroad you were elected dean at the Faculty of Architecture of the Czech Technical University in Prague after the Velvet Revolution.
Things were not simple during that period. It was necessary to engage people from practical architecture and at the same time treat the existing staff sensitively to maintain continuity of education. I opened up the school to relationships abroad which I had established before. If I went abroad and held a lecture somewhere it naturally increased the school's prestige and the interest in studying there.

Did you exchange impressions with Ivan Ruller who was dean in Brno at the same time?
Naturally, and not just about architecture. It was said at that time that the co-operation between the Brno and Prague schools was the best in history. Our relationship was also manifested by the fact that when Ruller ended as dean he proposed to me that I apply for the post as nobody was elected in the ballot. And so in 2006 I became dean in Brno. I spent a total of 13 years with an activity which is attractive at a superficial glance but in reality is a double-edged gift, I was happier in the museum. I also told Jan Kristek on his recent appointment that he was mounting an unsaddled tiger.

How did your relationship with Brno form?
Father loved Brno. He spent there the time between the ages of 15 and 19, when his teacher at the technical college was Jaroslav Syřiště, he attended unforgettable concerts and operas of Leoš Janáček, he watched the first magnificent buildings by Wiesner, Kumpošt and Fuchs rise. They were also the strongest impression that I kept from my first Brno visit in 1958, as were the first neon lights on Kobližná Street. Later I got to Brno with a recitation circle at grammar school and during my studies at the Czech Technical University in Prague I would travel there for interesting architecture. It was obvious that something was happening there – everyone was a pupil of Rozehnal or Fuchs and a new wave emerged: Viktor Rudiš, Ivan Ruller, Zdeněk Ďurpekt, Jaromír Sirotek, Milan Steinhauser, Zdeněk Řihák and others. Myself, I would also go there to meet Bohuslav Fuchs and Bedřich Rozehnal and after several years I submitted my dissertation thesis to the Brno Faculty of Architecture. It was taken over from me on 8 November 1989 by Miroslav Martinek who intended to help me as a non-party member to pass a doctoral dissertation which could not go through in Prague. As a paradox I later defended the work as dean at the Prague Technical University when Martinek was no longer dean at the Faculty of Architecture of Brno University of Technology but I never forgot his friendly gesture.

A new generation of architects was growing up in Brno even in the 1980s: Aleš Burian, Gustav Křivinka, Petr Pelčák and others. I helped them start a series of lectures in the Stavoprojekt company and organise two successful exhibitions – on the 85th birthday of Vladimír Karfík and on the 85th anniversary of the birth of Bedřich Rozehnal. So the relationship with Brno and collaboration were permanent. It was great that Ivan Ruller was still there as he knew the previous generation and would have been able to smoothly operate under the conditions of the first republic which he learned by watching his father. Incidentally, I got acquainted with Ivan Ruller at the funeral of Bohuslav Fuchs in September 1972. I had no idea then that one day I would take my leave of him on behalf of us all in the Church of St Augustine.

Today we admire what our predecessors built but how do you evaluate our post-revolutionary architectural achievements?
There are a number of high-quality works to be sure, but they do not possess the power of first-republic architecture. When you say Spain, Portugal or Finland, people recall a particular style, but in our country there is no strong identity today, such as that we had during the first republic. At that time architecture was a component of state identity, and an important role was also played by the high culture of the builders.

Over several years you have been moving your architectural library to the Villa Stiassni in Brno. Why this place among many?
It started when I was dean in Brno and the National Heritage Institute succeeded in acquiring the Villa Stiassni. It was then that the idea of making it a centre of architectural research arose, and it was also an opportunity to establish a research library there where my own library would play a priority role. I wanted it to remain homogenous and the chance was there. When I go from Prague to Brno I always carry two bags of books, so far it has been about 9 thousand volumes, some books were left after my father and uncle. We have even put up a section of the living room of our family in the villa, a corner with seating designed by my father with upholstery by the AKA company run by Bohuslav's family. Now I have a piece of my home there. ■

Go beyond the limits of what you know and of yourself, challenges Marie Illeová from Airbus Hamburg

She is probably our best graduate in the past 30 years if not ever. This is how Miroslav Píška, director of the Institute of Manufacturing Technology and head of the Department of Machining Technology at the Faculty of Mechanical Engineering BUT praises the graduate Marie Illeová. She has been working for seven years in the senior management of Airbus Hamburg, most recently in the digital transformation project team where she concentrates on the sales activities of the company and the transformation of company culture. Always loyal to BUT she is grateful to her teacher that he did not renounce her when she boldly stated that technology was not for her.

Jana Novotná
Photo archive of Marie Illeová

What led you to study at BUT?
My love of mathematics and geometry. I must own up that my father and brother are technical university graduates, which might have influenced me in my decisions.

How was your interest in manufacturing technology shaping up?
I wanted to devote myself to pure mathematics and its application in industry, so for the first two years at BUT I studied mathematical engineering. I became interested in studying general manufacturing technology when I happened to meet French students and learned about the possibility of studying abroad under the Double Degree Industrial Engineering program in France, otherwise nobody would have made me go there. This brought me into contact with Professor Píška and it was hand in glove. I was very impressed by his approach where he tries to apply theoretical knowledge to practical examples and challenges students to collaborate in practical applications. After two years of mathematical engineering I prolonged my studies by a year, completed the missing mechanical engineering courses and in the third year took off to France.

What were the benefits of your stay in France?
For me, the double degree studies opened up the door to the world and to myself. I am convinced that going on a stay abroad makes you much stronger – you have to quickly adapt to the new conditions, such as a different rhythm of study, a foreign language and cultural customs. What you consider to be a given is not so for other nations. I suppose this played a key role in my development and the ability to adapt which today is one of the key competences in companies. While your knowledge does not matter so much these days, it is important how you can use your creativity, how quickly you are able to learn or un-learn something and learn something else instead. In this respect the double degree was great school.

How did it feel when you had to decide after receiving an offer from Airbus Hamburg?
At that time I had an excellent position with a French company in Brno, but I felt it was time to go out somewhere again and learn something new. Germany was not my dream destination, I was rather tempted by Canada. But when Airbus offered me a job in Hamburg, I said to myself why not. And I don't regret it at all, although the beginnings were not exactly easy. I needed to quickly understand how such a big company employing 140,000 people around the world works so that I would be able to bring some value to Airbus. For the first three years I was going round suppliers and helped improve production and quality, during which time I gained a deep insight into various industrial processes.

Do you have an idea how many Airbus employees are from the Czech Republic?
In Airbus Germany there are over 70 different nationalities but only a few of them are Czech. I did not look for national relationships, but shared values. I know only one Czech here, by coincidence also from BUT.

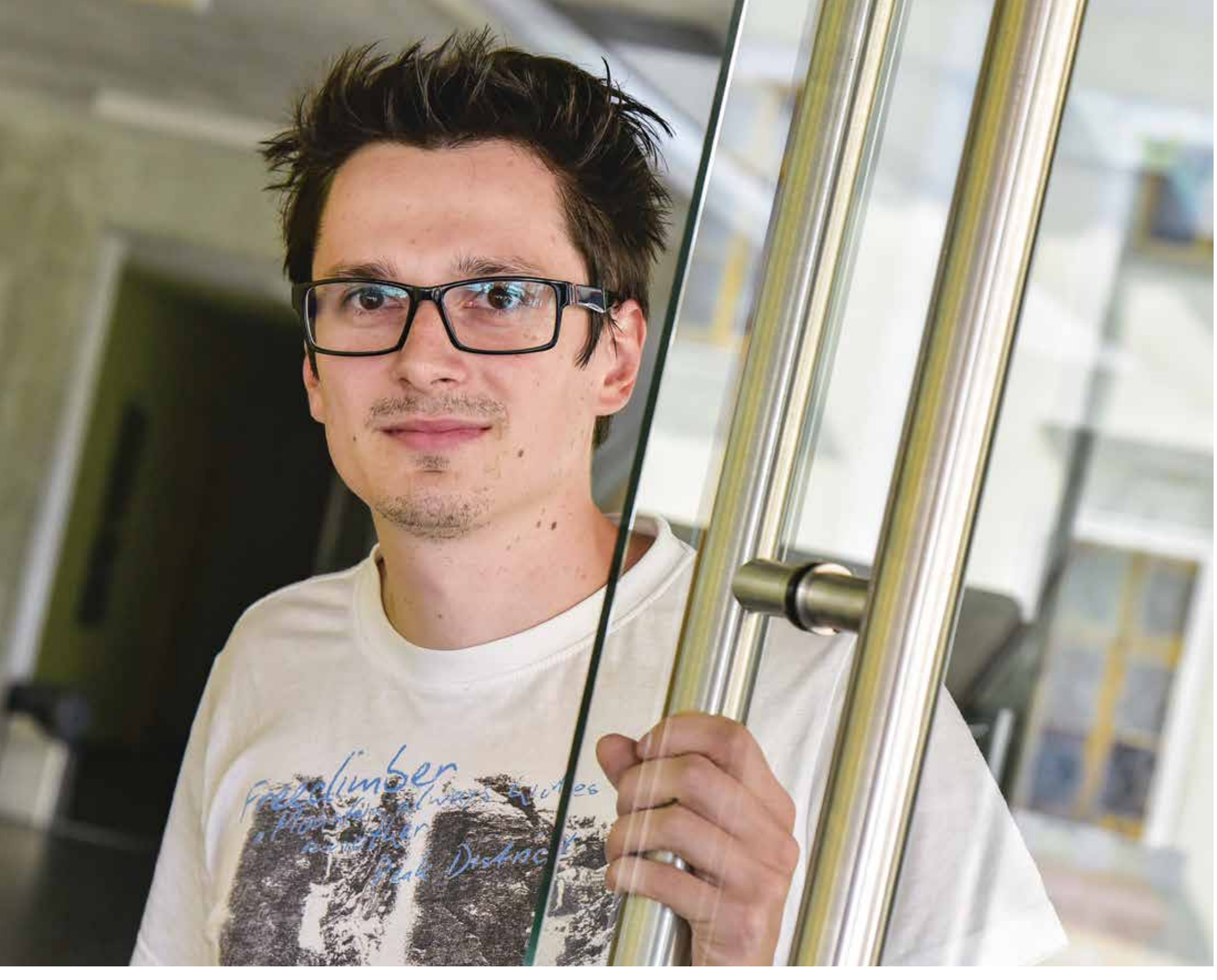
It's more than a year since you have been involved in the digital transformation project where you take care of company culture. How are your new steps accepted by your colleagues?
Optimisation and issues of changes in internal processes have always interested me, so it was an easy decision when Airbus launched the great digital transformation project a few years ago. My present function is primarily oriented on the "soft skills" – a change in the company culture and communication.

Today, and in such a big company as Airbus in particular, communication is a crucial tool if you want to achieve any change. We use agile methodology for all new digital projects – this is a change in itself. We are no start-up that quickly changes its structure, but we can be inspired by how such teams work. I help teams to concentrate on what we can do in a different way, where we can optimise something, how to better use "collective intelligence", where Airbus is heading, what the positions in the company will be like in five years...

In connection with Airbus there is often talk about the tough commercial war with Boeing – does this affect the atmosphere in the company and the thinking of the employees?
Competition is all important, if you want to move further. We are grateful for Boeing, as it continually forces us to make innovations and achieve more effective manufacturing. Without such a partner we would not develop so quickly.

Is it possible to stay with Airbus for a whole professional career?
In Airbus it is definitely possible to stay for a whole lifetime as it's incredibly easy to change your position. Otherwise I would never have been able to get to my work which is on the boundary between HR and communication.

Is it possible with your experience to return home and find a comparable job in the Czech Republic?
In the future I remain completely open to new possibilities, I'll see what comes along. Rather than where I work I am particular about the content of my work. If an opportunity arises I will be glad to return to the Czech Republic and deal with company culture and the impact of the working environment on life. ■



PROJECT

The OneProve mobile application will distinguish a forgery from the original

Just one or two photographs with a smart phone and the OneProve application is able to evaluate whether you hold an original or a forgery in your hands. It will identify imitations of paintings, brand handbags, clothing or legal documents. The application which links up artificial intelligence with mobile technology is the first of its kind in the world and scientists from the Faculty of Information Technology BUT are working together with others on its development.

Hana Marko
Photo Igor Šefr and archive of OneProve

At the beginning there was the Artstaq internet art exchange, founded several years ago by Roman Komárek. He soon discovered that while the purchase of a work of art is usually a good investment, people do not have confidence in buying paintings online. This is how the OneProve startup came about. "Its founders came to me and asked whether a solution using artificial intelligence could be invented for distinguishing an original painting from a forgery. To have trust in online purchases and make things simple for the buyer," described Kamil Behúň, a doctoral student from the Faculty of Information Technology. Now he is one of the three founders of the start-up where he is responsible for technical development. If a problem occurs, he looks for advice from his colleague from the faculty, Professor Adam Herout, who works as a consultant in OneProve.

The application uses an algorithm that evaluates the structure of a photographed detail of a painting and compares it with the original in a database which has already been verified by an expert as genuine. "For the evaluation of a painting we need to see both a photograph of the complete work and its detail capturing its unique microstructure which is very difficult to imitate. For example, in paintings it is the brushstrokes, the way the paint runs or the imprint left behind by the brush hair. There is no falsifier that could precisely imitate that," explained Behúň.

The resolution of most of today's mobile phone cameras is sufficient to enable the developers to programme the application so that it is as simple as possible for the user and there is no need to buy any additional equipment. "For us it's technically more difficult as our algorithms have to cope with more than if we relied on our own sensors instead of telephones. Even so we have achieved excellent precision. We are able to distinguish between paintings as well as various other imitations of materials, including textile, leather and paper," added Behúň. According to him the application can even differentiate between two printouts made on the same printer and the same paper. It will recognise the different microstructure of two sheets of paper and the way the ink blots on them. In the future the application may be applied in verifying the authenticity of various documents and certificates from lawyer's offices.

Although the original purpose of the application was to help people with online purchases of paintings it shows that it is useful for a much wider circle of users. "An example is owners of galleries or individual collectors of art. If they lend a painting for an exhibition somewhere for two years they want to be sure that the same piece will be returned into their hands. Thanks to the application they can verify this in a simple way," says Behúň. Other users may include delivery companies that transport the paintings. At the beginning they will take pictures of the painting at the seller and if the same work does not reach the buyer, it is much easier to trace in which part of the purchasing process the painting was lost and who bears responsibility.

OneProve is making a track through the art market and has established co-operation with many galleries around the world, as well as large auction houses in the USA and Switzerland which examine whether famous works are genuine. Today the database contains several thousand verified paintings, among the better known Czech painters there are paintings by Jan Kotík. However the roll out of the application is not running as quickly as the founders initially hoped. "It takes time as we are trying to push forward a revolutionary solution in the domain of art which is a very conservative environment. In addition it is governed by corporations and approval processes take a long time. The application is often used in art by people who are not on good terms with technology, and its control has to be very intuitive. But the time we now have gives us a chance to process feedback from users and include modifications to leave them satisfied," assessed Behúň.

In the future OneProve will not concentrate solely on works of art but also on the market in brand fashion goods and legal documents. The developers are working on prototypes of the application for those areas. "The solution that we are offering is truly genuine and can be applied in various sectors. Whether it is jeans, purses or handbags. There are other applications, such as the one for verifying brand handbags, but it requires a special camera for taking pictures of the material and uploading the picture to the database. We have greatly simplified the whole process," explained Behúň. He also confirmed they were in negotiations with several business partners who sell brand-name clothing and in the future they expect that large foreign e-shops, such as eBay or luxurious fashion brands should be interested in the service. Investors also see the future of the start-up positively and OneProve can choose. Last year it received a massive subsidy from the STRV development company and was supported by the mr Fund. ■

AWARD

After winning the New Flying Competition the Chickens from Brno University of Technology have teamed up with the Czech Technical University in Prague

The BUT Chicken Wings flight team from the Faculty of Mechanical Engineering has had a very successful year. In September 2018, four years after the team's inception, the young designers came first in the international New Flying Competition in Germany. Afterwards, the ambitious students from Brno joined forces with their colleagues from the Faculty of Mechanical Engineering of the Czech Technical University in Prague and together they took part in the Air Cargo Challenge 2019.

Radka Španihelová, Faculty of Mechanical Engineering, BUT
Photo archive of BUT Chicken Wings

In the air, a wingspan of five metres, on the ground, just under a metre. It was this reduction of the wingspan along with an original crank gear developed by the Brno students from the BUT Chicken Wings team that most impressed experts from the jury of the international New Flying Competition. The competition is organised by the Airbus and Lufthansa companies in collaboration with the Neues Fliegen e.V. students' association from the Hamburg University of Applied Sciences.

"The assignment was difficult in that it offered several alternative solutions. We spent the first weeks of work drawing sketches, making calculations and testing our theoretical presumptions. In the end we decided to develop an original mechanism that makes it possible to fold the wings of the aircraft alongside the body after landing. The crank mechanism that also uses the supporting struts as kinematic members is capable of reducing the wingspan from five metres during takeoff to 0.92 metres while parked," explained Filip Stanislav, head of the Wing section and student of the Faculty of Mechanical Engineering.

In designing the mechanism of the aircraft named Shark the students primarily concentrated on the maximum wingspan reduction as this criterion had the greatest weight during the assessment. "The method of wingspan reduction developed by us does not simultaneously increase the other dimensions of the aircraft, i.e. length and height. The complicated nature of our mechanism mainly consists in the necessity of precisely observing the positions of all moving parts and achieving sufficient rigidity. In case of any imperfections the designed motion kinematics ceases to work and the forces in all the components of the mechanism start to increase. This technical solution caught the attention of the technical commission and helped us win the competition," said the body designer Jan Rohánek.

The competition in Hamburg was also attended by teams from Germany, Mexico, China and Azerbaijan who all presented their aircraft. "We had an opportunity to study the advantages and pitfalls of the different solutions. The climax of the whole four-day event was two competition flights. In the first the teams showed the performance characteristics of the aircraft. Chicken Wings proved its qualities and came first far ahead of their competitors. The second flight concentrated mostly on the resistance of the structure under the prescribed loading of +3G in a sine-wave flight three times in a row," explained head of the team and pilot Tomáš Trojánek. Although the team ended up with a minor penalty in the second flight, in the end BUT Chicken Wings celebrated overall victory.

The team of 20 students at the Institute of Aerospace Engineering of the Faculty of Mechanical Engineering devoted the complete academic year 2017/2018 to designing and building the aircraft. "The preparations were quite strenuous. We worked on the concept of the aircraft during the courses and outside of them and spent almost all weekends building the aeroplane. The greatest challenge was the complexity of the collapsing mechanism which required the utmost precision in the making of all component parts, and last but not least the financial aspect of the project. To build Shark we used composite materials, plywood, balsa and aerospace aluminium alloys," added Tomáš Trojánek.

Invigorated by the new experience and success the team set out to prepare for the new season. There was quite a few changes. The quintessential one was an expansion of the team, which so far had a base only among the students of the Faculty of Mechanical Engineering in Brno, to include students of the Department of Aerospace Engineering at the Faculty of Mechanical Engineering of the Czech Technical University in Prague. From the original five founding members the team grew to up to eighteen working at Brno University of Technology and six new members active at the Czech Technical University in Prague. Together they started to prepare for the Air Cargo Challenge international competition which was held this year in August in Stuttgart, Germany.

The competition involved 27 teams and Chicken Wings with their concept of the new aircraft called FausT came 7th in the end. Just four days before departure for the race the team members had to face a grave problem – during final training the aircraft suffered fatal damage and the young designers had to build it again. There was exactly 96 hours between the destruction of the aircraft and the repeated maiden flight. In Stuttgart FausT successfully passed the technical inspection and in the race flights it finally claimed 7th place among international competition. The designers are particularly proud of their own system of weight loading which was among the best and they are determined to come back next year and win. ■

BUT Chicken Wings

The student team was established at the Institute of Aerospace Engineering at the Faculty of Mechanical Engineering of Brno University of Technology in 2014. In each academic year the team designs and builds a model of a small pilotless aircraft with which the young designers take part in a selected international competition. The team consists of about 20 students who devote their free time to the project. The principal aim of the competitions is to develop theoretical and practical skills of aerospace engineers early during their university study. The students work on the projects for free outside their school duties and they are helped in covering the cost of building the aircraft by sponsors.

www.chickenwings.cz

The surveyor Viliam Vatrt from the Faculty of Civil Engineering of Brno University of Technology was the first to calculate the globally recognised point 0

Professor Viliam Vatrt is nicknamed the 'Dobruška Newton'. He was the first in the world to succeed in calculating the W_0 constant which determines the unified start point of all above sea level elevations. The constant finds its application both in surveying and in military or aviation matters. It has helped astronomers unify world time and it can be used to determine how quickly the ocean level is rising or where potable water can be found in the earth. W_0 is written in the tables of basic physical constants next to Newton's gravitational constant and the speed of light.

Hana Marko
Photo Igor Šefr

Calculating elevations above sea level has always been a problem – due to the irregular distribution of mass in the Earth, the differing salinity of the seas, the prevailing wind direction and the gravitational effect of the Moon and the Sun, the elevation of the sea surface is generally not equal to zero. Regardless of this, groups of states have established elevations based on the nearest sea, where the apparatus for recording average sea level, so-called mareographs, is situated. As a result, there are more than 200 different elevation systems in use today. Their unification could be facilitated by the W_0 constant which is the global ideal mean elevation of sea level.

In the Czech Republic, elevation above sea level has been measured based on the level of the Baltic Sea since 1957. The so-called Adriatic elevation system which had been used earlier is as much as 0.42 metres higher within the territory of the Czech Republic compared to the Baltic system. Consequently, there are several answers to the question of how high is Sněžka mountain. According to the Baltic Sea the highest Czech peak is 1,603 metres, while according to the more precise Vatrt's constant it would be 12 centimetres higher. Even more radical recalculations would be experienced, for example, in France where the elevations would have to be reduced on average by about 60 centimetres.

"Calculations of elevations above sea level related to different mareographs are fairly imprecise due to their local elevations. And each sea has its own specific characteristics. In Amsterdam the wind systematically raises the level of the North Sea. The Adriatic Sea has a certain salinity which influences the elevation of its surface. If you compare the elevations of various mareographs the difference may be up to two metres," explained professor Viliam Vatrt from the Institute of Geodesy of the Faculty of Civil Engineering BUT. Twenty years ago he succeeded in calculating the W_0 constant, which is a parameter characterising earth's body, while working for the Military Geographic and Hydrometeorological Institute in Dobruška.

Admittedly, the theory of the W_0 constant has been known since the 18th century and at the beginning of the 20th century its value was established with a precision of the order of 100 metres. But it was Vatrt who introduced it into practice when processing data from satellite systems and who defined the constant with a precision of up to 5 mm. "It was a great adventure. Like solving a puzzle which no one has decoded before. When our calculations were proven to be correct I was glad that all those working Saturdays and Sundays were not wasted," added Vatrt describing his joy from the discovery for which he received the Czech Brain Award in 2011. Shortly afterwards the United States, Canada and Mexico started to use the W_0 constant as the basis of their elevation system. It has been adopted almost immediately by the International Astronomical Union for which the constant helped coordinate time measurement. In astronomic observatories they use so-called atomic clocks which count seconds with a precision of multiple decimal places. However, due to the effect of gravitation their time flows at different elevations with different speeds. "Observatories are usually situated on elevated mountain locations and in the past they always determined their elevation relative to the local sea, so that it was not precise. And before nobody was able to establish the difference in elevation above sea level, for example, between an observatory in Argentina and one in Switzerland. Each of them maintained that their time is correct but it did not work," said Vatrt explaining that if time is to pass with the same speed around the whole world it is also necessary to harmonise the elevations of all atomic clocks and define them with regard to the same elevation start point. This was enabled by introducing the W_0 constant.

Apart from astronomy and surveying the discovery of the exact value of the W_0 constant has practical applications in many other disciplines. For example, in aviation it can contribute to more reliable operation and to making landing manoeuvres in adverse weather easier for pilots. "Pilots continue to use the barometer which is a hundreds of years old technology. As the unified elevation system has not been introduced across the globe yet the pilot has to calibrate data concerning current air pressure with the control tower – otherwise their difference could be as much as 100 metres. Unification of the elevation systems by means of the W_0 constant would enable safer and denser air traffic," added the professor from BUT. Thanks to the constant scientists were also able to calculate that the ocean surface is rising on average by as much as 3.4 mm per year due to the climate warming. Vatrt's constant plays an important role in military applications where the unified elevation system allows for more precise determination of the elevation of the target during bombardment. "If an object is to be bombarded it is important that the soldiers hit the right spot. This is partly ensured by the GPS positioning system. However, the released bomb does not fall vertically, but usually flies at an angle and is supposed to hit the target at a certain elevation. If the elevation is determined incorrectly, the bomb can fly over or fly short and hit another object," explained the scientist.

One of the most recent discoveries in the application of the W_0 constant is prospecting for raw materials under the earth's surface. Using the modified VTT (Vatrt Team Technology) method Vatrt manages to identify density differences in the ground under certain conditions. After consultation with geologists it is possible to determine the type of the raw material before starting deep drilling. "Thanks to the constant we are able to calculate whether there is lacking or additional mass on the site. If we arrive at a positive number, we know that something light, such as water or gas, could be there," added Vatrt, outlining the method which made it possible to find water in the dry regions of Ethiopia. According to him, the same principle could be used in searching for raw materials on other planets. ■

Mathematician of the Faculty of Mechanical Engineering commemorates Kurt Gödel with an educational trail

According to Jan Pavlík from the Faculty of Mechanical Engineering only a few people know that Brno was the birthplace of a mathematician whose significance for the world of science is comparable to that of Albert Einstein. Yet, Kurt Gödel is presently commemorated in his home town by a small gray plaque at a tram stop on Pekařská Street. Jan Pavlík would like more people to know about Kurt Gödel and his importance and has come up with an educational trail project.

Zuzana Pospíšilová
Photo archive of Jan Pavlík

Jan Pavlík from the Faculty of Mechanical Engineering BUT would frequently come across the name of Kurt Gödel during his studies. "But it was as a student of mathematics. It was impossible to avoid him there. He came up with results that shook not just mathematical logic but mathematics as a whole. They also had an impact on physics and even philosophy," added Pavlík. In his opinion Gödel's importance for science is comparable to that of Albert Einstein.

Kurt Gödel, who was born in 1906 on Husova Street in the house which is now the seat of Brno City Council, is only recalled by two small plaques: "The first memorial plaque is at a tram stop. It is gray on a gray background which makes it virtually invisible and even people who are searching for it do not have much chance to spot it. It can hardly catch the eye of a passer by. As a result the number of people who would know about Kurt Gödel is not increasing," says Pavlík. The second memorial plaque can be found on Pellicova Street, to which the Gödel family later moved.

Jan Pavlík has thought of a more attractive way to inform people in Brno about the world-renowned mathematician and his work. "I propose a trail in the park where Kurt Gödel used to play as a child. It would have ten stations in the form of display boards explaining what he did, what made him famous, and how he contributed to science. As he was primarily interested in logic, each board might contain a logical problem that would demonstrate his results," described Jan Pavlík, who worked on the idea together with the director of the Brno Observatory and Planetarium, Jiří Dušek.

"Some object that Kurt Gödel was not Czech. That is true. He was born at the time of Austria-Hungary and the Gödel family spoke German. But he was born in Brno and completed elementary school there. In addition, as somebody who is so important for the world of science it makes sense to commemorate him with a number of marked trail stops at least," argued Jan Pavlík.

In the end the forgotten scientist has been brought to the city's attention, although in a different way. Since August 2019 one of Brno's streets, specifically the last turning to the right off Pekařská St, before Šilingrovo square, has been named after Kurt Gödel. In the future this act will be followed by a campaign called Kurt na furt (Kurt Forever) with the aim of making this Brno native even more prominent in the public's eye. As early as 2006, a lecture room bearing Gödel's name was opened on the occasion of the centenary of his birth at the Faculty of Information Technology of Brno University of Technology. ■

AWARD

Photo archive of Siemens Czech Republic

Veronika Grézlová received the Werner von Siemens Award

A graduate of the Faculty of Chemistry BUT, Veronika Grézlová, who now continues with a doctoral study at CEITEC BUT, ranked third in the Best Diploma Thesis category in the Werner von Siemens Award competition. Her work – Optimisation of Antibacterial Properties of Polymer-Phosphate Bone Fillings – received the prize in this year's 21st edition of the competition, in which Czech Siemens awarded projects in technical disciplines and natural sciences.

In her diploma thesis Veronika Grézlová examines the substitution of antibiotics in injectable bone cements by non-metal nanoparticles of selenium. The results of her work can be used in reconstruction surgery, ortophedy, traumatology and implantology. Bone cement with selenium nanoparticles can help replace antibiotics and prevent development of resistance or allergy. As the effect of antibiotics during oral application is systemic, a greater dose needs to be administered repeatedly. During the application of bone cement only one dose with slow release of antibacterial selenium might suffice. The new antibacterial bone cement can be mini-invasively applied by injection to fill bone defects, or during gluing implants or splintered fractures.

(ed)

Iveta Černá: The Tugendhat Villa suffers from visits by the public, but that is its mission

Jana Novotná
Photo Igor Šefr

Whatever happens in the future, she will be forever inseparably connected with the Tugendhat Villa. A graduate of the Faculty of Architecture of Brno University of Technology and director of the Tugendhat Villa, Iveta Černá, spent the first fifteen years of her career in the National Heritage Institute in Brno. After she received an offer which she couldn't refuse she moved from the freshly reconstructed building in Freedom Square to the shaky ground of an architectural heritage monument which rather than a construction site reminded one of a battlefield.

The Tugendhat Villa is your child, destiny, lifelong work … Do you see it like that?
Yes, it is like that, sometimes I talk about it as the apex of my professional career. The position is really unique and I had a chance, so to speak, to raise my child to adulthood – I was there throughout the whole period of the house's reconstruction and had an opportunity to reveal its mysteries.

What nurtured your interest in architecture?
In our family the disciplines of civil engineering and architecture are nothing exceptional. In addition I had an affinity for visual art so it was no problem to pass the talent examination at the Faculty of Architecture. A kind of a sign of my orientation towards the areas of architecture theory and history manifested itself during my specialisation in the final two years of study, which I spent at the Department of Heritage Monument Reconstruction and Protection.

Have you ever pondered the career of an active architect?
Yes, I did. An exceptional teacher is often capable of arousing an intense interest and in my case such a unique person, Alois Nový, was on the staff at the Department of Industrial Plant. He was the supervisor of my competition project with the subject of a solar refrigeration plant and for a certain period it was a real possibility that I would design buildings. I also gratefully remember Jaroslav Drápal, who influenced me in the theoretical field.

After school you spent 15 years in the National Heritage Institute.
I joined the department which took care of the Brno agglomeration and I was lucky to be in the company of older colleagues who selflessly dragged us, young apprentices, through construction sites, down excavations and up scaffolding to get hands on experience in natura. But I also got to interwar architecture through the work of Zdeněk Kudělka at the Art History Department of Masaryk University, which I later attended. It was then that I began to specialise in the 20th century. Thanks to the practical training in the National Heritage Institute I was able to capitalise on my knowledge of theory and history as well as the technology of restoring the structural substance and details. The preparation work for the restoration of heritage monuments which included quite sophisticated multi-professional surveys and analyses was also important.

When did you come to the Tugendhat Villa for the first time?
I became acquainted with the Tugendhat Villa at the end of my career in heritage protection, when as a specialist in the 20th century I was asked, together with experts from other institutions, to collaborate on creating the nomination material of the Tugendhat Villa prior to its entry in the UNESCO list. We worked out relatively complex material and it was announced that the beginning of the new millennium would be born in the spirit of a possible inclusion of 20th century architecture on the UNESCO list. When I came to the Tugendhat Villa from the new building of the National Heritage Institute it was a minor shock. Diagonal cracks indicated that the garden terrace was damaged by structural load, the in-house drainage caused massive leaks in ceiling structures, the house was not furnished, apart from a few items – and this was the initial state when the whole process of reconstruction and preparations for it began.

The beginning of the reconstruction was marked by arguments. What were you able to influence from the position of your function and what not?
The arguments concerned two unsuccessful architectural competitions with the ensuing legal repercussions, searching for sufficient funding and grants. As a consequence we were delayed by seven years against the originally projected deadline but the time was put to good use. Under expert supervision by the Faculty of Restoration in Litomyšl we organised international restoration campaigns during which we carried out analyses of the individual material substances. It was established that the authenticity level of the original substances reached the 90% mark which confirmed the legitimate position of the house as the most original work by Ludwig Mies van der Rohe in Europe.

After those seven years of delay the actual reconstruction work was completed within a record time of two years.
Yes, it was. A type of grant, the so-called Integrated Operational Programme EU, which had just appeared, promised 100% financing of prepared projects and during the endless process of delays we reached a phase when we were really ready. Alongside the project documentation, including a building permit, we had a massive collection of surveys and analyses which identified both the authenticity and the method for restoring the individual sections.

Did you make any surprising discoveries during the work?
For example, we found fragments of the original glazing from the glassworks in Chudeřice near Teplice. The Torfoleum isolation material made from a peat basis strengthened by cattle hair indicated German provenance from the Bauhaus art school. All in all, the only Czechoslovak products were glazing and ceramics. A great surprise was the discovery of the original veneer from Malagasy ebony found in the Faculty of Law which, based on evidence, came from the dining room of the house. We made many discoveries and revealed many new stories but even so the villa continues to hold some mysteries.

Did you ever doubt that everything would be completed to deadline?
We were telling ourselves that when the villa had been built in 16 months, we might manage to repair it within 20 months, but on the other hand things kept changing even during the work. We expected that the preserved elements would be restored directly on site, so as not to move them, but then it was not possible for practical reasons. Everything was complicated by the fact that it was impossible to establish a material storage site on the street so that material transport was done by a crane which carried the material over the house into the garden for short-term storage and then back. Great complications were caused by the repair of the staircase and the garden section of the house. Due to drainage leaking into the sub-foundations they were sliding into the garden and it was necessary to reinforce the whole foundation system. Mies used a unique triple vertical foundation where instead of pilots he opted for basement wells, and this complicated system supports the unstable material composed of tertiary clays on which the house is erected. Consequently we had to deepen the whole basement structure. The original plaster layers were taken down and stored in the same way as Renaissance frescos and after a year they were returned to their original place. As Mies says, God is in the detail, and our God there was authenticity. We learned an awful lot.

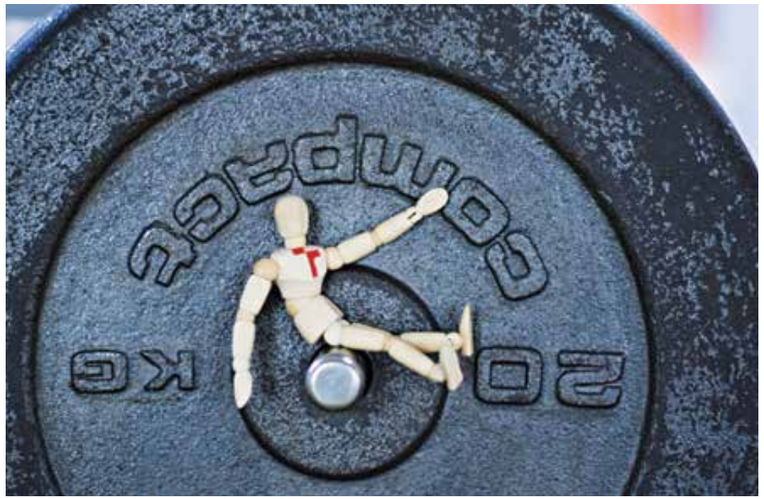
You say that today around 50 thousand people pass through the house over a year. This must put it under great stress.
Yes, it does, and the villa consequently requires continual care. To take an example, the lino made in an original German factory has become worn out over the six years of operation. In the same way we have to repair the special interior plasters several times a year, and all of these are the negatives that the operation brings with it. But we face up to the challenge as the reason for the whole of this complicated process was to open the villa as an installed heritage monument of modern architecture to the public.

Do you have any time at all left for some other heritage monuments of Brno functionalism?
Definitely, and not just functionalism. I am currently engaged in the Arnold Villa project. The villa belongs to the former first colony of houses built on the slope in Lužánky at the beginning of the 20th century. Next to the Löw-Beer and Arnold Villa there is the Giskra Villa and other buildings and we have the idea of connecting them by gardens into a single precinct and allowing visitors to take a walk through a peaceful park with arbours in the centre of the city. ■

A new study programme combines sports and modern technology

The introduction of a new bachelor's study programme, Sports Technology, was preceded by a questionnaire survey among students potentially interested in the programme on the one hand and companies and sports associations on the other. The survey confirmed the considerable demand for an education programme combining the study of modern technology at the Department of Biomedical Engineering FEEC and sports in the Centre of Sports Activities BUT.

Interested students became acquainted with the new programme in February during the Open Door Day at the Fitcentrum Machina in the campus at Pod Palackého vrchem. Future graduates from the course, which is unique in the republic, can find jobs in the development of new sports technologies, such as smart wristbands, tachographs, motion sensors or in-body systems for whole body diagnostics. At present secondary school students may apply for the bachelor's study programme, while accreditation for the follow-up master's programmes is being worked on by experts from CESA and FEEC. ■



(ed)
Photo Oto Janoušek

Are we in for a breakthrough discovery at the Fluorescence Spectroscopy Laboratory?

Markéta Skopalová, Faculty of Chemistry, BUT
Photo Igor Šefr

A microscope with globally-unrivalled parameters and a freshly received international grant as part of unique co-operation with scientists from Taiwan. These are the brief characteristics of the Fluorescence Spectroscopy Laboratory within the BioKol research group and its member Filip Mravec from the Faculty of Chemistry of Brno University of Technology. One of the domains of this graduate physical chemist is applied quantum mechanics at the level of fluorescence phenomena which allow us to investigate both standard chemical and biological systems.

"Compared to other techniques, such as detailed electron microscopy, fluorescence is irreplaceable due to its ability to examine living cells," says Filip Mravec introducing the fluorescence microscopy method. It can be used in a number of operations including DNA cloning. In terms of the practical application of this method Filip Mravec stresses the importance of establishing the length of life of the fluorophore. "Making conclusions only based on stationary fluorescence, measurements of spectra, analysing colours, without the period of life is grossly misleading," explains Mravec. According to him, it is only by investigating the length of life of the excited state that we can clearly say whether something is happening with the fluorophore.

It was exactly about this part of measurement that the Brno chemist lectured at Taiwanese universities two years ago and he is to repeat his visit soon. It was there that, thanks to Miloslav Pekař, who is the main representative of the BioKol group, the co-operation on which the newly-received research grant of Filip Mravec is built, was born. It is shared with the Taiwanese Professor Chien-Hsiang Chang from the National Cheng Kung University in Taiwan. "Within the grant we nicely managed to combine our specialisations. The Taiwanese partner has so-called surfactant IPA systems, we have hyaluronan and fluorescence," says Filip Mravec describing the newly established cooperation that should run over three years under the framework of the international grant. Alongside fluorescence techniques the scientific focus of Mravec is the biopolymer hyaluronan. He concentrates on its physical-chemical research, application such as in the form of wound-healing preparations or its interaction with aminoclays, giving rise to hybrid systems that are interesting from the point of view of creating new carrier systems.

At the end of the long road, part of which is the newly-received research grant, there could be a system for the distribution of medicines: "We create nanostructures for the purpose of transporting a concrete single substance to a particular place, but we try to imagine there could be a universal system that might carry substances with different properties. Among them, for example, medicines or nutritional substances," says Mravec presenting the grant and adding that the existing

systems are both expensive and very demanding in terms of their preparation.

At the basis of the newly-established cooperation is long-term research by Chien-Hsiang Chang, during which he inseparably joined two single-chain surfactants by removing the counterions. The resulting carriers are physically-bonded vesicular structures (IPA), the cost of which is a thousandth of that of the substances used at present. The materials which are several times cheaper and, in addition, allow for combinations of different surfactants at various ratios enabling scientists to create made-to-measure customised materials. The huge advantage of the surfactants is their availability and stability. They are substances which occur in soaps and detergents for everyday use. In an aqueous environment they will generally form something like nanoballs – micelles which are capable of absorbing part of the dirt not washable by water and then they are washed away together with the dirt from the body.

For the time being the greatest disadvantage of the said system is toxicity. This is also the reason for Chang's linking up with the Brno laboratory and their research into the biopolymer hyaluronan. At the moment when the system is unstable, it will start to fall apart and the individual surfactants will be released from it having toxic effects. The Taiwanese scientist is therefore attempting to increase the stability of the system by adding various substances, such as cholesterol. The task of the Czech team is to determine whether the added cholesterol is evenly distributed in the membrane of the vesicular system, or whether it is kept in a particular part only. Knowing the properties of fluorescence probes the scientists should be able to establish whether the system is stable or how it changes with increasing temperature. Apart from cholesterol the stability of the system could be increased by bonding hyaluronan, which, owing to the loosening of intercellular links, should simultaneously help the pervading of substances through the barriers, for example, in transdermal applications.

Whether we can expect a breakthrough discovery, thanks to the Faculty of Chemistry, is still in the stars. But even at this moment we can definitely be proud of the achievements of our laboratory. ■

Jana Drbohlavová: I like it when I can lock myself up in the laboratory

Jana Novotná
Photo Igor Šefr

"Better not touch anything or you might swipe some poison or acid," warns Jana Drbohlavová, when we enter "her" chemical laboratory at the Faculty of Electrical Engineering and Communication. When she asks whether she should wear a lab coat for photographs we understand it's not a formality. It does happen occasionally that this scientist from BUT whose career started at the Faculty of Chemistry arrives home with clothes burnt through by sulfuric acid.

Has chemistry attracted you since you were a child?
It was not so straightforward. I played the flugelhorn for 12 years so I was considering dedicating myself to music, but I was also lured by pharmacy. As I failed the entry examinations and enjoyed chemistry I decided in favour of the Faculty of Chemistry.

What was the path from the Faculty of Chemistry to the Faculty of Electrical Engineering and Communication?
Via France. In 2004 I received the graduation diploma and immediately enrolled in doctoral studies. At that time I researched into photocatalysis which happened to be the subject of study in a laboratory in France so I applied for a doctorate under double supervision and rather surprisingly I got it. Right after I finished in April 2008 I joined the Faculty of Electrical Engineering and Communication (FEEC). In France I started to do nanotechnology and at FEEC they needed a chemist with a specialisation in nanotechnology. Ten years ago things were just starting.

Today you work in the Smart Nanoinstruments research group at CEITEC. How do you divide the time between FEEC and CEITEC?
This depends on the current projects as right now I have two projects at CEITEC. At FEEC I am bound as a lecturer being responsible for the course in Practical Chemistry for Electrical Engineers, so I have an academic function at the faculty and a research function in CEITEC.

Do you feel better as a teacher or a researcher?
As a researcher, by all means, because you can detach yourself. I like it when I can lock myself away in the laboratory, although this happens rarely. My position requires that I spend most of the time reporting on and preparing projects which is rather dull office work on a PC.

CEITEC brings together research in the areas of vivid and inanimate science. To which of these two spheres do you incline?
Definitely the inanimate one. I am a physical chemist so my domain is there. But I really enjoy working together with biologists or people who can develop the results for applications in medicine. When we synthesise nanoparticles which can be used in materials for healing burns or various injuries to soft or hard tissues I find that very rewarding. So, we co-operate with other colleagues from CEITEC, everything is highly interlinked.

Could you explain why it is the nano scale that is so interesting for science and not, for example, micro or pico?
We often use quantum dots, the tiny particles that can radiate and the description "quantum" itself is the essence of the problem. They are phenomena involving quantum limitation of electron states in semiconductors, thanks to which quantum dots possess better properties than traditional materials, they can radiate more energy. It has been found that the period of their radiation and the colour intensity is much more powerful than in traditional organic pigments, so these substances are more beneficial at the nano scale. It also depends on the material used – for example, in magnetic nanoparticles in some cases it is the nanodimensions and elsewhere the microdimensions that can be advantageous in relation to where a particular substance is applied. It's not always strictly a given that nano is better than micro, but it is valid in some cases.

Today nano is a fashionable word ...
You are right. And vice versa, I have a feeling that many people are suffering from so-called nano-phobia, as they do not have enough information. It is very important that, for example, the European Chemicals Agency, with which we collaborate within the European Commission, has just established the Observatory for Nanomaterials which can be accessed on the internet both by the general public and people from the industry and is translated into 23 languages. It can be found on the EUON (European Union Observatory for Nanomaterials) website and its aim is to inform the general public– explain the various nanotechnologies in the areas of the food industry, cosmetics, the automotive industry, etc., and allow them to learn in an accessible way about how it works. An important aspect is the safety of nanomaterials, so-called nanosafety, which is a task that I am dealing with in the Commission.

This is related with your work in Brussels.
Yes, I work in the Directorate-General for Research and Innovation (DG RTD), specifically in the Directorate for Industrial Technology in the unit called Advanced Materials and Nanotechnologies.
A colleague who is about to retire shares his experience in nanomaterials safety with me, such as which auxiliary agencies collaborate with the Commission, so that nanomaterials could be safely and correctly regulated within the EU. We co-operate a lot with the OECD, the body for economic development, which is responsible for the standardisation of nanomaterials, which in contrast to ISO and CEN standards is legally binding. We provide them with scientific data through the EU NanoSafety Cluster, which represents coordinators of all European projects related to nanotechnologies. This ensures the transfer of information on nanomaterials for securing their safety at all levels – from the production line via the user to waste disposal.

Could you mention any particular project that you are working on at the moment?
I have two projects as a co-researcher. One is the development of a new fungicidal agent on the basis of nanoparticles for the eradication of serpula lacrymans. So far we have managed to develop a fungicide that the serpula really does not like. We test it on small spruce blocks that we submerge in the fungicide and then allow to mature in closed bottles. After three months we can observe whether there has been a reduction in the weight of the wood, how the fungi is behaving, whether it grows through the wood or creates a layer on the surface and so on. When nothing appears we have won.

I found a theme among your projects which is very topical in the summer season – Sustainable Production of Fish in Ponds under Climate Change Conditions.
Yes, this is the second project focusing more on sensors, as we are engaged in the development of sensors together with the Department of Microelectronics. The project is concerned with monitoring oxygen deficiency in ponds. It is a great problem, as oxygen values change abruptly, although there is some prediction of climate changes. Colleagues from Mendel University who specialise in fish breeding are experts in this field. In collaboration with the fish breeding farm in Pohořelice and water experts from České Budějovice we are trying to develop an instrument that could measure the content of oxygen, phosphorus and nitrogen in water, as this is the principal issue. When the level of nitrogen, which is the main nutrient element together with phosphorus, rises water bloom and other green organisms and algae will automatically begin to proliferate, the concentration of oxygen will drop and fish will not like it. When it's hot, things are even worse. We want to use the new portable Raman spectrometer to determine the concentration of phosphorus. It is an expensive technology, but if it prevents the death of fish in the whole pond, as happened several times this year, I think it is worth it.

The traditional Czech Christmas might be in danger.
Or we will have to breed carp in artificial tubs where we will have things more under control. But that might not be the right thing to do. ■

VUTIUM PRESS

Photo archive of Martin Horáček

Prince Charles received the Czech version of his book

At the end of November 2018 a world congress of INTBAU (International Network for Traditional Building, Architecture and Urbanism) was held in the building of the Royal Society of Arts in London, which was also attended by Martin Horáček from the Faculty of Architecture BUT. He presented the activities of Brno University of Technology and the Czech section of INTBAU concentrating on care for architectural culture and renovation of the traditional building heritage to a congress audience.

Martin Horáček talked about two books, the Czech version of which was a collaborative work between the VUTIUM Press and B&P Publishing – a publication called Harmonie (Harmony), whose author is the Prince of Wales, and Sjednocená teorie architektury (Unified Architectural Theory) by Nikos A. Salingaros. Selected congress delegates were invited to a reception by the patron of INTBAU Prince Charles in the town of Poundbury in the course of which Martin Horáček presented the prince with a copy of the Czech edition of his book. During the congress he also handed over a copy of the Czech edition of Unified Architectural Theory to one of its co-authors, the American town planner Michael Mehaffy, who is captured with him in the photograph.

(ed)

Right from the start it is therefore important to learn how to fall correctly, says Ondrej Kondek

Where do you have the second wheel? This is the standard question heard by the student of the second year at the Faculty of Information Technology BUT, Ondrej Kondek, when he is riding out of town to train jumps on his unicycle. His discipline, the trial, consists of jumping over obstacles and he has been devoted to it for seven years now. Passers by often have no idea they have just met one of the best unicyclists in the world. Two years ago at the world championship in South Korea he managed to garner the silver medal in his category and was tenth overall.

Hana Marko
Photo archive of Ondrej Kondek

Six years ago, when Ondrej Kondek read an interview with a unicyclist trial racer in a magazine he saw the light. "I was totally electrified and immediately wanted to give it a try. The beginnings were not easy. It takes a few hours to learn how to ride a classic bicycle – but to learn how to maintain balance on a unicycle takes much longer. I was not completely sure of myself until after a couple of months," described Kondek. "I negotiated the first metres only when I could keep leaning on the wall. Mother supported me but she said that if I broke something it would be the end for me," smiled the student.

The most frequent injuries in this extreme sport are sprained ankles. Right from the start it is therefore important to learn how to fall correctly. "You have to make the fall an automated process, as in trial you more often fall than ride. When I am practising a jump up to a certain height, I may succeed in one attempt from twenty. But those are not falls that would be out of control, we just jump down on the feet," explained the unicyclist and emphasised that unlike a standard bicycle there is no danger of falling over the handlebars with the ensuing head injury. However, using protection for the shins and knees, gloves and a helmet is taken for granted.

Apart from trial, where the rider has to jump over obstacles and jump down from two metres high, there are a number of other unicycle disciplines. In the flat the sportsmen show off various tricks on a flat surface, in downhill they go down difficult natural tracks. Freestyle is an artistic ride with dance elements. You can even play hockey or basketball on unicycles. "In Brno we sometimes play hockey as a hobby with friends. In Germany the interest in this sport is greater and they have a hockey league," highlighted the student.

The world championship in unicycles takes place biannually and is attended by approximately 2,000 riders who race in various disciplines. Regardless of the tough competition Ondrej Kondek succeeded in gaining the silver medal at the last year's championship in South Korea in trial in the 18–20 age category. Overall he was tenth in the world. "It was great satisfaction for me. I had trained for the races every other day for almost three months. The body has to become accustomed to the exertion. If I left out just a week, my condition and balance would immediately deteriorate," described the racer.

While in the more extreme disciplines such as trial and streetstyle, the racers are mostly guys, freestyle with musical accompaniment is dominated by girls. Unicycles are the most popular in Germany, Denmark and Japan when riders have to go through qualification for the world championship. The Czech and Slovak community is not so numerous. "There are so few of us that everybody can go. From Slovakia two of us regularly attend the world and European championships, and from the Czech Republic they are also two. Naturally we know each other well," smiled Kondek.

According to him there is little awareness of unicycles in the Czech and Slovak Republics. "Only a few people know about it, and unicycles are ignored by the media. Most people think we are performers from a circus. This is unfortunate because they can't do a tenth of the things that we do," added the rider. Another reason for the low number of unicyclists is that you have to start at an early age. "Although it's the same in most sports, the problem here is that if you give a child a unicycle, they can't do anything with it. And that is awfully demotivating. Only a few have the perseverance to endure the difficult beginning which takes several months," said the student assessing the situation.

Together with some friends Ondrej Kondek tries to get children enthused about this untraditional sport in the Try One unicycle school in Brno-Kohoutovice. His lessons are attended by about twenty children from eight to fifteen years of age. The number of boys and girls is roughly equal, but girls prefer more elegant riding styles, while boys love to jump and attempt various tricks. "Naturally, they keep falling a lot, so we teach them how to jump down correctly so as not to hurt themselves," described Kondek. It often happens that parents who attend the course with their children become hooked and start riding a unicycle.

Training in a group is important for every unicyclist who wants to improve. Kondek often sets off to events where he can meet other riders from Germany, Austria and Hungary. "After the championship in South Korea we spent three weeks with the others in Korea and the Philippines and we were riding together. Thanks to the unicycle I travel a lot and establish many contacts which I can use for the benefit of the whole unicycle community," indicated Kondek. He has noticed that riders throughout the world complain about the lack of quality saddles for unicycles. He came into contact with a firm that concentrates on cycling and together they developed a prototype of a carbon seat. He presented the saddle at the European championship held in Cologne at the end of February. ■

Hockey pucks for the IIHF are a matter of prestige for Gufex, and not big profit

The Gufex company which makes the official pucks for the championships of the International Ice Hockey Federation is the epitome of the saying that appearances are misleading. When we reached an older low house in Kateřinice near Vsetín, where the firm resides, we thought that our navigation was at fault. But then Kateřina Zubíčková, a graduate of the Faculty of Business and Management BUT, ushered us into a container office, which temporarily serves as the director's bureau, and everything fell into place.

Jana Novotná
Photo Igor Šefr

Hockey pucks were everywhere, black and with the most varied imprints, and the company director introduced us to the history of the firm founded in 1990 by her father, Pavel Mráček. "He was one of the first to start a company after the revolution and it was the first and only firm in Kateřinice," remembers the present-day chief executive.

The mixture for the production of hockey pucks is a secret family recipe that only five people know, something like the Becherovka liqueur.

He launched the manufacture of products from technical rubber and having friends in the hockey team from Vsetín, they got the idea of giving it a try and attempting to make hockey pucks. As Pavel Mráček had gained experience in rubber production from his previous jobs, he had a vague idea of how to go about it. "He got in touch with chemists and people from the rubber industry and over a year, after a series of tests and measurements, he put together the basic mixture which contains several components in a precisely specified ratio. It is a secret family recipe that only five people know, something like the Becherovka liqueur," laughs the director.

The unique composition of the substance that the inventor had patented lends the pucks two essential advantages. They are the low degree of abrasive wear so that the pucks do not smudge the advertisements on the side boards, and the fact that despite their high speed the pucks do not break the protective plexiglass. "Father began to produce pucks in 1994, and as they passed international tests with excellent results three years later they were selected as the official pucks for the Olympic Games in Nagano," recollects Kateřina Zubíčková. In 1999 we signed an agreement with the International Ice Hockey Federation and Gufex pucks were made the official hockey pucks for all world championships organised by the IIHF, as well as the next Olympic Games in Salt Lake City and Turin.

While running a successful business the entrepreneur became ill. "When he learned that the illness was serious, his greatest wish was to keep the firm going, and when he died after six months, we took over with mum and my older sister," continues the current director. As she had liked paper work, after secondary school she went on to the Faculty of Business and Management at Brno University of Technology where her husband-to-be had already been studying civil engineering for two years. Although they initially shared different plans, after school they returned home and Kateřina took responsibility for the administrative affairs of the company. "Given that we are a family firm, my work is highly varied and I cover a broad spectrum of activities. I do the budgeting, accounting, all paper work, purchasing, supervise the overall operation of the company, deal with customers, sign contracts," enumerates the company boss who speaks English and is therefore capable of handling foreign contracts.

At present she employs ten people but is not against moderate growth. After all, at a nearby plot they are building a new production hall under the supervision of Kateřina's husband who is mayor of Kateřinice and a proud graduate of the Faculty of Civil Engineering BUT. "But we still want to keep the firm on the family firm scale, we believe that quality is always more important than quantity," accentuates the director. This also applies to the relationships within the company. "It's not always easy to act as a boss to people who have known me for all their life and do not hesitate to tell me they remember me as a four-year-old girl," laughs the entrepreneur.

We're going to take a look into production. There are old machines here with which Mr. Mráček started the business and which his successor intends to keep as long as possible: "All people advise me not to get rid of them, that they can still do good service and unlike the new ones are easy to repair." The manufacturing process starts with the material supplied by an external producer in the form of so-called cartridges. "They are placed in a mould which has 38 holes and this is slid into the press. It must have the precise weight in grams so that a puck can be made from it. In the press they are baked using a standard method for about 12 minutes at a temperature of 170 degrees," explains our guide. As we can check for ourselves after removal from the press the pucks are quite hot and they have so-called overflows on them formed during compressing. These are necessary if compressing is to be successful and after cooling they are manually torn off.

In 1999 Gufex pucks became the official playing pucks in all world championships organised by the IIHF.

During this the pucks undergo the first inspection and if the surface is not perfect they are put aside. These pucks have the properties and parameters equal to the official ones, but are used for training purposes only. "After the removal of the overflows, the pucks proceed to the cutter where sharp edges are cut off and the result is the traditional puck as we know it which can go directly for shipping or continue on to printing," explains Kateřina Zubíčková. There are a number of varieties of printing methods, but in Gufex they currently prefer UV printing, which is the most stable and most requested as it allows even photographs to be printed in high quality.

The Chinese proposed that we move production to China but it did not work out.

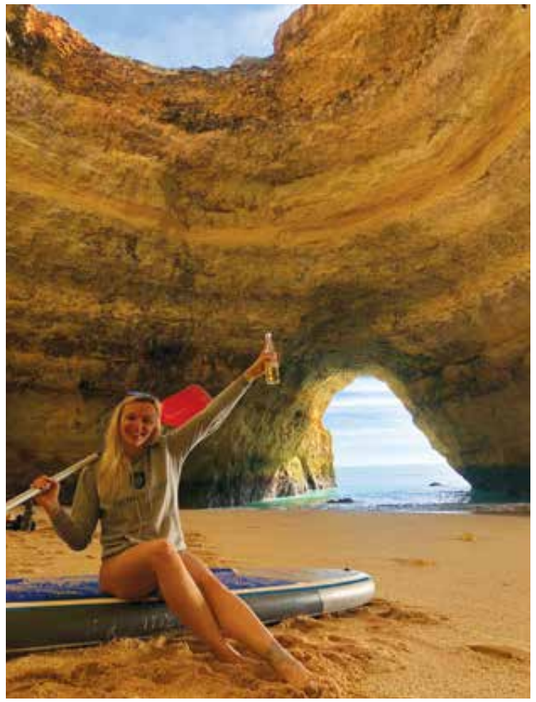
Almost 90 percent of the hockey puck production from Gufex heads abroad. The buyers are ice hockey clubs or organisers of sporting events as well as advertising agencies. A puck with an attractive imprint is an excellent marketing product, and an object of collectors' passion. "We have most of our customers in the Nordic countries, where they are very particular about quality, we export to Russia, the USA, and even to South Africa, Israel and Mexico," explains the chief executive who travelled to Switzerland in the autumn to prolong the contract with the IIHF for another four years. This means the guaranteed supply of pucks to all championships organised by the federation in the next 4 years. "But don't get it wrong, we produce around 1,300,000 pucks per year and only about 15,000 go to the championship, so it's an almost negligible part of the overall volume. It's not a matter of the company's profit, only of high prestige," emphasises Kateřina Zubíčková and points out the original production range of the company representing about three hundred products from technical rubber with financially more interesting results than hockey puck production.

When time permits, the boss of Gufex attends all the championships where their pucks are in play. "It feels nice – we get to know new places, see good ice hockey and meet our business partners." So far it is not certain whether the pucks from Kateřinice will appear in the Olympic Games in Beijing in 2022. "Nothing can be taken for granted, it depends on our ability to negotiate and on the decision of the Olympic Committee in the particular country. A recommendation by the IIHF does play a role, but invitations will be sent to many companies," explains the director and adds that the Chinese have already visited Gufex. "We learned that six million Chinese had been ordered to learn to play ice hockey so they need pucks. They proposed we move the production to China," laughs the BUT graduate and adds that, as could be expected, it did not work out. ■

BUT Is IN Wherever I Am

The travelling exhibition entitled "BUT Is IN Wherever I Am" presented the results of a photographic competition organised in the academic year 2018/2019 by BUT's Department of Foreign Relations. Students could send in photographs from their study stay or internship abroad, winter or summer school as part of the Erasmus+ programme, CEEPUS, Freemover, Aktion and others.

A total of 75 photographs by 39 students were submitted for the competition of which the best three were selected as follows: "Lake View With Squirrel" by Tomáš Stodůlka from the Faculty of Electrical Engineering and Communication, "Temple" by Jakub Klimeš from the Faculty of Civil Engineering and a photograph called "Sweden" by Ladislav Dubnický from the Faculty of Mechanical Engineering. ■



(ed)
Photo Tomáš Stodůlka, Andrea Závadská, Jakub Klimeš, Ladislav Dubnický and Zdeněk Pokorný

PROJECT

The world's longest slide designed using software from BUT researchers

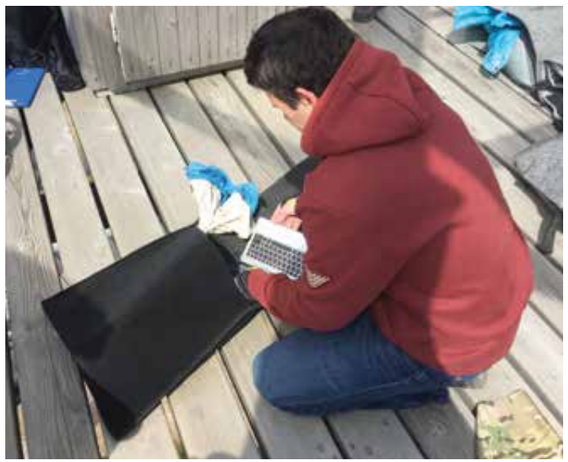
Three, two, one, go – with this countdown researchers from the Institute of Solid Mechanics, Mechatronics and Biomechanics at the Faculty of Mechanical Engineering of BUT in Brno start their measurements of slides and chutes across Moravia. Their goal is to develop specialised software that would make it possible to design dry toboggans giving visitors sufficient adrenaline from the ride but at the same time being safe. An interest in the software has been voiced by the Alfeko company from Třebíč which is currently designing the longest dry toboggan in the world. The 220-metre long slide should be built in an amusement park in South Korea.

Radka Španihelová, Faculty of Mechanical Engineering BUT
Photo Radka Španihelová

Dozens of rides down slides, input data from sensors and a few bruises are the outputs of test measurements carried out by the researcher Stanislav Věchet from the Institute of Solid Mechanics, Mechatronics and Biomechanics at the Faculty of Mechanical Engineering. Together with his team they are working on developing software that will enable the virtual design and testing of slides.

"Before each ride we put a load of certain weight inside the sliding bag together with a nine-axis sensor commonly found in mobile phones. During the ride we measure what is happening with the sensor. Specifically, we measure the acceleration in three axes, speed in three axes, tilting, which is a combination of acceleration and a magnetometer also in three axes," describes the researcher Stanislav Věchet.

Sometimes it is a load weighing 10 kilograms, at other times the researchers themselves may be seated in the toboggan. This activity that would make many a child desire to become a researcher has great significance at the beginning of developing the software. "We measure passages on existing slides in order to acquire input data on the sliding properties of materials when riding down the chutes. And we also test materials for the future development of software that would enable the company to predict in advance how fast the visitors will ride on the slide, whether they will not pile up inside the tunnel or, vice versa, whether they will not come out of it at too great a speed," explained the director of the Institute of Solid Mechanics, Mechatronics and Biomechanics at the Faculty of Mechanical Engineering, Jindřich Petruška. The software that will be developed on the basis of the acquired data will reliably model the parameters of a child or an adult in various types of sliding bag.



The software development project has been conceived in cooperation with the Alfeko company from Třebíč which designs and manufactures slides. Their range on show includes short slides in children's playgrounds as well as long dry toboggans in amusement parks.

The Alfeko company was motivated to collaborate with the Brno engineers by a number of factors. "We were approached by a client in South Korea who wishes to build the world's longest slide, 220 m long, but does not have a suitable slope for it. The existing primacy is owned by a slide in London that is 170 m long. We believe that the software will enable us to design the slide so that people could shoot down fast and at the same time safely, preventing injuries to the legs or hands," described the Alfeko company executive Libor Wurm adding that so far engineers have designed slides based on their experience without similar virtual models.

The researchers from the Faculty of Mechanical Engineering have completed several measurements in amusement parks, including the longest Czech slide in Dolní Morava, which is 110 metres long. They are now returning from the field to their computers to process all the amassed data. They plan to finish the development of the software by the end of this year. ■

From Brno University of Technology to Angola and back

In-between bachelor's and the following master's studies at the Faculty of Mechanical Engineering Anna Ambrozková took a break for a year to go to Africa. During the 11 months spent working as a volunteer in Angola this student of mathematical engineering discovered that she could not simply close down this chapter of her life and in the next summer holidays she is setting off for the dark continent again. Anna is not used to walking the straightforward path; she tends to opt for more demanding solutions. Her route to the teaching that she will probably pursue after school was done with a detour via the Faculty of Mechanical Engineering so that it would be well earned – as she puts it. And it was similar with Angola – she yearned to travel to Africa from her childhood, but not as a tourist – she wanted to stay and learn to understand the local culture and meaning of life.

Jana Novotná
Photo Igor Šefr and archive of Anna Ambrozková

Why Angola?
I wanted to go somewhere in the centre of the continent, in the poverty-stricken part of Africa, but otherwise I did not care. I arranged my stay through the Salesians who send volunteers to countries with the most friendly communities, and when Angola came up, I picked it up although as a former Portuguese colony they speak Portuguese and that was a foreign language to me. I spent the first three months in Luena which is the capital of the Moxico province and despite a population of 200 thousand it is referred to as the remote back country. I was the only Czech in the community centre so I was forced to speak Portuguese all the time and as a result I learned quite quickly.

Did you know what your work would involve?
I had bits and pieces of information from Salesian volunteers around the world who mainly worked as teachers at primary schools and in their free time tried to entertain the children and taught them to play various instruments. In Luena, immediately after my arrival they found out that I could play the piano and I was told that in two days I would start to teach 15-year old children to play. I didn't know the language or the local situation, the kids started from square one, in addition, almost none of them had a piano at home, so it was not easy. Over time after I learned the language, I began to give extra classes in mathematics, physics and a little bit of English, later I opened an evening course of English and taught additional piano courses.

Did you also work with children from the street?
That was when I moved to the capital Luanda. The population is 6 million and the Salesian State School is much bigger – around 4 thousand students attend it daily. I had already known the language so I taught mathematics, English and music and I also started to commute to a centre for boys from the street. In Angolan cities there are lots of children on the street and the Salesians establish centres for them where they put boys from the street, attempt to introduce some regular schedule into their life, send them to school or let them learn a trade.
Even so, occasionally a boy might flee – I experienced that myself. It is the work of Salesian men so they only take care of boys, although there are also girls on the street who often support themselves by prostitution.

Why did you move to Luanda?
It was actually due to a misunderstanding – poor communication. At first I did not know what I was allowed to do and what not – nobody explained it to me. I went out alone with an Angolan friend and that's intolerable for the locals. Today I understand. Local men often deny their partners and children and when a female volunteer appears who has no idea and they go out together the repercussions may be dangerous. I had to leave as a result, which was hard for me, and I cried about it, but thanks to that I got to know Luanda, which I keep in my memories. Especially the centre for boys from the street remains in my heart.

The street children are orphans?
Not just orphans, they may be children who fled from their home or the parents themselves got rid of them. They do not have decent living conditions and lack in motherly care and love, not like over here.
An Angolan family does not have as much significance and depth as our families – they do not share experiences that would bond them together. A mother will tie the child to her back so that she could go out and make money, and the child will spend most of the day like that. It is not exceptional that young parents will give their children to their own parents to bring them up.

How do the Angolans perceive the work of the Salesians?
Being with the Salesians or being on good terms with them means an awful lot in Angola. The locals are aware of what the Salesians do for them so if you have a problem and say that you are with the Salesians it opens up the doors.

One often hears that sending help to Africa is like a drop in the sea.
Sending money and things is great, but sending people there is even better – either volunteers like I was or international companies that teach the locals how to farm and be self-sufficient in agriculture. Angola is a green country with plenty of water and when they succeed in clearing fields of mines after the civil war, they could excel in farming. Tourism also has great potential but the locals still don't know how to take advantage of that.
The People In Need organisation sends voice messages to young mothers describing how to maintain the hygiene of the new-born, they send trainers of midwives to remote villages … and this kind of help certainly makes sense.

What have you learnt in Angola?
If I had not been a patriot by that time, then I am one after my return, that's for sure. Before, I thought that I could marry a foreigner and live abroad, after Angola I know that I want to stay here. I realise the opportunities we have and how everything works, as nothing works over there. Angolans live for the present. They do not have a vision of a career, they do not think what is going to happen tomorrow, but they are happy, much more than we are. When they have a birthday, regardless of the number of years, they congratulate themselves for completing another year of life.

Why are you returning to Angola?
I made many friendships with volunteers and Angolans, we are in contact and they ask me whether I will return. I want to help again but mainly I want to see those people. I have a feeling that it's not a closed case for my part, there are so many emotions. I hope that after my second visit it will be easier to say goodbye to Angola …

More at https://www.facebook.com/anevangole/ ■

David Bělohrad: Initially I didn't feel like joining CERN, today I would not change

Zuzana Pospíšilová
Photo archive of David Bělohrad

A graduate of the Faculty of Electrical Engineering and Communication BUT, David Bělohrad, is one of the six Czechs working long-term for the Swiss CERN. At the same time he is one of the few on the staff with an open-ended employment contract. Initially he thought that he would stay in Switzerland for only a couple of years. It's been seventeen years now, he does not plan to return to the Czech Republic and work in CERN still brings him joy.

David Bělohrad arrived in CERN, the prestigious European Organisation for Nuclear Research, better known by its French acronym, in 2002. In his words it was more of a lucky chance and on the advice of his friend. "At that time I was a doctoral student at BUT under the supervision by Professor Kasal. Simultaneously I was working in the Institute of Scientific Instruments of the Czech Academy of Science. I had successfully passed the examinations and was about to write the dissertation thesis. I told myself it wouldn't be bad to take a look abroad and check how things work there. A friend advised me that CERN was searching for people with a similar specialisation to mine. So I sent them a CV," described David Bělohrad. As he did not apply for any specific position, his CV ended in the database. "The way things work in CERN is that when you do not apply for a particular selection procedure, your profile is filed in the database where it stays for about a year. If a position which might be suited to you emerges during that year they will come back to you and invite you to the selection procedure," added Bělohrad. In his case it happened almost a year from the day of sending his CV. "I was half-way through my dissertation, I had moved on in the meantime and to be honest I did not feel like going anywhere. But my girlfriend at that time persuaded me to at least have a try," recounted David Bělohrad.

The selection process lasted two days and incorporated both specialised knowledge tests and debates with future

colleagues. "Two weeks later I received an offer for a job," added Bělohrad. Although he succeeded from among twenty-five other candidates from all over Europe, he was still undecided as to whether to leave the Czech Republic.

In CERN David Bělohrad is one of the few employees to receive an open-ended work contract.

"In the Institute of Scientific Instruments I dedicated myself to magnetic resonance. The work in CERN focused on something completely different. I faced the dilemma of leaving with the completion of my dissertation postponed until some indefinite time in the future, or staying and completing my doctorate. In the end I decided to accept the offer," described Bělohrad. The decisive factor for him was the conditions that CERN proposed. For a doctoral student in the Czech Republic something unattainable. "But I continued to harbour the naive idea that I would finish the dissertation at BUT. Unfortunately that did not happen. When you arrive in a foreign country, you run into so many obstacles that for an extended period you have no time for anything else. We struggled with the social, cultural and language differences," enumerated David Bělohrad. As a result after two years he terminated his doctoral studies in Brno and enrolled in distance study at the Czech Technical University. "It was purely for practical and logistical reasons. I had a flight connection to Prague and it was easier to consult my work. By that time I had small children and looked for the most feasible solution. So I did the doctorate in Prague," explained the researcher.

Initially David Bělohrad thought he would stay in Switzerland for only three years. "CERN usually offers contracts for three years with the proviso that after that period it may or may not be prolonged by another three years. I expected that either I would return to the Czech Republic or move to Munich where I had some collaboration contacts from the past," described Bělohrad. In the end he succeeded as only a few had had the luck to do in CERN. "The original contract for three years was prolonged for another three years, but sometime in the fifth year they offered me something very rare, an open-ended contract. At that point we had to make ourselves clear about one point with my wife; what it was that we actually wanted and where we wanted to live long term. In the end we decided to stay in Switzerland," added Bělohrad.

"During the sixteen years in Switzerland I was busy measuring the intensity of particles. That is the number of particles flying in the accelerator. Last year I decided that it was time for a change. One of the good things in CERN is that after a certain time you can change your specialisation and move on to another group. Now I am in a group which measures the cross sections of bundles. A bundle of particles is composed of individual particle clusters circulating in the accelerator at almost the speed of light. You can imagine each cluster as a cloud containing up to 1011 protons. Figuratively speaking, we cut this cluster at the transversal plane and measure its cross section," explained David Bělohrad, describing in a simple way what the project that he is now engaged in is concerned with. Yet, he has not lost his former colleagues and meets them every day as he says. "We all belong to a so-called group, which breaks down into smaller specialised groups. Some are purely mechanical or software groups. We closely cooperate in the projects so the only thing that has changed for me is that I sit in a different room in a different building," noted Bělohrad smiling. At the same time he has underlined the fact that CERN primarily employs experts in electronics, IT or mechanics. Despite the myth circulating among people that it is an institution mainly for physicists. "CERN does the infrastructure. Based on a requirement by physicists who specify the type of particles, size of bundles and other parameters that interest them, we build a measuring unit on a suitable accelerator for the given experiments. Then the physicists who are not employees of CERN, but usually of some universities, carry out the research and experiments they need using our equipment," added David Bělohrad who also dispels various myths and inaccuracies about CERN in the role of the national coordinator for the Czech Republic. From the position that he was appointed to in the last year he maintains dialogue between the Czech Republic and CERN and explains life and work in the Swiss institution to experts and students at Czech universities. "Czech students applying for a job in CERN are few. One of the reasons is that they feel good in the Czech Republic and do not need to leave. Many of them already have a job. And it seems that the greatest problem is harmonising the internship with study. Often the student has to prolong the studies because of the internship and needs to get additional credits, as the internship will not be counted," explained Bělohrad, naming the frequent hurdles.

The conditions which CERN offered to David Bělohrad are unattainable for a doctoral student in the Czech Republic.

Abroad you gain a world outlook and perspective. It is also an excellent entry in your CV.

But he enthusiastically recommends an internship or job in CERN to those who are interested. In hindsight he does not regret his decision and today rather than a Czech he considers himself a European. "Abroad you get a different view of what is going on at home. You have a global outlook and distance. It's also an excellent entry in your CV," confirmed Bělohrad. For the time being he does not plan to return to the Czech Republic with his family. "We might return with my wife for our retirement. But who knows how things are going to turn out," concluded the Czech expert in CERN. ■

3D PRINTING

Photo Petr Dvořák

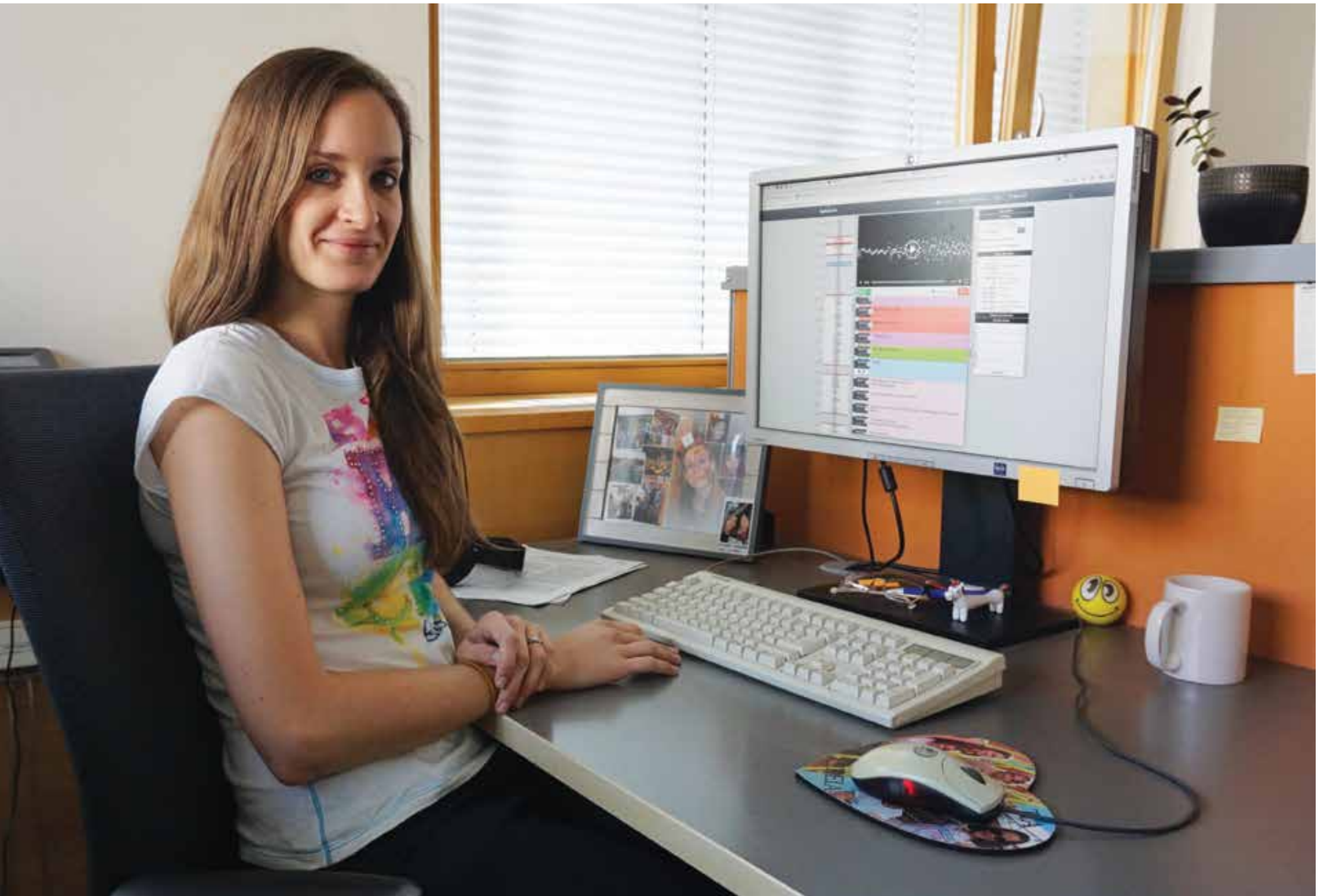
First pilotless 3D plane

The last day in May 2019 was used by the staff of the Aviation Institute at the Faculty of Mechanical Engineering BUT for the maiden flight of the first pilotless BUT aircraft completely printed on a 3D printer. The successful maiden flight took place in the early hours in the modellers' section of Medlánky airport. The internal structure of the VUT 714 FDM aircraft was created by student Martin Sladký as his bachelor's thesis. Remote control of the machine was taken care of by Tomáš Hájek, the plane was started by the supervisor of the work Petr Dvořák. The making of the plane was possible through collaboration with the 3DlabPrint company which specialises in developing 3D printed scale models of real aircraft.

Compared to the composite version of the VUT 714 aircraft the plane created on the 3D printer is seven percent heavier but the internal structure still offers a possibility of additional weight removal. Its creators believe that they will be able to further reduce the weight, hopefully even below the level of the composite version. The main advantage of this method of plane production is considerably lower labour requirements during completion and the possibility of immediate implementation of construction changes without the need to modify the expensive moulds for the composite production.

Petr Dvořák, Faculty of Mechanical Engineering BUT

Mireia Diez Sánchez from the Basque Country teaches computers at the Faculty of Information Technology to understand human speech



She came to the Moravian metropolis on a study stay several years ago and she liked it at the Faculty of Information Technology so much that she decided to return. Today Mireia Diez Sánchez is working under the Marie Curie grant for one of the globally most important research groups in the field of speech data mining – Speech@FIT.

Hana Nečasová, Faculty of Information Technology BUT
Photo Ekaterina Egorova

Imagine that a computer would be able to distinguish between voices of different people. And instead of a prolonged search through several hours of recordings of lectures, meetings, negotiations or TV programmes it would help you find the speaker you need in a second. Mireia Diez Sánchez is working on a similar task in Brno under the SPEAKER DICE project, training computers to automatically recognise "who is speaking when". What seems like an easy task for a human is not always so simple for a computer.

"We are developing different techniques for the automatic processing of speech recordings. In brief, we are programming computers to be able to transcript spoken speech in words or to tell us more about the subject and which language is being spoken in the recording," describes Mireia.

In the research team under the SPEAKER DICE project she teaches computers to automatically process information on how many speakers occur in a given conversation, recognise their voices, partition the conversation in places where the speakers change and group the resulting segments by speaker.

Which language the speaker is speaking is after all not so important. Computers can "learn" almost anything. As in all the other technologies for machine learning it applies that having a sufficient volume of data for training is key. The more data that is available for a given language, the better can it be automatically recognised by technology.

"For diarisation the presence of several languages in a conversation is not so much of a problem as in other speech processing tasks, such as an automatic transcription of speech or automatic translation. But some audios are more difficult – a studio recording of a talk-show is much simpler than a film, where people speak in various environments, it is mixed with music, sound effects, shouts, laughter and characters interrupt one another in their conversation," explains Mireia.

At present almost all machine-learning applications use neural networks but the system from the Faculty of Information Technology is based on a Bayesian probability model. "We rely on the classical theory of probability. Our code is open and is used by several laboratories around the world," clarifies Mireia. She adds she is pleased that all teams that achieved top results in the recent first world championship in diarisation systems used

the system from the Faculty of Information Technology.

"Compared to the other systems in the field our system differs in the overall approach to the diarisation task – while standard systems contain independent modules for speech segmentation, clustering segments by voice and re-segmentation, which we can imagine as 'enhancement' of the results, we use a single probability model which can do everything at the same time," adds the young researcher from the Faculty of Information Technology.

But according to her there is a long road in front of them before diarisation is commonly available in commercial applications. "It will be applicable, for example, in highlighting subtitles for each speaker when adapting audiovisual material for the deaf. But diarisation is mainly used as pre-processing for the following tasks of information mining from speech – for the identification of the speaker and for speech recognition, where we achieve the best results, provided we manage to adapt the system to the voice of each particular speaker," says Mireia.

Mireia comes from the Basque Country where she grew up surrounded by computers and gaming consoles thanks to her elder brother. "I guess I was influenced in a way but I still did not have an idea about what I was going to be as an adult. It was slow progress – I have always liked mathematics and this developed into an interest in physics, so that originally I enrolled in the university for a physics course," remembers Mireia.

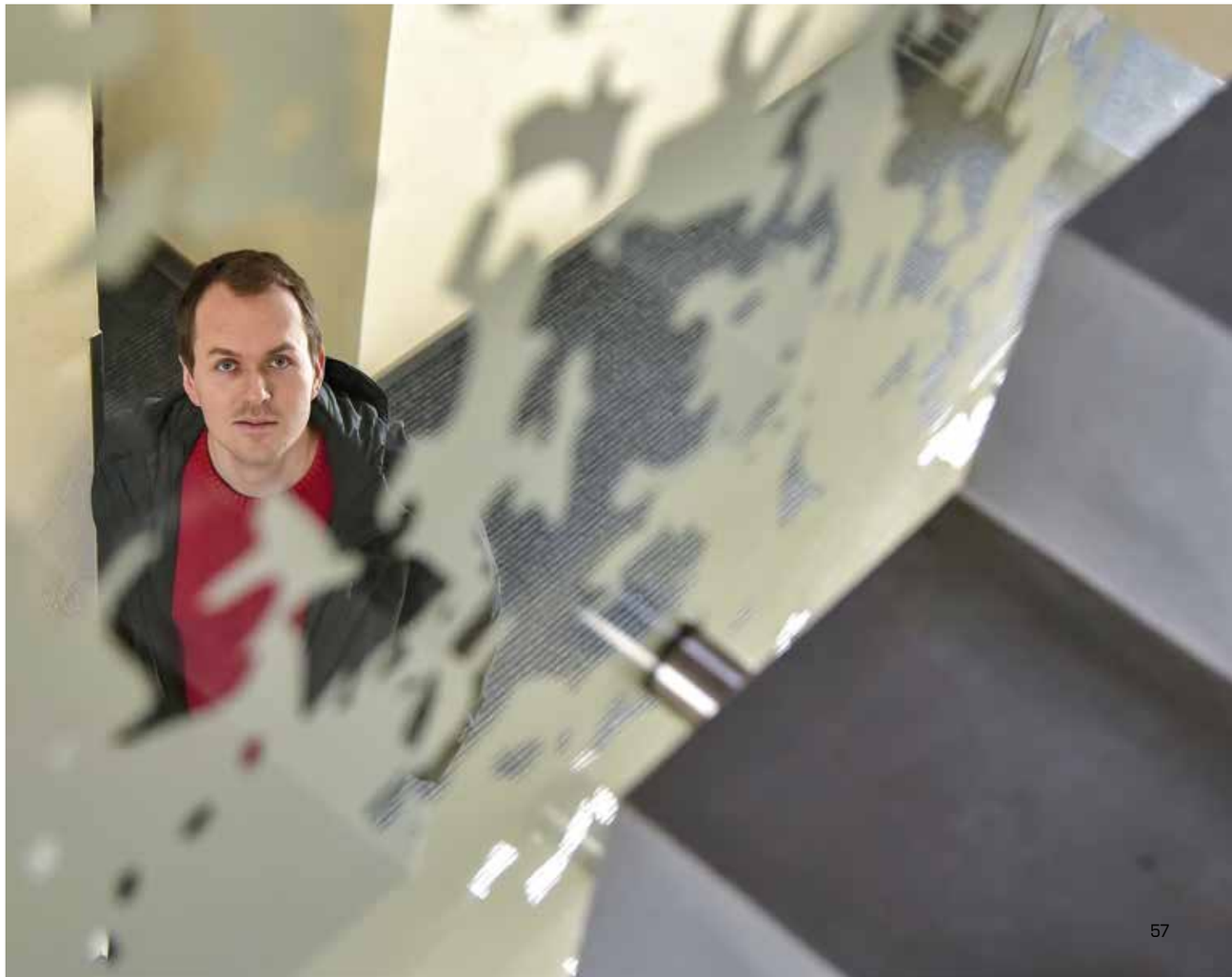
In the end she was lured by applied science and electronics from which she received a bachelor's degree. "In the final year I began to really enjoy programming and machine learning. As a result I chose the language recognition project for my diploma thesis and was co-opted onto a research group, where I remained even during my master's and doctoral studies," describes Mireia. It was during her studies that she visited Brno several times and she became so enthusiastic about the work of the Speech@FIT research group that she decided to return to Brno once she finished her doctorate. A few years ago she was greatly helped in that by a Marie Curie grant aimed at young talented researchers. Before, Mireia could associate Brno with the Moto Grand Prix only, today she knows her way around the city, she has learned to like beer, and she even speaks Czech. "But I make a lot of errors. I speak fluent Spanish, Basque and English. It is said that learning a fourth language is easy. But not if it is the fourth language family, or when it is such a complicated one as Czech," she laughs.

Mireia admits she does not like the long Czech winter or that she is so far from her family and friends. "But Brno is a beautiful city, friendly and with a pleasant atmosphere. There is good public transport, excellent food and a lot of opportunities to travel," closes Mireia Diez Sánchez.

Although she originally planned to stay for just a couple of years, according to her the saying "Life happens just as you are trying to make plans" began to work and in the summer she married a colleague from the faculty.

But she does not have a Czech surname today. "I observe our Spanish tradition when we do not change names after the wedding. We all have two surnames, one for each parent. Our surnames define the family genealogical tree – I could try and say all of my 14 surnames. I really like that – we have our family roots and where we come from is encoded in the name," closes Mireia Diez Sánchez. ■

Miroslav Strnad: Now I think more about the building as a whole and about detail in relation to the building



Jana Novotná
Photo Igor Šefr and archive of Kaplicky Internship Award

An architecture graduate of the Faculty of Civil Engineering BUT, Miroslav Strnad, had a pretty clear idea of his career after school until he won the Kaplicky Internship competition. As a result he unexpectedly spent almost a year after his studies as an intern in the prestigious Allies and Morrison studio in London. He might have impressed the international jury with his way of imbuing his architectural considerations not only with reason but also his feelings as became manifested in our interview as well.

The decision concerning which university to enrol at was based more on a feeling. He had to choose between the Prague and Brno universities and in both schools between the Faculty of Architecture and the study of architecture at the Faculty of Civil Engineering. "At the talent examinations I began to realise that I felt a difference between the faculties – people at architecture behave like artists, while at the Faculty of Civil Engineering they look at things from the practical aspect and this approach was closer to me," explained Miroslav Strnad. He did not see himself as an artist, but as a man who wants to create real things and wants to know how these things work. In the end he opted for BUT as he felt more at home in Brno than in Prague.

From the second year in addition to school he started to do auxiliary work in an architectural studio in his native Olomouc. "I felt that the school is not enough and that I want to experience the practical side as well, so I gradually went through all the stages until I worked my way up to the position of a fully-fledged architect," says the successful graduate. When he was choosing the supervisor of his diploma project at BUT he looked for an active architect, not a teacher. This made the choice narrower until he selected Marek Štěpán and a church as the subject. "Until that time it had never occurred to me that I could do a church, but it was a useful experience. It is good to try different themes in architecture, whether it is traffic infrastructure, commercial spaces, housing, family homes or church architecture. You get a broader outlook and a feel for the individual projects and when you then go and accept a new challenge you can exploit something from that experience," explains the talented architect.

In 2017 Miroslav Strnad submitted his design for the Church of the Sending of the Holy Spirit with a spiritual centre for the Brno-Líšeň housing estate to the Kaplicky Internship competition and successfully defended his work in English. When Bob Allies, the founder of the Allies and Morrison studio, announced the winner it came as a pleasant surprise to the finalist from BUT, but it was also a little stressful. "I did not expect it. I went into the competition mainly to see how students from other schools think about architecture and compare it with my approach. I did not even wish to win too much as I had a lot of things to take care of and I had to make a lot of arrangements in order to be able to fly away at all."

He returned from London the same man, but a different architect. Before London he spent three months in Tokyo as part of a compulsory practice scheme, so that the theme of a big city and working in it was nothing new to him, but it was different from the point of view of approaching the work: "I was really taken by the systematic approach to solving things in London.

> I felt that school is not enough for me; I also wanted to experience the practical part so I went through all the stages, one after another, until I worked my way up to the position of a fully-fledged architect.

During team meetings they always proceeded from the broadest problem when all the important things were

> It's good to try out different themes in architecture. You receive a broader outlook and a feel for the individual tasks.

being decided on until general consent was reached, and then gradually moving over to the little ones until everything was tuned to the smallest detail. Even on this huge scale the system worked perfectly and the performance effectiveness was high." Although in the London studio they offered the winner from Moravia that he could get involved in different projects for a given period, he preferred to concentrate on a single thing. "Jumping from one thing to another is not my style of work and they accepted it. At the time of my arrival they were launching a visionary study for a large stretch of land near Cambridge – an area of the original airport which was being encroached on by the expanding city," describes the intern adding details of the work in which he became involved as an equal member of the team. In the end he went to personally hand over the documents to the investor. "I do not concentrate on similar themes so that helped expand my horizon and a feel for the city and an expansive area and gave me an opportunity to think about the development of the city in the future. When you design a house it's completed in 3 years, then it serves its purpose for about 10 years and afterwards it may be rebuilt. But if you design the city network it's something that remains basically the same," adds Miroslav Strnad.

An appreciation of his contribution to the studio was the fact that at the end of his stay he was invited to collaborate for another half year which he accepted after some hesitation. "My only condition was that I would do something else, preferably architecture. I joined a team which was working on the project of a new university building for the London College of Fashion. It is a world fashion design centre which includes all phases of fashion creation – a space for approximately 5 thousand people worth 4 billion CZK, I think that we don't have such a big structure in the Czech Republic," explains the young architect who joined the project at a phase close to project documentation. "I was captivated by the fact that the English colleagues after thinking out three high quality solutions to the problem, came up with a fourth solution which might be the best in the end. I started to understand there that it was the way to quality work," highlights the young creator. Personally he was in charge of a theatre stage. "The space was complicated by being irregular – it was an organic body inserted into a building so we carried out dozens of tests on the geometry of the whole operation and made a number of changes in terms of the technical design of the project's feasibility," describes the intern who introduced a number of good ideas to the project. The final solution that he submitted after six months is ready for implementation and is a valuable complement to the overall design.

As probably the greatest benefit of his London stay the young architect sees the ability to think about a building as a whole and about a detail in relation to the building. "When I am making a decision on which material to choose, I am now much more interested in what relationship the material has to the space in which it is used, and to the building as a whole, and about the impact of the detail on the people. It is difficult to communicate but I think that during that time I considerably improved my thinking about architecture," says Miroslav Strnad. Returning home logically involved some limitations. "In London it was nice that I could devote myself full time to architecture, to what I have studied and what interests me. Here I have roughly half the time for that and the second half is dedicated to advertising and other things which are also part of the deal and cannot be avoided. I must say that I have more affinity with the complex approach when I can influence a number of things, not just the design," says the architect with satisfaction.

> The English, after they come up with three quality solutions, will then conceive of a fourth which may be the best in the end.

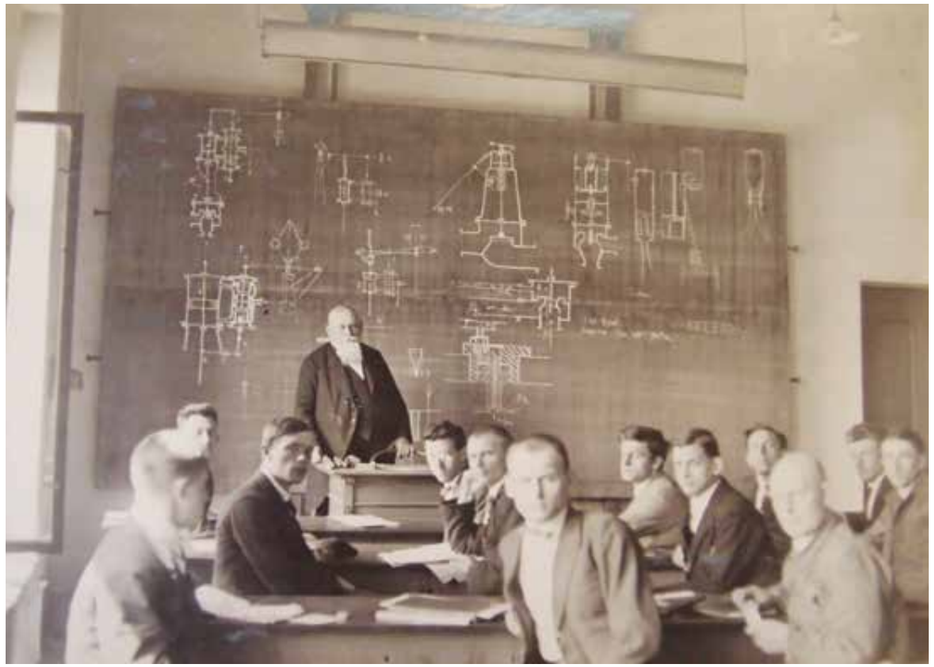
Apart from standard work in the Olomouc office, which has active projects throughout the republic, he ponders his awarded design for a spiritual centre. "I would like to open the theme again. It will require updating the documents, getting them ready for presentation and starting to talk with people who are in a position to influence it." And an architectural dream? "I would like to build a house where I will be absolutely convinced about everything from the basic concept to the last detail!" ■

The Album of Russian Undergraduates was an expression of gratitude to Brno University of Technology

Adolf Štys in the collection of building models

The Archive of Brno University of Technology holds more than two kilometres of shelves of archived material. One item that is outstanding among them in its dimensions of 40 × 60 cm and its significance is the Album of Russian Undergraduates from the year 1924. The Album is also exceptional for the fact that it contains exactly one hundred photographs from the first half of the 1920s which capture the school, its professors and students.

Alžběta Blatná, Archive of BUT
Photo Archive of BUT



Josef Zvoníček during a lecture

It was created by Russian students to commemorate their student years at Brno University of Technology on the occasion of celebrating its 25th birthday. The Album is introduced by a short laudatory text addressed to the alma mater and the few lines are completed with the old academic salutation "Vivat, crescat, floreat!" ("May it live, grow and flourish!"). Attached underneath are around 170 signatures by Russian students. The professors captured on the photographs include, for example, Otakar Gartner, Antonín Nedoma, Miloslav Pelíšek, Jur Hronec, Jaroslav Jiljí Jahn, Antonín Smrček, Vladimír List, Josef Sumec, Leopold Grimm, Karel Šimek, Vladimír Novák, Karel Čupr, František Nachtikal, Jan Caha, Václav Bubeník, Bohumil Vlček, František Píšek, Josef Kožoušek, Zdeněk Elger, Karel Ryska, Augustin Semerád, Josef Zvoníček, Bohumil Kladivo, Adolf Štys, Emil Mašík, Ota Veletovský, Josef Rieger, Jan Zavadil, Vincenc Hlavinka, Vladimír Fischer and Bohumil Babánek. Why the department of chemistry remained undocumented is unclear as it was a course preferred by foreign students.

The number of foreigners studying at Brno University of Technology in the 1920s was quite high and they were not only Russians, but citizens of the then Kingdom of Serbs, Croats and Slovenes, Bulgarians, Poles and Rumanians. The first wave of Russian refugees arrived in Brno in the school year 1921/22. This trend peaked in the mid-1920s. To get a clearer idea – in the school year 1924/25 the school had a total of 1 658 undergraduate students, of which 394 were of Russian origin.

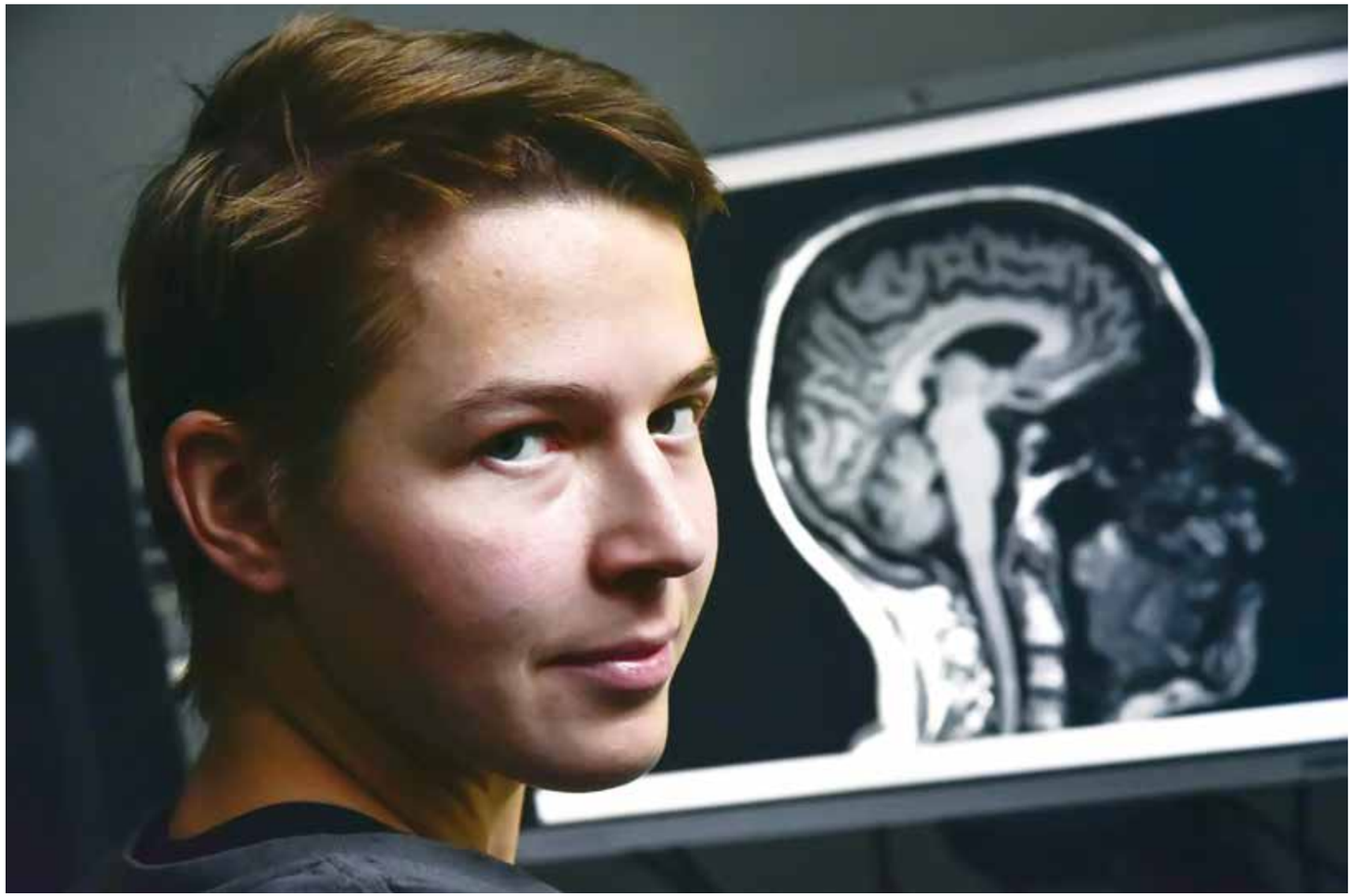
In his memoirs Russian students are also briefly mentioned by Vladimír Novák, who was president of the Committee for Allowing Russian Students to Study in Brno during his time in office as rector in 1921/1922: "I was given the awkward task of finding accommodation for about 200 Russian student-refugees who arrived in Brno in 1921. They had an all-round support from our government and our Ministry of Foreign Affairs simply ordered me to take care of the students. With support by the city, which provided the necessary plot of land, we built two wooden barracks on Cihlářská St, on the site today occupied by the Masaryk Students' Home (for secondary school students) and we accommodated 140 students there. We searched for rooms for the others in families. They received underwear, shoes and clothes and a monthly financial contribution so they were taken better care of than Czech students. Those Russian students who lived in families learned to speak Czech very quickly and many of them stayed on in Czechoslovakia permanently. In the barracks the Russian students were kept in isolation from our students and a lack of knowledge of Czech was a great obstacle in their studies."

The Album of Russian Undergraduates is part of the Collection of Contemporary Documentation (1847–1957) and those who are interested can browse through it during the regularly organised open days. ■

A student investigates the effect of dance on the structure and function of the brain

Dance-related movement has a positive effect on the brains of healthy seniors and those with a slight cognitive disorder as has been indicated by preliminary results of research carried out over three years at CEITEC by Patrícia Klobušiaková under the supervision of Irena Rektorová. The student of the Faculty of Medicine of Masaryk University and the Faculty of Electrical Engineering and Communication of Brno University of Technology has received several awards for her research.

Hana Marko
Photo Igor Šefr



Patrícia Klobušiaková has devoted herself to science since her junior year when, as a student of medicine, she entered the P-PooL extended scientific preparation programme. "The programme offers students of the Faculty of Medicine an opportunity to take part in research projects right from the first semester. I love sports and I was attracted by one of the enlisted programmes concerned with movement-related activities. It was a natural choice for me. More or less by coincidence I became a member of the group of applied neuroscience at CEITEC. At first I made magnetic resonance measurements and then I found an interest in the methods of data processing and evaluation," described Klobušiaková the beginning of her career as a researcher. She is currently working on seven neuroscience projects.

One of them is the above-mentioned research into the effect of dance-related movement on the structure and function of the brain. At the start of the project healthy seniors and those with a minor cognitive disorder were divided into an exercising and a non-exercising group. At first all of them went through an entry magnetic resonance check, neuropsychological examination and a physical prowess test. "In the next step, one group took exercises three times a week over half a year with trainers from the Faculty of Sports Studies of Masaryk University. The programme of the exercises included different individual dance activities, including even African dance. The second group abstained from these exercises. At the end we repeated all the entry examinations," explained Klobušiaková about the research procedure. Of all the possible types of movement scientists opted for dance as it is an activity which contains a cognitive element. As a result, in each session the seniors had to learn something new.

So far, Klobušiaková and her team have processed data from the first and second year of research in which 62 persons were involved. The results indicate that the group of dancing patients exhibited conspicuous roughening of the cerebral cortex compared to those who did not take part in the exercises. "The cerebral cortex influences orientation in space, visual functions and may enhance visual-motor integration. In addition, in functional magnetic resonance we discovered that those exercising had an increased intra-network activity in the brain which influences executive functions, such as planning," said Klobušiaková, summing up the preliminary results. During measurement the positive effects of dance on the brain were manifested both in healthy seniors and patients with minor cognitive disorders.

Patrícia Klobušiaková has already received several awards for her research into the effects of dance on the brain. She came first in the Student Scientific Conference at the Faculty of Medicine MU and she was third best at the Student Scientific Conference of Czech and Slovak faculties of medicine. She also received an award from the EEICT competition of student creative activities, organised by the Faculty of Electrical Engineering and Communication BUT. It is at this faculty that Klobušiaková has been studying in her third year the Electronic and Communication Technology course. She plans to continue working for CEITEC, where together with her colleagues they are concentrating on the non-pharmacological treatment of some symptoms of Alzheimer's and Parkinson's disease. ■

FORMULA

Photo archive of TU Brno Racing

Dragon 9 spent the summer on racing circuits

Although summer is usually given over to relaxation, members of the TU Brno Racing team did not have time to enjoy a rest. In July and August they took part in the Formula Student international races in the Netherlands, Hungary, Germany and the Czech Republic with the Dragon 9 formula. The best position was achieved by the Brno formula on the circuit in the Netherlands where it took bronze. In addition, at the races in Most the team captured the first place for the engineering design of the racing car.

The young designers successfully finished their ninth season and are now preparing for the tenth in which, apart from the formula with the combustion engine, they will design and build their first electric formula. The team is currently recruiting new members from among students across BUT.

(ed)

HELP

Photo Jan Brada

The Faculty of Chemistry helps albinos in Africa

A recipe which makes possible sustainable and affordable production of sunscreen for people with albinism in Ghana was created by Andrea Hároniková from the Faculty of Chemistry BUT within the volunteer project Sun Cream for Albinos. The aim was to invent a product that could be easily and inexpensively made from local raw materials and in local conditions.

Together with Vojtěch Kundrát from the Faculty of Chemistry they initially attempted to make a greater volume of cream under simulated African conditions. The next plan was to establish a production plant in Ghana and train local workers. In order to start production on the African continent it was necessary to put together 130 thousand CZK. A group of volunteers launched a crowdfunding campaign on the Hithit server thanks to which they managed to collect a sum greatly exceeding the required amount.

In July the cream received a certificate of not being harmful by the Ghana Standards Authority. It is another step in the process of sunscreen certification which is a precondition for the sale of the product in Ghana. As part of their programme supporting albinos in Africa, who are stigmatised in the local conditions, the sun cream for this risk group will be made by the Ghanaian organisation Engage Now Africa.

(ed)

ART

VAŠULKA KITCHEN BRNO CENTER FOR NEW MEDIA ART

Vašulka Kitchen Brno

On 30 October 2018 the Brno House of Arts opened the Centre for New Media Art bearing the name of the renowned Brno native Woody Vašulka. In the past this important pioneer of videoart and founder of electronic audiovisual art also lectured at the Faculty of Fine Arts BUT. The credit for an essential contribution to the foundation of the Vašulka Kitchen Brno goes to Tomáš Ruller and Jennifer Helia De Felice, both from the Faculty of Fine Arts BUT, together with Viktor Pantůček from Masaryk University.

The name of the newly-established institution refers to the cult venue, The Electronic Kitchen, founded by the husband and wife Vašulka together with Andreas Mannik in 1971 in New York. The centre offers two exhibition rooms, a small research room and the archive of the Vašulkas containing more than 27,000 pages of documents.

More at: https://www.vasulkakitchen.org/

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