

MY UPCE



MAGAZINE
OF THE UNIVERSITY
OF PARDUBICE
2024 / 2025

Will AI Replace Teachers?

What does AI mean to our researchers? Do they worry about its impact on their roles?

6

First Lady of Power Plants

Graduate Romana Zadrobílková is the first woman in history to lead the Opatovice Power Plant.

18

Debris Laboratory

How to strengthen or repair structures to make them more resistant – even in an earthquake.

30

The Heroine of a Detective Story

From a young age, Markéta Svobodová, a student at the Faculty of Restoration, dreamed of becoming a detective. Her childhood aspirations came to life when she uncovered the identity and beauty of the young girl immortalised on canvas.

14





24

MY HOBBY

Birds under Her Wing

She rushes home from school to care for them. They have feathers, wings, and beaks. Kristýna Štěpánová, a student of the Faculty of Arts and Philosophy, takes care of several handicapped parrots.

Read My UPCE
online!



26

ALUMNI

Restorer with a Musician's Soul

A graduate of the Faculty of Restoration, Vojtěch Mrovč, regularly and happily jumps between the murals and the stage, for example with the famous musician Glen Hansard.

EDITORIAL

Tomáš Novotný, Head of the Centre for Transfer of Technology and Knowledge

3

PIXEL

Professor Michal Holčápek has been awarded the “Česká hlava” (Czech Head) Special Jury Prize for 2024.

4-5

PHENOMENON

Will AI Replace Teachers?

What does artificial intelligence mean for our researchers like Petr Doležel from the Faculty of Electrical Engineering and Informatics and Ondřej Krása from the Faculty of Arts and Philosophy? Do they worry about its impact on their roles?

6-11

THEME

Lipidica Launching Clinical Trials

A unique method to diagnose the diseases developed by the team of Professor Michal Holčápek of the Faculty of Chemical Technology has moved closer to clinical practice.

12-13

GENERATION

The Heroine of a Detective Story

From a young age, Markéta Svobodová, a student at the Faculty of Restoration, dreamed of becoming a detective. Her childhood aspirations have come to life.

14-17

ALUMNI

First Lady of Power Plants

Graduate Romana Zadrobílková is the first woman in history to lead the Opatovice Power Plant.

18-21

MY PROJECT

Crowd Shipping: Package Delivery Innovation

Halyna Pivtorak from Ukraine is interested in an alternative way of last-mile delivery of goods: so-called crowdshipping.

22-23

PHENOMENON

Debris Laboratory

How to strengthen or repair structures to make them more resistant – even in an earthquake.

30-33

GENERATION

Love on the Court

František Pihera and Edita Dražanová from the Faculty of Health Studies met through beach volleyball. But the game took on a whole new dimension when they put on cleats and played it in snow.

34-37

MY PROJECT

Cross-country Ski Racing

David Veselý, a Chemistry researcher of the Faculty of Chemical Technology, has improved the waxes for cross-country skis. His team developed a special additive that can make them go faster.

38-40

THEME

Writing Our history since 1950

What started as a single field of study has expanded, and six more fields of study have been added, making University of Pardubice a modern higher education institution.

41

The courage “to stick your neck out”

Everyone is pleased to see the positive impact or the outcome of their efforts and their work. For academics involved in applied research, this is when their invention or idea becomes part of a product or service used by the public.

The transfer of an idea, knowledge, or invention from the university environment to practice is called technology and knowledge transfer. It is a journey during which sufficient funding, legal protection, and the right commercial direction for the original idea must be provided. The transfer takes many forms – from getting a licence or selling a patent to contributing intellectual property to a newly formed spin-off company.

Transfer revenues are becoming one of the important criteria for evaluating research institutes and allocating public funds for their development. In this context, the University of Pardubice is involved in several development and support projects. An important activity is creating a network of technology transfer ambassadors at four selected UPCE faculties (FChT, FTE, FEEI, and FEA). The main role of these ambassadors is to provide advice to researchers at the faculty level and search



for innovative technologies suitable for transfer into practice. In terms of commercial development, Proof-of-Concept projects within the TA ČR GAMA programme have proven to be successful for our university, which we would like to follow up with a project submitted to the TA ČR SIGMA PoC call (currently under evaluation). Across the University we can celebrate several successful transfer cases. In 2023, the University of Pardubice's income from the commercialisation of intellectual property was in the millions of Czech crowns. You can read more about one of the promising transferred technologies – ski waxes developed by colleagues from FChT – on page 38.

I wish all my colleagues enough innovative ideas, the strength to push inventions to applications, and the courage “to stick their neck out”. It will be a pleasure for me and my colleagues at the Technology and Knowledge Transfer Centre to accompany and support them on this journey.

Ing. Tomáš Novotný, Ph.D.
Head of the Centre for Transfer of Technology and Knowledge UPCE

MY UPCE

MAGAZINE OF THE UNIVERSITY OF PARDUBICE 2024/2025

Rectorate, Promotion and External Affairs, Organisation ID: 00216275

Address: Studentská 95, 532 10 Pardubice 2 **Phone:** +420 466 036 413, +420 466 036 406 **E-mail:** myupce@upce.cz

Web: www.upce.cz/press **Chief Editors:** Zuzana Paulusová, Martina Macková, Lada Součková,

Editorial board: Lucie Košťálová, Petra Bajerová, Martina Macková, Adrián Zeiner

Language editing: Zaan Bester **Translations:** Language Centre of the University of Pardubice

Photo-documentation: University Conference Centre – Adrián Zeiner, Petr Špaček, Radek Pížík, Milan Reinberk (FChT),

Michal Král and the UPCE archive **Graphic design and setting:** studio Designiq

The editors reserve the right to abridge and edit the texts.

Print: Printing and Publishing Centre of the University of Pardubice, 2023, print run: 1,000 copies

ISSN 2788-0680, MK ČR E 22928





PHOTO BY Luboš Odráška

Professor Michal Holčapek from the Faculty of Chemical Technology at the University of Pardubice has been awarded the “Česká hlava” (Czech Head) Special Jury Prize for 2024. He earned the most prestigious Czech award for scientists for his research on lipids and the discovery of a unique method that can diagnose pancreatic cancer using only blood analysis. A clinical trial has been running since September, for which the team has been collecting samples at 15 collaborating centres across the Czech Republic, and which will be completed within three years. On the day of the award ceremony, professor Holčapek learned even more good news: “We have received a US patent for early screening of pancreatic, kidney and breast cancer, which is a long-awaited event. Until now, we have had patents for Europe, Japan, and Singapore. And this is great news for us,” said the award-winning scientist during a live broadcast on Czech Television.

Will AI replace teachers?

INSIGHTS FROM OUR RESEARCHERS

STORY BY Zuzana Paulusová • PHOTO BY Adrián Zeiner, Daniel Honc, DALL-E3

Artificial intelligence (AI) has captured the attention of experts and enthusiasts alike. At our university, researchers like Ondřej Krása from the Faculty of Arts and Philosophy and Petr Doležel from the Faculty of Electrical Engineering and Informatics have been studying its development both professionally and as a passion. They not only integrate AI tools into their work but also encourage students – and everyone else – to do the same. But what does AI mean to them? Do they worry about its impact on their roles as educators and researchers? Here, they share their thoughts on what AI brings to our lives and whether we should brace ourselves for a dystopian future.

We might not always realise it, but artificial intelligence is already deeply embedded in our everyday lives. It helps us search for information, corrects our typos, recommends books and shows, generates invoices, and even creates personalised nutrition plans. Every week, it seems, we hear about a new capability. While these systems aren't the humanoid robots of science fiction, AI has already surpassed human abilities in many areas – not just in chess, poker, or the complex Chinese board game Go, but also in recognising faces and generating realistic text. Yet, what exactly is artificial intelligence? The term itself remains hard to define. Most people understand it as

a system designed to simulate human thinking and behaviour, but many questions still linger.

Does AI have a brain?

“The goal of artificial intelligence is to create a set of procedures and algorithms that solve problems as a human would,” explains Petr Doležel, who specialises in artificial neural networks. “One component of this is artificial neural networks, which mimic the nervous systems of animals – especially humans.” Much like the brain, these networks demonstrate remarkably complex and sophisticated behaviours by connecting billions of simple processors in a



structure similar to neurons. So, while we can't say AI has a brain in the biological sense, it's not entirely accurate to claim that it doesn't.

Progress brings risks...

Whether we like it or not, AI is becoming an integral part of our lives. "Thanks to scientific breakthroughs, societal changes, and technological innovations, humanity has achieved remarkable progress

– reducing infant mortality, increasing life expectancy, and significantly lowering illiteracy rates. These accomplishments, along with many others, are significant and should not be diminished in any way," says Ondřej Krása. However, he also cautions against unchecked optimism. "The pace of technological change is accelerating, scepticism in society is growing, and many of us struggle to keep up with an ever-changing world." Just five years ago, Krása



notes, it was possible to follow AI advancements across the board. “That’s no longer the case. Today, you have to focus and specialise; it’s impossible to keep track of everything happening in AI.” For those outside the field, it can be difficult to grasp just how advanced current systems have become.

⊕ How do you perceive the rapid development of technology, especially AI?

Ondřej Krása (OK): Humanity’s achievements throughout history are remarkable in many ways. Technological advances have brought lower infant mortality, longer life expectancy, and significant reductions in illiteracy. However, every major technological breakthrough comes with risks. Even in ancient times, people feared the advent of writing, considering it a double-edged sword. The printing press and steam engines were also met with suspicion. These fears were not unfounded, but the benefits usually outweighed the negatives. With AI, the pace of technological change is accelerating further, and I worry that the balance of benefits and drawbacks may tip toward the negative. Right now, we’re reaping the rewards of AI’s progress, but as intelligent systems evolve, the potential for harm grows. This rapid development raises considerable concerns for me.

Petr Doležel (PD): I see AI as a tremendous opportu-

nity to dramatically improve society’s quality of life. It has the potential to revolutionise processes across industries – from energy and healthcare to entertainment – almost overnight.

AI is increasingly a topic of public discussion, especially in the media. What’s driving public opinion now is just a small but impactful part of its capabilities. However, its broader impact on society is far-reaching. AI is still a developing scientific field, with applications ranging from medical diagnostics and city transport optimisation to robotic innovations. These include everything from kitchen appliances and manufacturing aids to autonomous systems exploring the Moon.

⊕ How does AI benefit us?

OK: One of AI’s most significant contributions is its ability to handle vast amounts of information at incredible speed. For instance, I often ask AI to provide an overview of research in areas I’m interested in. While the information it offers must be critically verified, it gives me a foundational understanding almost instantly, significantly speeding up my work. AI is also incredibly effective at narrowing down research options – tasks that would take humans an extensive amount of time. Its potential in diagnostics is especially impressive. In some areas, it already



Ondřej Krása, from the Faculty of Arts and Philosophy, is a philosopher by education and profession, with a long-standing focus on ancient philosophy, particularly Plato and scepticism. In recent years, his scholarly interests have shifted toward exploring the nature of artificial intelligence, examining both its potential benefits and associated risks. Among these, he studies existential risks – threats capable of either destroying humanity or hindering its ability to thrive. In addition to AI, such risks include nuclear conflict and viral pandemics, the latter brought into sharp focus by the global COVID-19 crisis.



Petr Doležel, from the Faculty of Electrical Engineering and Informatics, specialises in artificial neural networks and their applications in manufacturing and industrial settings. His research includes developing systems for controlling robotic arms on production lines, detecting potential threats in security-sensitive areas, and monitoring human behaviour in public spaces such as mass transit hubs. He creates tools capable of analysing visual, auditory, and contextual data to make decisions such as: 'This is safe', or 'This requires action', and guiding precise manipulations like handling products on an assembly line. Unlike projects aimed at achieving general artificial intelligence – designed to replicate human consciousness – Doležel's work focuses on practical, task-specific AI solutions that address real-world challenges.

surpasses human doctors. The day when we no longer have to wait for specialists to evaluate medical images because AI will do it instead is likely not far off. This could have a profound impact, particularly in regions where access to medical care is limited.

PD: Over the past couple of years, some of the most visible advancements have been in text and image generation. AI is now producing outputs that intrigue us all, penetrating virtually every field. The development of generative adversarial neural networks and transformer networks has been particularly groundbreaking. These innovations have propelled neural networks to generate data and information in ways that are indistinguishable from human work at first glance. The scope and impact of these developments have grown exponentially.

8 Do you use AI often in your work?

OK: I use AI almost daily, primarily for quick consultations on topics and problems I'm addressing. AI not only provides rapid feedback but also pushes the

boundaries of human knowledge. For instance, a few months ago, AI contributed to deciphering part of a scroll buried by the eruption of Vesuvius – something we'd previously thought impossible. In the context of ancient philosophy research, this could mark a major breakthrough, as we're now able to read carbonised texts that were previously inaccessible. AI is literally helping us unlock the past.

Beyond research, I also consult AI on issues related to department management. I explain my challenges to it and often receive helpful feedback. While its suggestions aren't as expert as those from a seasoned coach or psychologist, it's a convenient alternative – especially when getting an appointment with a professional isn't so easy (laughs).

PD: I use AI in my teaching to demonstrate its potential to students. For example, it helps them create demonstration problems, revise their work, or generate ideas. In advanced courses, we even design our own neural network models to tackle complex problems.



AI is also an invaluable tool in my scientific work. It helps prepare sources, summarise content, and condense large amounts of information into useful insights. On a practical level, it's great for small but time-consuming tasks, like drafting emails. When assigning a task to a subordinate with a two- or three-day deadline, I no longer spend hours crafting the perfect email – AI generates it in seconds. This reflects the basic level of collaboration. At a more advanced level, the dynamic shifts from individual-to-individual interactions to broader individual-to-organisation processes, encompassing responsibilities like managing information flow and optimising delivery systems. These seemingly simple directives can drive significant improvements in organisational efficiency.

Right now, we're benefiting from companies like OpenAI and Google offering their models for free. But people aren't just testing these tools anymore – they're integrating them into their daily work. I'm certain we're on the verge of a shift to the paid AI era.

🗣️ Could AI take the place of an educator?

OK: Students already have access to AI tools that serve as qualified, patient tutors, ready to explain concepts whenever they need help. I foresee a time when AI will be capable of crafting lectures far better than I can. In terms of pure linguistic interaction, AI systems could soon surpass me. However, teaching is more than just conveying information. Students respond not only to words but also to gestures, facial expressions, and the personal experiences of their teacher. I bring a human element to the classroom that AI cannot yet replicate. While AI may become a powerful educational tool, it will take time before it can replace the multifaceted role of an educator.

PD: AI won't suddenly replace all teachers. Instead, educators will increasingly rely on AI tools to support their work – essentially becoming supervisors to AI modules that assist with individual student needs. AI's patience and adaptability are its greatest strengths, and we should harness them. However, a human teacher must always remain at the helm to guide and supervise the learning process.

Interestingly, students are more open to embracing AI than many educators. While some of my academic colleagues are sceptical, students are eager to use any tool that simplifies their workload. And that's exactly what AI is designed to do.

🗣️ What emotions does AI evoke in you?

OK: My feelings are mixed, but fear tends to dominate. Humanity has achieved remarkable success through its ability to invent and adapt to change, but the pace of technological advancement has be-

come so rapid that many people find it hard to keep up, leading to widespread apprehension about the future.

The risks associated with AI are significant. The first is the obvious danger of misuse – extremely capable systems in the wrong hands could pose a grave threat to humanity. The second is more abstract but equally serious: negative externalities. Much like the unintended consequences of burning fossil fuels leading to climate change, optimising economic or social processes through AI could yield undesirable side effects. The third risk is the possibility of a highly capable AI that no longer aligns with human goals. While this may sound like science fiction, theoretical considerations and real-world examples suggest this concern isn't unfounded.

PD: I view the development of AI very positively. Human innovation has always aimed at making life easier, and AI is no different. Properly trained systems will function as expert advisors across many domains in the coming years. AI is already revolutionising fields like customer service, banking optimisation, and record-keeping. Machines are increasingly capable of taking over tasks that were once exclusively human. History shows this is a natural progression – some jobs disappear, while new ones emerge. As long as humanity remains committed to progress, society as a whole will continue to advance. This dynamic isn't unique to AI; any transformative innovation, like harnessing nuclear fusion, would similarly reshape human society and job structures.

🗣️ How important is the ethical aspect and the matter of values?

OK: The ethical dimension of AI is, in my view, absolutely critical. If we fail to align these increasingly capable systems with human values, the challenges posed by AI will escalate rapidly.

However, aligning AI with human values presents significant difficulties. For thousands of years, humanity has struggled to agree on what these 'human values' actually are. Even if consensus is reached on some values, the ability to embed them deeply into AI systems is still beyond our current capabilities. We can regulate AI's external behaviour to some extent, but much of what happens internally remains a black box. Until we achieve greater transparency and control, ethical concerns will persist.

PD: At this stage, we're not dealing with general AI – systems equal to humans across all areas – so ethical responsibility lies squarely with developers. Just like a firearm in the hands of an unethical person, a poorly designed AI can be misused. If general AI eventually surpasses human capabilities and acts autonomously, it could behave in ways beyond our

control. At that point, ethics may become an afterthought, as we'd no longer dictate AI's decisions or actions.

📍 How far can development go?

OK: Many leaders in AI development are striving toward general artificial intelligence (AGI), which would match or surpass human intelligence in most areas. Six months ago, Sam Altman, one of the key figures in the AI boom, claimed they had internally achieved AGI but later retracted his statement. Recent advancements suggest we are rapidly approaching AGI. The question remains: what kind of world will emerge when systems more intelligent than humans are fully operational? I personally fear some rather dark scenarios. What's even more surprising is the lack of effort by more optimistic

colleagues to outline a vision for a positive world shaped by general AI.

PD: In recent years, we've seen concepts like 'singularity' gain traction. This refers to the point where AI learns so rapidly that humans can no longer keep up, leading to an exponential increase in its capabilities, fuelled by positive feedback loops. At that point, humanity would no longer be the dominant force on Earth.

To coexist with AI in the long term, oversight of its use will be essential. However, the immediate challenge lies in preparing society for its increasing integration. Education systems need to adapt to make people employable in an AI-driven world. Another significant challenge is the energy consumption of AI, which is immense. For now, though, as long as AI systems can be unplugged, I don't see an existential threat.

AND HOW TO START COMMUNICATING WITH AI?

Engaging with AI is simpler than it seems. Open a tool like ChatGPT, use its text or voice interface, and try tasks you typically handle at work. Experiment with how it can make your workflow easier. "To use this tool effectively, you need to learn how to communicate with it. Enter commands in a way that leads to good results," explains Petr Doležel. Language isn't a major barrier; whether you use Czech or English, the interaction works well. It's helpful to engage in conversation, make specific requests, and even show gratitude. "Some prompting techniques, though seemingly absurd, do work. For instance, offering AI a fictional financial reward can motivate it to perform better, despite the promise being meaningless to its internal mechanisms," notes Ondřej Krása about working with AI.

We posed a different kind of question to AI: what will the University of Pardubice look like in 100 years? How might the academic gown evolve, and what will the labs of the future look like? Using DALL-E 3, we generated images to visualise this vision of the future. Here's how AI sees the next century at the University of Pardubice.



Lipidica Launching Clinical Trials

STORY BY Zuzana Paulusová • PHOTO BY Lipidica, a. s.

Approximately 2 400 patients die every year due to pancreatic cancer. A unique method of diagnosing the disease, developed by the team of Professor Michal Holčápek of the Faculty of Chemical Technology, has moved closer to clinical practice. Lipidica has launched a multi-centric clinical trial and is recruiting patients, as well as healthy subjects at risk of the condition.

Pancreatic cancers are tumours showing one of the least positive prognoses. In contrast, the number of patients who are newly diagnosed with the condition keeps growing, and experts predict that it will become the most frequent fatal gastrointestinal condition by 2030. The existing methods diagnose the disease too late. What is insidious about the disease is the fact that the symptoms may be silent and once they start to appear, the disease is already too advanced and cannot be treated.

The tumour size is key

The key parameter determining the likelihood of survival is the tumour size at the moment of the diagnosis. If the tumour is detected early, 80% of patients may survive 5 years longer. Later, every millimetre plays a role. Tumours smaller than 1 centimetre and those ranging in size from 1 to 2 centimetres have a 5-year patient survival rate of 40% and 20% respectively. With tumours bigger than 2 centimetres, the survival rate is below 10%. That is why early detection is so important. Thanks to Professor Michal Holčápek and the unique blood testing method, thousands of patients may get a chance to live longer. His research revealed that the concentration of lipids in plasma changes for different tumours. This is caused by the cancer cells as well as the immune response.

Just a standard blood test is needed

To diagnose the disease, only a standard blood test on an empty stomach is needed. A special method (high-performance supercritical fluid chromatography combined with mass spectrometry) is used to determine the concentration of more than 150 lipids in the sample and create what is called a lipidomic profile. Then statistical analysis is used to compare the profile with that of healthy subjects and patients with pancreatic cancer. The value rendered by the comparison is key. If it is lower than 0.5, the profile corresponds to a healthy individual. If it is higher than 0.5, the patients will most likely hear the cruel verdict since their lipidomic profile resembles that of patients with pancreatic cancer. The unique method, based on a lipidomic analysis, is protected by European patent EP3514545 (a method of diagnosing pancreatic cancer based on lipidomic analysis of a body fluid) and has the potential to reveal a lot about human health.

Recruitment in progress

The clinical trial has been approved by the State Institute for Drug Control, as well as the Ethics Committees of the institutions involved. The trial will recruit subjects including adults from high-risk groups as well as patients with newly diagnosed



early-stage pancreatic cancer. The trial will last for 3 years and will be implemented in cooperation with the CZECRIN research infrastructure at the Faculty of Medicine of Masaryk University, and will be conducted at multiple sites across the Czech Republic. Once the clinical trial has been successfully completed, it will be possible to use the lipidomic test in clinical practice.

What about the beginnings?

It was 11 years ago when Professor Holčapek's team at the Faculty of Chemical Technology received the ERC CZ grant. Thanks to the grant, they started research

into the potential role of lipids for early diagnosis of pancreatic cancers and other tumours. The outcomes of the project included two applications for European patents and a paper in *Nature Communications*, a prestigious journal. The research carried out at the University of Pardubice attracted the attention of FONS JK Group, a.s., a company with expertise in lab diagnostic methods and healthcare IT systems. The negotiations led to the establishment of Lipidica, a.s., a company jointly owned by the University of Pardubice and the FONS JK Group, with the goal of commercialising the research results.



LIPIDICA

Map of healthcare facilities participating in the Lipidica clinical trial by region

The Heroine of a Detective Story

STORY BY Zuzana Paulusová • PHOTO BY archive of Markéta Svobodová

From a young age, Markéta Svobodová dreamed of becoming a detective or working in a lab. Now a student at the Faculty of Restoration, her childhood aspirations have come to life in an unexpected way. When a long-forgotten, mysterious painting surfaced, Markéta wasn't just tasked with restoring it – she also uncovered the identity and beauty of the young girl immortalised on its canvas.

Initially, Markéta knew very little about the painting. It dated back to the late 19th century, and its artist was unknown. For decades, the piece had languished in the archives of Olomouc, hidden beneath layers of dirt and dust. Humidity and improper storage had taken their toll. "It was in terrible condition," Markéta recounts. "It looks like it had been standing in water for some time, which affected all its components – the decorative frame, the fabric, and the paint layer, which had suffered significant losses." Even the wooden supports bore signs of damage. To make matters worse, the painting had been struck by something heavy, leaving holes and several long cracks. Despite its sorry state, Markéta was captivated from the start. "The girl in the painting is beautiful. Her mysterious gaze immediately drew me in, as if she were trying to tell me something," she shares. Those haunting eyes accompanied her through countless early mornings and long evenings. Little did she know how far this unknown girl would lead her.

🕒 When was the last time you saw the painting?

About three days before the end of the exhibition. We created the exhibition to share the painting's story,

and I gave guided tours at the museum in Olomouc, walking visitors through our journey together.

🕒 Do you miss it?

I did spend a lot of time with it, so in a way, I do. Restoring it was an incredible experience – one I'll never forget. I was fortunate in every way to have had the opportunity to work on it.

🕒 How did the painting end up in your hands?

It became the focus of my bachelor's thesis. My supervisor had two paintings lined up for me and a classmate to choose from. We both wanted this one! To be fair, we decided to draw lots (laughs). First, we played rock-paper-scissors to see who would go first – and I won! My classmate ended up with the other painting, and I got my dream project.

🕒 How did it all begin?

When the painting first came into my hands, it was in a terrible state. I knew the restoration process would be challenging. My first step was to take swabs from the painting for microbiological analysis to check for any infections. There's always a chance that something harmful could be lurking beneath the layers of dirt and dust. Luckily, no mould was detected.

🕒 What came next?

Next was a detailed photographic documentation

process, an essential part of any restoration research. It helps us uncover important details about the artwork. Using imaging techniques, I photographed the painting under various types of light: daylight, ultraviolet, and infrared. The final step involved an X-ray examination.

➊ What did the survey reveal?

The non-invasive analysis provided valuable insights into the painting's materials and structure. For example, it showed that the artist used pigments with metallic compounds. When pigments contain heavy metal-based substances, they create a strong glow under X-rays. Seeing the whites light up so vividly, I immediately recognised the use of lead white. In addition to this, invasive methods were used, such as taking microscopic samples from the painting. These samples revealed more about the binders, pigments, and the intricate layers that make up the artwork.

➋ Why is all this necessary?

To gather as much information as possible about the painting. This knowledge allowed me to create a comprehensive restoration plan. From a research perspective, the painting was incredibly fascinating, offering many unique insights into its creation and history.



➌ Were you surprised by anything revealed in the survey?

The biggest surprise came when I used ultraviolet light. Suddenly, text appeared on the reverse side of the painting. It was faintly visible in daylight but completely illegible. After some graphic adjustments, the text became clear – and there it was, written in German.

➍ What did it say?

“Pauline Keszler, born in Loštice in Moravia, sister of the painter of historical paintings Jos. Keszler in Vienna, painted in Loštice 1850...”

➎ That must have been a significant clue!

It was huge! I was running around the faculty, telling everyone with so much excitement (laughs). This discovery prompted me to delve deeper into Josef Kessler, the painter

mentioned in the text. I scoured various sources, but there wasn't much information about him in the literature. Then, I stumbled upon a book specifically about him. It was written by an Austrian priest, Hans Klinger, who was a devoted admirer of Kessler's work.

➏ Where did the book lead you?

The book detailed Josef Kessler's life and mentioned that he had five brothers. But the painting clearly

Did you know?

The story of the painting was so extraordinary that it inspired an exhibition titled *Sister*, which was showcased at the Regional Museum in Olomouc. The exhibition was a great success, and there is a possibility it may travel to other venues in the future. It captivated audiences not only with the intricate and meticulous restoration process, but also with the almost detective-like journey of uncovering the painting's story. This journey led the student to identify the girl in the painting and piece together the broader context of her family history. “Being part of this incredible process has been a once-in-a-lifetime experience,” says Markéta Svobodová, the student behind the restoration. Currently in the second year of her postgraduate studies at the Faculty of Restoration in Litomyšl, Markéta also teaches at a Primary Art School and continues to pursue her own artistic projects.





depicted a woman. What puzzled me was that there was no mention of a sister anywhere in the book. This made me question if the translation of the text was wrong.

❶ Was it?

No, the translation was correct. But the lack of any reference to a sister didn't make sense, so I turned to 19th-century records from Loštice, where Josef Kessler was born. I started combing through the registers to see if a daughter had been born into his family. It was tough – the records were handwritten in German cursive, and I was exhausted. The lines blurred together as I read them over and over. All I kept finding were mentions of his brothers. And then, suddenly, there it was. I can still picture it (laughs).

❷ You found the missing sister!

Yes! It was 2:37 in the morning when I saw Pauline Kessler's name in the register. At first, I thought I was dreaming. I was so tired I closed the book, but when I looked again in the morning, it was still there (laughs).

❸ How did it feel?

I was both thrilled and stunned. It was a monumental moment – not just for the painting but also for the historical record. I had disproved a detail in the book and uncovered the existence of a sister who had been completely overlooked. It was incredible to think that Pauline Kessler had finally been found after all these years.

❹ Didn't the restoration take a backseat because of your search for the painter's history?

I couldn't afford for that to happen! Restoring the

painting was the subject of my bachelor's thesis, and I had to complete both the restoration and the research on time (laughs). The additional research came later.

❶ What did you enjoy most about restoring the painting?

From the very beginning, I aimed to restore the painting as a whole, which included the decorative gilded frame. That wasn't a typical part of my bachelor's studies, so it was both a challenge and a chance to learn new techniques. Once I cleaned off the thickest layers of dust and dirt, I removed the painting from the decorative frame and stretcher to access the underlying layers. That's when I discovered that the central scene had been painted on paper, surrounded by and backed with fabric. The entire piece was supported by an additional layer of fabric on the reverse.

❷ What restoration procedures did you perform?

I focused on preserving as many original fragments as possible, adjusting my approach accordingly. First, I worked to even out the surface and straighten the edges. I reinforced the paper backing with Japanese paper to mend the holes and cracks. Once the general repairs were complete, I added a new canvas backing to stabilise the entire piece. Next, I turned to the colour layer. I tested the solubility of the old varnish and began thinning it. As I worked, the original colours started to emerge – vivid and breathtaking. Over time, varnish yellows and darkens, so removing it brought the painting back to life. The colours were stunning. Finally, I used a blending imitative retouch technique to restore the areas where paint was missing, seamlessly integrating them with the rest of the

artwork. Once everything was complete, I reassembled the painting, including its gilded frame. Seeing it restored to its full beauty was incredibly rewarding.

🕒 What is particularly important when restoring such a work?

The key is to restore it without causing any harm to the original. Every intervention I made had to be both aesthetically acceptable and as reversible as possible. This means that if someone in the future decides my work isn't suitable, they should be able to undo it without damaging the original painting.

🕒 When did you realise the painting might be included in an exhibition?

During the restoration process, as I uncovered more about the identity of the girl in the painting, it became clear that the work could serve as the centrepiece of an exhibition. This added an extra layer of responsibility to the restoration. While I could have taken a purely conservative approach, the potential for an exhibition made it crucial to also restore the painting's aesthetic value. It was an amazing opportunity to undertake a more comprehensive restoration that could be shared with the public.

🕒 Did you eventually uncover the entire history of the painting?

When I identified the girl in the painting, Michaela Čadilová, the exhibition's curator, became deeply interested in the research. She was just as enthusiastic as I was, and we began working together to trace the painting's history. We were eager to see how far back we could go.

🕒 What did you discover?

We learned that the painter, Josef Kessler, didn't have children, but his brothers did. By following their lineage, we found two branches of the family who owned other paintings by him – artworks we were keen to see.

🕒 Did you manage to see them?

Yes, we visited one family in Loštice. They shared a wealth of valuable information and were incredibly helpful. It turns out they were the same family Hans Klinger had visited when researching for his publication on Kessler.

🕒 Did the other family contribute to the puzzle as well?

They had a painting we were particularly interested in. Klinger's book included a black-and-white photograph of a painting of a girl, and based on the features, we suspected it could be 'our' Pauline – just older.

🕒 Was your suspicion confirmed?

When we saw the painting in person, the resemblance was undeniable. The girl in the second painting looked strikingly similar to 'our' Pauline. Upon closer inspection, we found Josef Kessler's signature on the painting, along with the year 1860 –

exactly ten years after the first painting. I later superimposed photographs of both paintings on the computer. By cross-referencing their features, we confirmed that 'our' Pauline Kessler is indeed the subject of both works. The shared, unmistakable characteristics left no doubt.

🕒 The family had no idea who was in the picture?

They called the painting Auntie Bušinka, believing it depicted the painter's aunt, Libuše. This name had been passed down through the family. Unlike 'our' painting, this one was more intimate. The painter's style seemed looser and more graceful, evident in the expression, clothing, and overall composition. In contrast, 'our' painting appeared to have a more representative or formal function.

🕒 But you knew right away that the other painting was of Pauline, too...

During our visit to the first family, we were shown a photograph of a woman they called Auntie Zhánělová. By then, we knew Pauline had married František Zháněl at around 38 years old and taken the surname Zhánělová. Suddenly, we had three versions of Pauline Kessler before us at different stages of her life. That's when the whole puzzle came together.

🕒 And that's when it became clear there would be an exhibition.

It's unusual to create an exhibition centred on a single painting, but this case was special. First, people were impressed by my restoration work, and second, the painting's story was so captivating. It's rare to uncover such a significant piece of history through restoration. Together with the museum curator, we began planning an exhibition aptly titled *Sister*.

🕒 How did you feel while working on the painting?

It felt like solving a detective story (laughs). Bit by bit, piece by piece, I pieced everything together, and then it all clicked. It's still incredible to me that, through my dedication and discoveries, we were able to uncover so much.

🕒 Detectives often keep little notebooks. Where did you record all the information you found?

I kept a journal to ensure all my notes were in one place. At the same time, I maintained restoration documentation from the very beginning. That's a standard part of the process, and all the key details had to go there. When I didn't have paper handy, I'd jot down quick notes on my hand (laughs).

🕒 You speak about your work with such enthusiasm – it's clear you've chosen the right field.

I really love restoration. What fascinates me is how it combines so many disciplines. You need to approach a piece holistically, understanding what's best for it. I always say you need to be a little bit schizophrenic in this field – you're part photographer, technologist, chemist, art historian, artist, and skilled craftsman. And that's what makes it endlessly rewarding for me.

First Lady of Power Plants

STORY BY Zuzana Paulusová • PHOTO BY archive of Romana Zadrobílková

Visible from miles around the Pardubice region, the towering chimneys of the Opatovice Power Plant dominate the landscape, symbolising strength and energy. These qualities are equally embodied by Romana Zadrobílková, the woman at the helm of the power plant. A graduate of the Faculty of Economics and Administration, she holds the distinction of being the first – and so far, only – woman to lead a power plant as its chief executive officer.

📍 Do you have sharp elbows?

I like to think of myself as mild-mannered and maybe even too nice. But I know I need to work on being a bit tougher. That said, I've heard some colleagues admit they're too nervous even to call me (laughs). I suppose I project an air that commands respect.

📍 It's still a man's world, isn't it?

I have to admit, I haven't faced significant pushback. However, I do encounter moments of surprise or awkwardness. People sometimes say things like, 'Are you really the director? Nice to finally meet you.' My role is definitely unconventional, especially since I don't have a technical background, and I'm often surrounded by men. But I strive to focus on doing my job well, and I don't let it hold me back.

📍 What led you to the Opatovice Power Plant?

While studying at a faculty of law in Prague in 2006, I came across a job advertisement for a legal position at the power plant. I went to the interview, and to my surprise, I made it to the second round – and eventually got the job. After graduating, I started working full-time. Initially, I had modest plans – I thought I'd stay for a couple of years to gain experience before transitioning to a career in advocacy. But I found the work at the power plant so fulfilling and enjoyable that I ended up staying.

📍 And you climbed the ladder to the top...

Yes, over time, I advanced to head of the legal department. That role gave me the opportunity to collaborate with colleagues across almost every department in the plant. Regarding the CEO position: people often assume it involves gruelling tests and rigorous selection processes. But in my case, it was more about the relationships and trust I'd built over the years. I had already spoken with the decision-makers about my potential promotion, and they saw me as a strong candidate. My experience, approach to work, and the results of our collaborations over the years made all the difference.

📍 Did you pursue further education for your promotion?

Law is a vast field, but it doesn't cover all the areas you encounter at work. I've never been able to separate legal matters from everything else, and perhaps that's what helped me reach this position. Even as a lawyer, I was deeply involved in business negotiations, navigating accounting and tax issues, and understanding the practical consequences of non-compliance of contracts. I even delved into the technical side – why engineers need a specific component and what happens if it's unavailable.

❶ Is that what led you to the Faculty of Economics and Administration?

I wanted to broaden my knowledge of business and finance, so I started exploring options that would fit my schedule. The Faculty of Economics and Administration was nearby and offered distance learning, which was perfect for me. Many of my colleagues at the power plant who had graduated from this faculty spoke highly of their experience, and that inspired me to follow in their footsteps.

❷ This time, you didn't attend classes every day, did you?

Not like during my law studies (laughs). Balancing studies with work – and later with family – was challenging, but it was manageable. Filling gaps in my understanding of economic topics gave me a real advantage in my role.

❸ Do you collaborate with the faculty now?

Our company has a long history of supporting universities in the region, including UPCE. Dean Stejskal recently invited me to join the faculty's advisory board. Our first meeting was in November (2024), and I'm very much looking forward to contributing.

❹ What does a typical workday look like for you?

No two days are the same, but they always involve

reviewing documents of various lengths and topics and attending meetings with colleagues or external partners. The intensity of the day depends on the subjects and outcomes of those meetings. One highlight of my routine is lunch with colleagues in our canteen, where we have an unwritten rule: no talking about work. Those thirty minutes make even the busiest day feel a bit lighter.

❺ Do you spend time on-site at the plant?

I visit regularly – I've been doing so since my time as head of the legal department, so people know me. Despite our best efforts, there's always a natural barrier between management and rank-and-file employees. That's why we hold annual meetings with all employees to share updates, celebrate successes, and address challenges. These sessions include open discussions where employees can ask management anything on their minds.

❻ How many employees work at the plant?

There are 350 of us ensuring the facility runs smoothly and providing households with reliable, worry-free heat.

❼ You mention 'worry-free'. How often do issues arise?

With so many technologies at play, things can occa-



sionally go wrong. Thankfully, major sources remain unaffected. We work hard to address any malfunctions as quickly as possible to minimise the impact on our customers. One event most people recall is from 2002, when the roof collapsed during the heating season, leaving about 55,000 households without heat for several days. The last significant issue was in January last year when faults in the feeders disrupted heat supplies to both Hradec Králové and Pardubice. In both cases, my colleagues managed to restore heat incredibly fast – within five days for the roof collapse and by the next day for the feeder issue. Even now, I deeply admire how quickly they brought the system back to life.

• Are outsiders interested in the plant's operations?

Generally, people aren't very curious about what we do here, which I actually see as a good sign – it means they have what they need. When they adjust the radiator at home, heat is there. When they do take an interest, it usually signals that something has gone wrong.

• Does the public have opportunities to visit the plant?

We regularly host secondary school groups and occasionally primary schools. We've also welcomed visitors from regional and municipal governments, as well as various associations. Individual visits are



rare, but when people do show interest, it's a great opportunity to educate them about the effort and technology involved in keeping their homes warm. To stay connected with the community, we share updates about our operations on social media. We're also planning to restart tours for our employees' families so they can see where their loved ones work.

❶ What other services do you provide to households in Pardubice and Hradec Králové besides heat?

We also generate electricity, which we supply to the distribution grid. Unfortunately, during power outages, many customers call us looking for answers. It's important to clarify that while we produce electricity, we aren't the direct supplier to end users.

❷ What is the plant's main fuel source?

We've tested various types of coal over the years and have now settled on a stable mix of two types of lignite.

❸ But the plant has committed to phasing out coal by 2030. Is that achievable?

Yes, we're transitioning our technology to align with decarbonisation goals and move away from coal. One critical component of our system is the boiler, which produces steam for the turbine that generates heat and electricity. We'll be replacing this with a new

source. The plan is to switch from coal to natural gas, which will help protect the environment and significantly reduce carbon dioxide emissions. While there's ongoing debate about whether gas is the optimal choice, it's currently the most realistic option for us. Reducing emissions is a priority, and we're actively exploring alternative energy sources for the future.

❹ In the future, could you use waste as fuel?

At the power plant, we have long been developing a waste-to-energy facility known as ZEVO. Unfortunately, the ongoing debate surrounding the hazardous waste incinerator in Rybitví has led to confusion, as many people mistakenly associate the two projects. This negative sentiment has impacted our efforts. However, ZEVO perfectly complements our strategy to diversify our energy sources alongside natural gas. It enables us to energetically recover waste from black bins that would otherwise end up in landfills, converting it into electricity and heat for the community.

❺ At what stage is this project currently?

Earlier this year, we received a positive Environmental Impact Assessment (EIA) and are now moving

forward with the necessary next steps. A key milestone is 2030, when we must cease generating energy from coal. If we can implement gas technology or ZEVO ahead of schedule, that would be ideal. The construction phase is time-intensive, but it's really the culmination of years of preparation, including navigating numerous permitting processes. Many don't realise just how much groundwork is required to reach that final stage.

❻ The new technology includes a turbine named after you...

When the supplier's representative suggested naming the turbine after me, I thought it was a joke and agreed to the idea. To my surprise, it actually happened. I just hope that this Romana turbine will behave itself and be a reliable part of our team (laughs).

❼ What does the power plant do during the summer?

We continue to produce heat, primarily for heating water, ensuring that our operations remain continuous throughout the year. However, during the summer, we don't need as much equipment running, which allows us to perform necessary maintenance,

refurbishments, and upgrades. This period is crucial for preparing for the main heating season, when people depend on us to keep their homes and baths

"The intensity of the day depends on the subjects and outcomes of those meetings. One highlight of my routine is lunch with colleagues in our canteen, where we have an unwritten rule: no talking about work."

warm during the cold months. Each summer, we strive to ensure that the following winter is smooth, with no breakdowns and uninterrupted service.

❽ How do you manage work stress and busy days?

I try not to view my job as extremely stressful. Perhaps I've learned to handle it well, and being a parent helps me keep perspective – realising that work isn't everything. There are many factors beyond my control, and dwelling on them would only drive me crazy. On particularly tough days, I'm grateful for returning home, where I feel comfortable and supported. These moments allow a difficult day to completely fade away.

❹ What do you enjoy doing in your free time?

I spend all my free time with my family. I have two children and a supportive husband, and we enjoy doing activities together like cycling trips and skiing in the winter. We also like mushroom picking and participating in escape games. Time with my family helps me recharge. When a free weekend arises in my busy schedule, I enjoy meeting up with friends, whom I value deeply. These moments are invaluable as they allow me to relax and maintain close relationships.

Crowd Shipping: Package Delivery Innovation

STORY BY Zaan Bester • PHOTO BY Adrián Zeiner

Halyna Pivtorak is originally from Ukraine and has been living in Pardubice for two years. Her research brought her to the Faculty of Transport Engineering, where she's exploring alternative ways of delivering packages purchased online. Have you ever heard of crowd shipping? Would you deliver a package to someone on your way home from work? Perhaps this idea will catch on here in a few years.

❶ Do you shop online yourself?

Sometimes – especially around Christmas (laughs). After the pandemic, everyone seemed to shop online, and now more retailers offer home delivery.

❷ But the rise in online shopping and home delivery isn't entirely positive, is it?

That's true. The growth in online shopping has led to an increase in last-mile delivery, which connects the store to the final customer. It's the most expensive part of the delivery process.

❸ Why is it so expensive?

The main part of the supply chain involves consolidated transport – large shipments carried by heavy-duty vehicles over long distances. In contrast, last-mile delivery involves many small packages, each requiring separate trips to individual homes.

❹ Your project offers an alternative to this costly system. Can you explain crowd shipping?

Many people know BlaBlaCar, the platform where drivers and passengers share trips for a fee. Crowd shipping works similarly. Someone making a regular trip – for example, commuting from university to home – can deliver a package along the way.

❺ So, crowd shipping relies on everyday people making deliveries?

Yes, but it's crucial that these deliveries happen as

part of regular, pre-planned trips to avoid creating additional traffic. Some research explores using public transportation for crowd shipping because relying on private cars could lead to extra trips, which would negate the environmental benefits.

❻ This idea could positively impact traffic, ecology, and finances, right?

Exactly. Crowd shipping helps reduce traffic congestion and air pollution while offering a cost-effective delivery method. The goal is to optimise city transport systems by minimising the number of delivery-related trips. Public transport like buses or trains can play a vital role in this approach.

❼ Is the concept of using public transport systems for crowd shipping new?

Not entirely, though it's currently more common in academic research than in practice. Some examples exist, such as Italy's "Take My Things" service. It connects shippers and carriers through an app, where users can list package details like size and delivery timeframe. The platform then matches them with suitable carriers.

❽ How does it work if I want to participate?

If you want to send a package, you'd register on the app and input details like size and delivery time. The app would match you with someone going in



the same direction. It's the same for delivery participants – they'd register, specify their regular routes, and accept suitable tasks.

④ Are there any pilot projects you find inspiring?

Yes, Finland has a project involving library book deliveries. People order books online, and they're transported in shared bags. This approach combines resource optimisation with environmental and social benefits, using existing transport systems.

④ Have you asked people in Pardubice and Ukraine about their thoughts on crowd shipping?

Yes, we conducted a survey with several sets of questions. The first set focused on people's willingness to perform deliveries, including acceptable parcel sizes and types. The second explored concerns, like potential risks or inconveniences. The final section collected demographic data like age, gender, and income level.

④ What were the results?

In Ukraine, a major concern was the risk of handling unknown goods. In Czechia and Slovenia, respondents were more worried about personal privacy, such as being tracked by customers. Czech respon-

dents also mentioned a lack of knowledge about how crowd shipping works.

④ How do courier companies feel about crowd shipping?

It seems like it would be competition for them, but our simulations suggest they would actually benefit. For example, if 7% of public transport passengers were willing to participate in crowd shipping, they could fulfil up to 50% of parcel demand for packages under four kilograms. This solution could reduce courier companies' costs for last-mile delivery – which is traditionally the most expensive part of shipping.

④ Why would everyday people want to participate in crowd shipping?

Financial incentives are a key motivator. But it's not just about money. For example, in a U.S. experiment, two groups of delivery participants were paid the same amount. One group also received messages emphasising their positive impact on the environment. That group made significantly more deliveries, showing how environmental awareness can motivate people to help.

Birds under Her Wing

STORY BY Lada Součková • PHOTO BY Adrián Zeiner

She rushes home from school to care for them. They have feathers, wings, and beaks. Kristýna Štěpánová, a student of the Faculty of Arts and Philosophy, takes care of several handicapped parrots. She does not mind travelling across the country to pick up another sick or injured feathered friend. One of them is perched on her shoulder during our conversation in a café.

🕒 You have a parrot on your shoulder. It's not a standard accessory.

You're right. This is my first parrot; he is actually a parakeet, and his name is Papag. I got to parrots thanks to my boyfriend at the time, who kept saying he wanted a budgie. But I didn't want one. I wouldn't say I liked parrots and didn't like the fact that they make a mess. And it's a worry. But he talked about it for so long that I thought I would buy him one. Shortly after that, we had six budgies, completely fell for it, and started looking into bigger parrots.

🕒 And does this parrot have a handicap?

Papag does have a handicap but not a visible one. It's not physical but mental. He's neurologically impaired and has poor reflexes. If someone wanted to hit him, he'd take it, wouldn't move, and might only peck back a minute later or so. When another parrot pecks him on the leg, Papag screams with much delay.

🕒 Why did you start caring for handicapped parrots?

It came about by complete accident. When we decided to get a parrot, we found a Facebook ad from the Most region that they had fledglings. We thought we were going for a healthy parrot. It wasn't until a few months later that Papag turned out to be a little different. But we didn't mind it at all – quite the opposite. I became interested in it. More and more often, I came across advertisements that someone wanted to get rid of handicapped parrots. A man, for example, wrote in the ad that if nobody came for the parrot by midnight, he would kill it.

🕒 So, you went?

So, I went. We picked up the parrot at the border

with Slovakia. He was in terrible condition. He had broken bones that had grown poorly, so now his leg is twisted. And since he was slower, the other parrots at the original owner's place pecked his eye out.

🕒 How's he doing at your place?

Better, I'd say. He's even in love and has a partner (laughs). They feed each other all the time, preen their partner's feathers, and they bring each other twigs as a sort of present. This female was the last to come to us and doesn't have an eye either. Probably because they have the same experience, they get along so well.

🕒 How many parrots do you have now?

Eleven, counting the larger ones.

🕒 That's quite a collection. Does a gang like that make a lot of noise?

There's not much of a racket, just an occasional whoop. They only get noisy in the morning when they try to wake me up and get them some fruit. I live in a studio apartment, where I managed to cram four aviaries, where the parrots are housed according to their species. So, it's more me living with the parrots than them living with me. They can also fly around the apartment, and I even take them for a walk – like Papag today.

🕒 So, seeing you with a parrot on your shoulder is nothing uncommon.

I try to take them out as often as possible. I even have a parrot with me when I go to my parents' place for the weekend. I use a harness and a leash for such occasions. And when we go inside or take public transport, I always put a nappy on the bird, too. Right now, Papag's got a cloth nappy with watermelons (laughs).

➊ **Where does one get parrot nappies?**

On the Internet. They come in different sizes depending on the species; they are washable and reusable.

➋ **But parrots also come with you to lectures at the university, which some classmates resent.**

Yes, I know. There've even been complaints that my parrot relieved himself in the classroom, which didn't happen. Every time I go in with them, they have that nappy. I can understand that some people mind it when a parrot suddenly squawks – it happens.

➌ **What other handicaps do your parrots have?**

One has had a shortened wing since he was a baby and will never fly. It is poorly developed and looks like a little stump.

The other one's mommy pecked his leg off. The breeder put a ring on the fledgling's leg, which the mother didn't like and tried to take off. I picked up another one with a screw in his head, so now, he has a hole in his skull, but fortunately, no brain damage.

➍ **Such injuries must need a lot of care. It can be financially challenging.**

Taking care of 11 handicapped parrots is really expensive. I spend most of the money on the vet. A small surgery, which I take the parrots to quite often, costs at least 2 000 Czech crowns. It often puts me in

a difficult situation, even though I keep working part-time. It happens that I survive the end of the month on dry buns. Once, I even organised a fundraiser and asked people for money for food and surgery, but unfortunately, not that much money was raised.

➎ **Do you have any veterinary education?**

I don't. I graduated from a pedagogical high school, and now, I'm studying Social and Cultural Anthropology. I want to get a degree in something to do with animal husbandry. I've learned everything on the fly

and know basic veterinary treatment. If something happens to the parrots, I can manage it. When one parrot ripped off a piece of another's toe, I knew how to pinch, dust, disinfect, and treat the wound. By the time I got to the vet, he would have bled to death, so I had no choice but to learn these things.

➏ **Do you still plan to continue in your current field?**

I want to focus my bachelor's thesis on the effect of parrots on humans, which is anthropology – so I will link it like this. But professionally, I see myself as an elementary school teacher who does parrots in her spare time. I'd also like to give lectures about them and start an organisation to rescue handicapped

parrots.

➐ **As an anthropologist, do you see any similarities between parrots and humans?**

There are some similarities between human and parrot societies. Parrots, like the human community, have a specific group hierarchy. We can also observe a certain kind of speech and gestures among them. And in many situations, the parrot has a more intelligent response than the human.

➑ **How do people react when they meet you with your parrot in the street?**

Mostly positively. It's something unusual for them, after all. Sometimes, they are

surprised and ask if the bird's alive (laughs). But in general, I feel that people are not very enthusiastic about parrots, and it's much harder for them to bond with the birds than with a cat or a dog, for example. Anyway, I believe those who get to know them more will fall in love with them.

➒ **I notice that you have several tattoos. Do you have a parrot tattooed somewhere?**

I've got one parrot on my back, and there's a tattoo on Papag on my ankle, too.



Restorer with a Musician's Soul

STORY BY Veronika Sejkorová Skřivanová, Zuzana Paulusová • PHOTO BY Milan Reinberk, archive of Vojtěch Mrověc

When he isn't scaling scaffolding or wielding a hammer, spatula, or brush, Vojtěch Mrověc picks up his violin bow. His life blends two passions: in Venice, he explored the dual roles of restorer and street artist, while in Brno, he shared the stage with the renowned musician Glen Hansard. Yet, despite these adventures, his heart remains dedicated to the honest craft he honed at the Faculty of Restoration.

• Are you more likely to have your violin or your restoration tools with you?

I almost always have both on hand because I keep a violin and a restorer's case in my car. You never know when either might come in handy (laughs). I'm actually a violist by training, but I found my way back to the violin through folklore and friends who play early music.

• Your violin has already led to some remarkable moments, like performing on stage with Glen Hansard...

That's true, and it's all thanks to my friend Francesco from Venice. Three years ago, during his first visit to the Czech Republic, we ended a small tour with Glen Hansard's concert in Brno. Francesco knows Glen and casually asked him, 'Hey, Glen, my friend is a great violinist – can he join you on stage?' To my surprise, I ended up performing an impromptu rendition of Way Back in the Way Back When. Glen then invited me to stay for the rest of the concert, including the grand finale with his full band. It was a surreal experience playing in the packed SONO venue.

• Do you still keep in touch?

We do. When Markéta Irglová, Glen's longtime collaborator, performed in the Czech Republic over the holidays, I had the honour of playing with her. We gave a stunning concert in Náměšť nad Oslavou and

another with the band in Olomouc. The atmosphere was magical.

• Do you have any other notable musical collaborations?

Currently, I'm playing with Pavel Helan, a musician who was a finalist in Czechia Slovakia's Got Talent (editor's note). We connected through the Sonjašnyk ensemble in Litomyšl, where I'm part of the string quartet. One day, after a performance, we were having a beer and casually talked about creating a music video for his upcoming album. That dream came true – the video for Spasena Ukraina will be released soon. The album, For a Little While Longer, is already out, with its main purpose being to support Ukraine and inspire perseverance.

• Where can people hear you perform?

I'm involved in many concerts all over the country with different projects – my schedule is packed. One of my favourite venues is Kámen Castle near Pelhřimov, where we regularly perform Baroque music. I became friends with the castle manager during a restoration project, and now she invites us back as musicians.

• Does music ever take precedence over restoration?

Not really. I enjoy both equally. These days, I focus on restoration during the week and perform on weekends. A musician friend of mine jokingly says,



'Restorers think he's a good musician, and musicians think he's a good restorer.' That sums it up pretty well (laughs). I hope one day to master both crafts fully, but for now, I'm happy balancing them.

Q You recently graduated from the Faculty of Restoration. What's next for you?

There are plenty of opportunities ahead. My first step is to apply for a license from the Ministry of Culture, which is essential for working independently on cultural monuments. Without it, you can't take on such projects. But before that, I'm preparing to head to Valencia.

Q Is this trip for music or restoration?

This time, it's for restoration. I'll be working on the Santos Juanes Church, which is home to some incredible murals. The church was badly damaged during the Spanish Civil War in 1936 and restored in the 1960s. Now, it's due for another round of restoration.

Q I heard that in one church in Valencia, restorers are using bacteria in their work. Is it the same church?

It is! This method has gained a lot of attention across Europe. In the past, adhesive residues were left behind during fresco removals, which complicates

restoration work today. Scientists and restorers are now testing a process using trained bacteria to safely remove the glue. Our faculty collaborates with technologists and universities in Valencia and Milan, which have extensive experience with these innovative techniques.

Q Are these kinds of unusual methods common in restoration?

Interdisciplinary collaboration with technologists is becoming increasingly important, especially for tackling complex issues like this. Restorers who embrace these challenges can make significant advancements, though I personally approach such methods with caution. It's crucial to handle the work as gently and meticulously as possible.

Q Spain is known for its amateur restorers occasionally causing damage. Have you encountered anything like that?

Yes, stories about bizarre restoration attempts do make the rounds on social media. These mishaps happen everywhere, even in our country. For example, you hear tales of someone sweeping up a fallen piece of stucco and throwing it away (laughs). Luckily, neither I nor my classmates have been involved in



anything like that. We're dedicated to studying and perfecting our craft to ensure we handle every project with care and professionalism.

🕒 What monuments do you expect to work on in the future?

My work typically involves churches, parsonages, monasteries, chapels, wayside shrines, and private houses, often in older residential areas. My specialty lies in restoring murals and historical plasterwork, including frescoes, secco paintings – a method of painting on dry plaster – sgraffito, and mosaics, which are commonly found in these types of buildings.

🕒 How do you approach restoration work?

The first step is understanding the monument's history, the artist's original techniques, and how previous restorers worked. This knowledge helps us connect with the essence of what we're restoring. Context is always key. That's why we start with a detailed survey, revealing what lies beneath the plaster and its layers.

🕒 Should your interventions always be visible?

It depends on the agreement and requirements, as the National Heritage Institute oversees all work on cultural monuments. Sometimes, our interventions are intentionally visible, while other times we aim for aesthetic seamlessness. For example, in Venice, they prioritise preserving patina and prefer leaving exteriors untouched to maintain their aged appearance. However, interiors, often featuring more recent decorations, are typically restored to their full glory. Ultimately, the investor's needs and the building's purpose guide our approach.

🕒 Have you encountered any particularly challenging monuments?

The difficulty often depends on the working conditions. Dust, dirt, and cold are all part of the job. We spend a lot of time on-site, equipped with helmets, vests, and proper footwear. In some cases, we even sleep in the buildings we're restoring, setting up makeshift living quarters nearby. Then it's straight back to work just behind the door.

🕒 That sounds a bit like a fight for survival...

It is demanding. Climbing scaffolding daily, sometimes building it ourselves, and performing tasks like applying stucco or injecting mortar into plaster can be exhausting. You might work for months, and the results can be so subtle that they're hardly noticeable to the casual observer.

🕒 Is there anything about your work that still surprises you?

I'm often amazed by the durability of the original materials our ancestors used. We're now rediscovering how effective these materials are – lime and animal glue, for instance, are incredibly difficult to replicate with modern alternatives. Just this summer, while working on Renaissance sgraffito at the castle in Litomyšl, I was astonished to find original sgraffito from the 16th century intact on a chimney that has withstood centuries of exposure to the elements.

🕒 What goes through your mind when handling such history?

It's humbling, but also nerve-wracking. When uncovering or cleaning a work of art, I'm always afraid of causing damage.

🕒 Did you have similar feelings during your Erasmus experience in Venice?

Absolutely. Venice was an incredible adventure. It's like a living museum of art and architecture – a city



Vojtěch Mrověc – a talented restorer, painter, and musician who has been passionate about art from a young age. Although he always dreamed of being a painter, he found his path in mural restoration and hasn't looked back. Even as a secondary school student, he collaborated with his hometown of Náchod on a comic guidebook, *In the Footsteps of Dany Smiřický*. He has illustrated several books for both children and adults, and is gradually returning to his personal art projects.

steeped in wealth and history, where the interiors of palaces evolved with changing times and owners. The experience taught me how to restore buildings that sit practically on water, dealing with air humidity levels exceeding 90%. It was invaluable.

🕒 What interesting things did you restore in Venice?

I worked on 19th-century decorations, including stuccoes, gilding, illusory marble, and frescoes by Francesco Hayez in the Giovanelli Palace. This palace was likely designed by the same architect as Venice's iconic Palazzo Ducale.

🕒 You even took an unconventional means of transport to work...

In Venice, cars or vans aren't an option due to the narrow streets and numerous bridges. To get around, you must walk or take a boat. All materials are carried by hand, and the best companion for crossing bridges is a hand truck – a must-have for any craftsman in Venice (laughs).

🕒 Would you like to return to Venice?

Absolutely, not just for the work but also for the people who became like family to me. We stay in touch, and sometimes they visit me in the Czech Republic, or I go to Italy, or we meet elsewhere in Europe. Still, there's nothing like being in Venice itself.

🕒 Why are the people there so dear to you?

I got to experience Venice from a unique perspective, thanks to Francesco Colabella, a local street artist who became my unconventional guide.

🕒 Did he introduce you to busking?

It was actually the other way around – busking brought us together. I initially started busking to earn extra money so I could enjoy evenings in Venice's pubs and get to know the authentic city. After work, I'd take out my violin and play in the streets. Busking opened doors and won me the hearts of many fascinating people.

🕒 What's it like to busk on the streets?

Opening your case and playing on the street is stepping out of your comfort zone, but it feels completely natural to me. It's about the unique energy and excitement it brings, immersing myself in the present moment and embracing unexpected experiences. Every day is different – I never know how people will react, what stories I'll hear, or who I'll meet. It's a fas-

cinating way to explore not just the world but also new aspects of myself.

🕒 Did you play something typically Czech?

Yes! The song *Sluneční hrob* by Blue Effect, famously featured in the film *Pelíšky*, was a big hit with the audience.

🕒 Music has been with you all your life... But how did you get into restoration?

It runs in the family. I always wanted to be a painter, but my brother, who discovered the Faculty of Restoration and started studying there, influenced me. I chose my secondary school with the goal of getting to Litomyšl, and after applying to various art schools, I ended up there with my portfolio.

🕒 Did you have any concerns about choosing an art school?

I did wonder if I could make a living from it. But it's crucial not to let such concerns stop you. I have many artist friends. For example, I recently collaborated with the excellent painter Michal Bačák on a mural in Bedřich Smetana's house. He's a full-time illustrator and artist, proving it's possible to succeed.

🕒 Did you follow the same field as your brother?

No, I chose a studio specialising in mural painting, sgraffito, and mosaics, while my brother focuses on sculptures and related materials. He eventually settled in Litomyšl, though we're originally from Náchod.

🕒 Do you ever work together?

We've collaborated on several projects in both restoration and music, and we'll definitely work on something together again in the future.

🕒 What restoration work do you have coming up in the Czech Republic?

We're continuing the restoration of the sgraffiti at Litomyšl Castle, and I have smaller projects across the country. For instance, next year, I'll partially complete the painting of the Stations of the Cross, which will be a nice change.

🕒 Could you eventually settle in Litomyšl? Maybe we'll meet you at the faculty again...

Who knows (laughs). In fact, I am returning to the Faculty of Restoration, but this time as a teacher. I'm taking over the specialised art training of students from the excellent artist Radek Petříček. I'm excited to be back in the studio and hope to return to painting, which I've had little time for lately.

Debris Laboratory

STORY BY Zuzana Paulusová • PHOTO BY Adrián Zeiner

They produce two-ton concrete columns. In the lab, they test what the columns can withstand, repair their damaged parts, and test them again. With their help, experts from the Faculty of Transport Engineering are discovering how to improve, reinforce, or repair structures to make them more durable, even in earthquakes.

It was on Monday, 6 February 2023. At 4:45 in the morning, Turkey was waking up to a new day – just another ordinary day. Suddenly, the morning quiet was interrupted by an earthquake, and not a weak one at that... It lasted about 70 seconds, with the tremors reaching as high as 8 on the Richter scale, which is amongst the highest values. The aftershocks lasted for another six hours with a magnitude of up to 6.7. Hundreds of thousands of residents were trapped in destroyed buildings. It is not unusual for an earthquake to strike where the earth's plates meet, but it was the first of this magnitude in over 80 years.

Some building structures in Pardubice experience similar stresses as in the earthquake. However, the locals do not notice it because these experiments are under control. They are conducted in a unique Centre for Education and Research in Transport laboratory, where Ladislav Řoutil and his Turkish colleague Özgür Yurdakul work. It has been 10 years since they met at the university. Their relationship, initially mentoring, started with Özgür's PhD thesis and gradually turned into a collegial one. This formed the basis of a research team that includes several other colleagues today.

Laboratory behind a massive door

The research team's laboratory is located in the technological complex in Doubravice. From the entrance, we head to the back of the complex and look for a sizeable grey door. It is behind them that the experiments take place. On the way to the lab, we pass massive concrete columns on the left. These are currently tested structural elements designed

by local experts and manufactured by a specialist company. The pair of scientists have dedicated their research to the collapse of building structures. That is why they take care to subject the parts of buildings or transport infrastructure under study to different types of loading. They look for their weak points and ways to strengthen them. In this way, they improve the mechanical response of reinforced concrete structures and listed buildings.

"Here, we investigate how a reinforced concrete structure behaves in response to normal and extreme loads caused by various influences. We try to trace where damage occurs in structures, when and where cracks form, and how they propagate through the material. At the same time, we need to describe the factors behind that. We follow the process from both an experimental and computational point of view, using advanced numerical models," begins Ladislav Řoutil, who starts the tour of the laboratory and explains what they want to achieve with their research. "Our research helps to design reliable building structures that meet the requirements for safety, economy, and long-term sustainability," he adds. They also strive to consume as few raw materials as possible.

Experiment as the research basis

Concerning testing, the researchers use custom-made parts of concrete structures. "These actual ones are made of reinforced concrete, weigh two tonnes, and are quite difficult to handle. We also use a crane for this, so we must have crane tests," explains Özgür Yurdakul as we stand in the high-



“The pair of scientists have dedicated their research to the collapse of building structures. That is why they take care to subject the parts of buildings or transport infrastructure under study to different types of loading.”



Ing. Özgür Yurdakul, Ph.D., comes from Ankara, Turkey. He studied civil engineering and has worked on the topic since his dissertation. He has been researching and living in Pardubice for about ten years. Immediately after his arrival, he became part of Řoutil's research team. He brings interesting international contacts to the team. For example, he worked as a postdoc in Naples, Italy. He is a member of the prestigious International Federation for Structural Concrete (FIB).

Doc. Ing. Ladislav Řoutil, Ph.D., has worked at the Faculty of Transport Engineering since 2012. He deals with structures and transport buildings, mechanics and statics of building structures, and modelling of their damage. In the past, he was awarded the "Outstanding Dissertation in Concrete" in the competition of the Czech Concrete Society. He publishes articles in professional journals and is involved in several research projects, and last year, he was appointed a Czech representative to Europe's Rail Scientific Committee.



“We are currently testing whether our procedures are also applicable in areas with a risk of earthquakes. Not only in Turkey, reinforced concrete buildings have various structural deficiencies.”

ceiling laboratory. It looks more like a construction site, with a reinforced concrete column waiting to be tested. A little further on, another one has already passed a similar experiment. It is visibly damaged. In some places, the concrete is hollowed out; in others, cracks reveal steel reinforcement or wires sticking out. These wires are crucial for testing. They are part of the strain gauges installed in the blocks when poured and give scientists the data they need. “Strain gauges are used as sensors to measure mechanical stress indirectly. We’ve carefully planned their deployment. They must not be damaged during the concrete pouring process and must remain in place,” says Özgür, adding that until recently, the parts of the structures to be tested were made by the researchers themselves. However, the need for the parts continuously increased until the team could not provide everything themselves, so they hired a partner company to manufacture them.

The structures so designed can finally be tested by the researchers. One test lasts about five days, including preparation and clean-up. Partial loading takes place throughout the day. “Even though we carry out a load test, we must prevent total destruction. That would also damage the experimental equipment, which we don’t want. If necessary, the test must be stopped in time, which is closely supervised by Özgür together with his team colleague, Reader Bohumil Culek, who analyses the data here on the screen,” notes Řoutil. However, damage to the tested structure is bound to occur. It is then repaired, together with the cracks, by the experts, and the whole structure is retested.

Testing (not only) Turkish structures

Scientists use a unique process to strengthen or rehabilitate concrete structures by applying carbon slats to selected areas. “This procedure is proving to be very effective for the additional reinforcement of various building structures. We are currently testing whether our procedures are also applicable in areas with a risk of earthquakes,” adds Özgür. Not only in Turkey, reinforced concrete buildings have various structural deficiencies. “They’re, for example, the result of inappropriate technical design or poor material quality, such as using low-strength concrete,” he explains. Problems are

also caused by improper design and inadequate inspection mechanisms, he says, and the use of steel reinforcement in building structures. “The surface finish of the reinforcement is typically ribbed, which improves the cohesion between the reinforcement and the concrete. But in Turkish structures, the reinforcement is often smooth, negatively affecting this cohesion,” adds Řoutil on the composition of reinforced concrete.

Therefore, they are developing procedures to ensure that further earthquakes in Turkey will not cause as much damage. Yet, the scientists do not import the Turkish parts of the buildings as souvenirs from Turkey to Pardubice. They use custom-made parts of the structures with the same composition as Turkish masonry for testing. Occasionally, the supplier of the constructions wants to make sure that there is no mistake in the composition as, to his surprise, it is very different from the Czech standards. The only thing the researchers bring back from Turkey is data directly from the field. Özgür went to a damaged area in Turkey after the last earthquake. Such scenarios serve as a laboratory for civil engineers, so he and his Turkish colleagues have collected important data from damaged structures that are opening up new horizons for the group and pushing testing ever further.

More research to come

For these purposes, Pardubice scientists are also planning research on using shape memory alloys. They have recently started developing and testing systems for damping vibrations of structures using specially developed non-Newtonian fluids. They and their foreign partners have already received a prestigious European grant for this research. Their research team is also nominated in the TOP Innovation in Pardubice Region 2024 competition, and their scientific results are valid internationally. Thanks to their membership in international committees, they are involved, for example, in incorporating research results into standards for designing structures across Europe. Özgür Yurdakul is very active in this respect. Not only does he serve on The International Federation for Structural Concrete (FIB), but he also fosters research with his enthusiasm and drive.

Love on the Court

STORY BY Zuzana Paulusová • PHOTO BY archive of František Pihera

They met through beach volleyball. But the game took on a whole new dimension when they put on cleats and ran to spike the ball on the snow-capped mountain tops. Two paramedics, František Pihera and Edita Dražanová, fell in love with snow volleyball. After all, they are at home on the court and at heights, although they have not had to provide first aid to anyone there yet.

Q Did you meet on the court?

E: Not exactly. It was at a party organised for players who got eliminated from the tournament by Saturday at the 2020 Czech Beach Volleyball Championships in Opava. And luckily, we both were knocked out and went to the party (laughs).

F: Imagine ěda cheering our opponents to knock us out.

Q So, are you rooting for each other now?

E: Of course, I'm a fan, but František is not interested in women's volleyball, and when I play, he doesn't live it. He'd rather go see his friends.

F: Edita wasn't even supposed to play in that tournament. It was at the time of COVID, and someone dropped out at the last minute, so it was a coincidence. Plus, the event was held on the other side of the country in Opava...

Q Where are you from?

E: I'm from Jindřichův Hradec, so I was almost across the country. I remember the trip to Opava was pretty crazy. Fanda is from Prague, so it was easier for him.

Q How did you end up in Pardubice?

F: I was studying in Prague at the Faculty of Physical Education and Sport of Charles University and finishing my bachelor's degree. I was deciding whether to continue at the same school, tempted to try something different. And my cousin gave me the idea of going to Pardubice to become a paramedic. Edita was studying medicine in Hradec Králové, so I thought I would be closer to her.

E: I wasn't sure if I wanted to continue in medicine. Studying this field is pretty demanding; I was drowning in books all year, which didn't quite fit my

lifestyle. I like to travel and play sports, plus doctors don't have it easy, so I decided to take a break for a year. I didn't want to get out of healthcare because I enjoyed it. The idea of studying paramedicine was an alternative, but I liked it so much that I dropped medicine altogether.

Q Can you also see yourselves working in one ambulance together one day?

E: Probably not. I don't know if it would work out well (laughs).

Q Do you play in a mixed team in volleyball?

E: We only play a single tournament together because, in the Czech Republic, official mixed tournaments are played more for fun. We have participated in the Academic Championship of the Czech Republic three times. We were second twice, and in one case, unfortunately, we couldn't play because we both had to leave for an exam.

Q Are you going to crush your opponents again this year?

E: At least we hope to defend our second place from last year. Hopefully, it will be better this year because last year, I'd had back surgery just before, so I was standing in the corner and hoping that Fanda would fix everything for me. And it worked out pretty well (laughs).

Q Do you have any special preparations for the tournament?

F: Not so much. We'd have to play together for a long time to tune up. Plus, these mixed tournaments often don't count towards overall points, nor do you usually advance any further. We take them more as a social





event, meeting friends and playing a nice game. We're mainly successful because we play relaxed and at ease.

E: But before the match, we usually tell each other at least a brief strategy – especially when we're playing against someone good. Mixed are more about the guys playing, as the net is set high for the men's game, and the girls can't spike across it.

Q: Do you play snow volleyball together too?

F: It is not played mixed at all. But we both go to the tournaments because both (men's and women's) categories are often played.

Q: How did you get into volleyball on snow?

F: About five years ago, the guys from beach volleyball and I discovered this sport, and we thought we'd try it. Initially, we took it as a fling and didn't expect to get so caught up in it, let alone participating in various championships and collecting medals.

E: I didn't know this sport at all. I became more interested in the game when I met Fanda, who had just won the national championship in Špindlerův Mlýn. And I thought that if he was going to play in the snow volleyball tournament, I might play as well. So, I got a team, and we go together.

Q: How is it different from the game on sand?

F: I like that every game's completely different due to the conditions, and it only shows on the court what

you can expect. The snow is hard and slippery at the start when playing on one court, and any quick movement is complicated. But the snow gets almost slushy by the afternoon, and you can hardly jump. The golden mean is the best.

Q: How much does bad weather complicate the game?

F: It is played in all weathers. Sun and snow are not such a problem. About twice, we experienced very strong winds in the mountains. That's when we're glad to get the ball over the net, and the game doesn't even look like volleyball.

Q: Do you mind the music playing during the matches?

F: That's what we love about snow volleyball – music always playing. We often bring our own speaker. About once, we had an opponent ask us to turn it off. In beach volleyball, the music only plays between exchanges and has to be turned off at warm-ups.

Q: What is your favourite music during matches?

F: It depends, but we like to play a lot of *Divokej Bill* and the like.

Q: What else do you enjoy about this sport?

E: It's fun, the game is very relaxed. No unnecessary stress to get some results. For us, it's about coming together. We've been training indoors all

winter, and suddenly, we can be out there, put on the cleats we're not used to at all. It's just fun. Moreover, the tournaments abroad, for example, in Austria, are played up on a hill, where you enjoy the views, and the vibe's utterly different from the Czech Republic.

F: The atmosphere is generally pleasant and friendly. This is also because snow volleyball is not yet considered professional. It's a new sport that's been around for a couple of years. I like that it's very social. We all go and sit down in the pub in the evening and chat with our opponents; we have a lot of friends amongst them.

Q When does the snow volleyball season end?

F: It's still played in the spring. For example, at the end of March 2024, we were supposed to go to Wagrain in Austria, where we like it, but the tournament didn't take place there last year. Anyway, there were tournaments in Georgia, Turkey, and mainly Italy on the list, which we liked, but when we found out we would be driving thirteen hours to get there, we gave up. The point is that we like to drive to tournaments. There's always more of us going, as we can pack what we want and travel around the venue.

Q Do you study together?

F: It depends. We have different learning styles, so we may ask each other questions when we don't understand something. It's more like we bring one another to studying...

E: Although we may be learning the same thing, we like to sit in a different place. I'm much slower at learning than František, who then asks me questions that I haven't yet got to.

Q Is it possible to combine studies with international tournaments and a top-level sport?

F: Beach volleyball season runs in the summer, and there's not much going on in the winter except for a few snow volleyball tournaments, so it's not that big of a deal. It gets more complicated with training. We have training groups in Prague, and regular commuting would take a lot of money, so we try to maintain our fitness and hit the sand only in summer. Ěda commutes to Prague at least at weekends. And now, she's arranged a group in Pardubice.

E: I train with the girls at the university Beachpoint once a week. The university also plays Sixes, which I had to give up as a player because it caused my two

surgeries, but I lead the girls' team there. I'm glad I can be a part of it, at least as a coach.

Q You indeed spend a lot of time together. Do you ever get on each other's nerves?

E: Everybody asks us about it and wonders (laughs). But in volleyball, it is not uncommon for a coach and a player to be a couple. Of course, we have days when we are not the nicest to each other, but that's normal.

Q You also travel a lot through sport...

E: Over the summer, we combine travelling with trips to volleyball tournaments. For example, we went to Slovenia last year. I didn't play there, but I joined the boys. Plus, we play a lot of tournaments around the Czech Republic. We always take it as a little holiday. In addition, we go on even bigger holidays – like last year, when we visited India.

Q I checked your photos, which show that you are also into other sports. Do you like adrenalin?

F: It's somewhat various outdoor sports. We both enjoy being outdoors with friends; we prefer ski touring or climbing. Everybody thinks that climbing is a hazardous sport, but when it comes to it, via ferrata, which are like hiking trails, are much more dangerous than climbing. We fix the ropes every two metres, so it's not so bad. But one must avoid any technical mistakes.

E: I'd slow František down a bit; climbing can put you in a dangerous situation, and it's definitely more dangerous than beach volleyball.

Q But it can also cause injury.

E: It's minimal in beach volleyball, I'd say. There's rarely anyone in our player pool who gets injured right out of the game.

F: This is also because beach volleyball is a non-contact sport. There's a net between us, which is the only place where a clash can occur. We tend to get sprains or strains on certain parts of the body rather than outright injuries from the game.

Q Do you already have plans for the summer?

F: (Laugh) I've been known to plan from one day to the next.

E: Indeed. Planning something with František is pretty unrealistic. If I ask him now if he's coming to Mallorca with me in July, he'll confirm it three days before he leaves. So, I'll plan the trip myself, and František will join me or not.

Did you know that...?

"Generally, snow volleyball is volleyball on snow. It is played on the same size court and almost with the same rules as beach volleyball. There are three players on each side, plus one substitute. We wear soccer cleats. As a setter, I also have gloves so the plush ball we play with doesn't slip through. On the other hand, the gloves can be a nuisance for the attackers," František Pihera explains the specifics of snow volleyball.

Cross-country Ski Racing

STORY BY Zuzana Paulusová • PHOTO BY Milan Reinberk

Even though he would not go cross-country skiing himself, he likes watching biathlon on TV. But it is not only through watching the Czech biathletes that he supports the Czech biathlon team. David Veselý, a Chemistry researcher of the Faculty of Chemical Technology, has improved the waxes for cross-country skis. His team developed a special additive that can make them go faster. And it could become available to ordinary cross-country skiers.

❶ Do you go cross-country skiing?

No, I don't. There is no way to get me cross-country skiing – it so much exercise (laughs).

❷ How about biathlon? Do you watch it?

I do, but really only from my couch.

❸ But you have an ace up your sleeve for the athletes...

What we are working on is a type of additive for different wax formulas, mainly liquid ones, used for ski waxing.

❹ What is the additive used for?

The goal of our research was to develop substances that would make the skis run faster, especially on snow. The general rule is that the higher the lubricity, the less dirt gets stuck on the material. And that is a great advantage for skiing. Skis prompted us to think of better lubricity, but we gradually expanded our interest and looked into better lubricity in general, not only for snow. The intention was to reduce the interfacial friction as much as possible.

❺ How exactly should the additive help cross-country skiers?

It is an accelerator. It will be most useful for the skating method when it is necessary for the skis to go as fast as possible. Every inch that makes the skis go further, and save the athlete's energy, counts.

The same goes for double-polling. For classic cross-country skiing, it is necessary to push against the ground and keep the skis in contact with the snow. That is where our additive will have no effect.

❻ What are the advantages of your additive?

It is highly hydrophobic. Once applied, the water

leaves the surface instead of remaining there. That was the starting point for us. Lubricity is related to surface energy, which is in turn dependent on the angle of contact. Water is the most important medium for skis, as well as other areas where our additive can be applied. The lubricity is best on water, and snow contains water. That is the trick.

❼ Are there any other properties of the additive?

We wanted it to stay on the material as long as possible. Skiers often complain of the skies becoming worse towards the end of the race. To avoid this, it is necessary to prevent the additive from abrading, but we cannot do that yet.

❽ What does the additive look like?

It is a white solid substance. Its chemical composition includes silicon, oxygen, carbon, and hydrogen. It is very soluble, so solutions containing the additive can be made. In theory, it could be used in powder form, but that does not make much sense from the technical point of view. That made sense when Teflon was used for the bases, and the powder got ironed into the surface. For modern bases, this would be a waste of material.

❾ How did you prepare the additive?

Through organic synthesis. It is rather complex for organometallics and takes more than a week. It is a sophisticated and quite complicated process with rather expensive input materials. The synthesis partially occurs in an inert atmosphere.

❿ How much of the additive have you produced so far?

More or less half a kilo. We prepared a number of formulas in small quantities and got to test them.

And the feedback saying “this the the best, this is what we want” made us research further. It makes a difference whether you prepare 0.05 grams, 10 grams or 100 grams of a substance.

❶ What was driving your research?

The gradual ban on PFAS (Per- and polyfluoroalkyl substances). The ban got the whole research area into action. It was often mentioned that such chemicals are not environmentally friendly, are hardly biodegradable, and possibly even detrimental to human health.

❷ So that goal was achieving the same properties without fluor?

We all agreed that hydrophobic properties are the most important properties for our use. To give you an illustration, a drop of water on a Teflon pan just spreads around. And we wanted to get the same for the ski bases used today.

❸ Did it take you long to fine-tune the additive?

We worked on that for about 2 years, but there were prior developments. At the beginning, we discussed what we wanted to achieve and whether it was possible with a wax-making company, our partner.

❹ How does the practical testing look like?

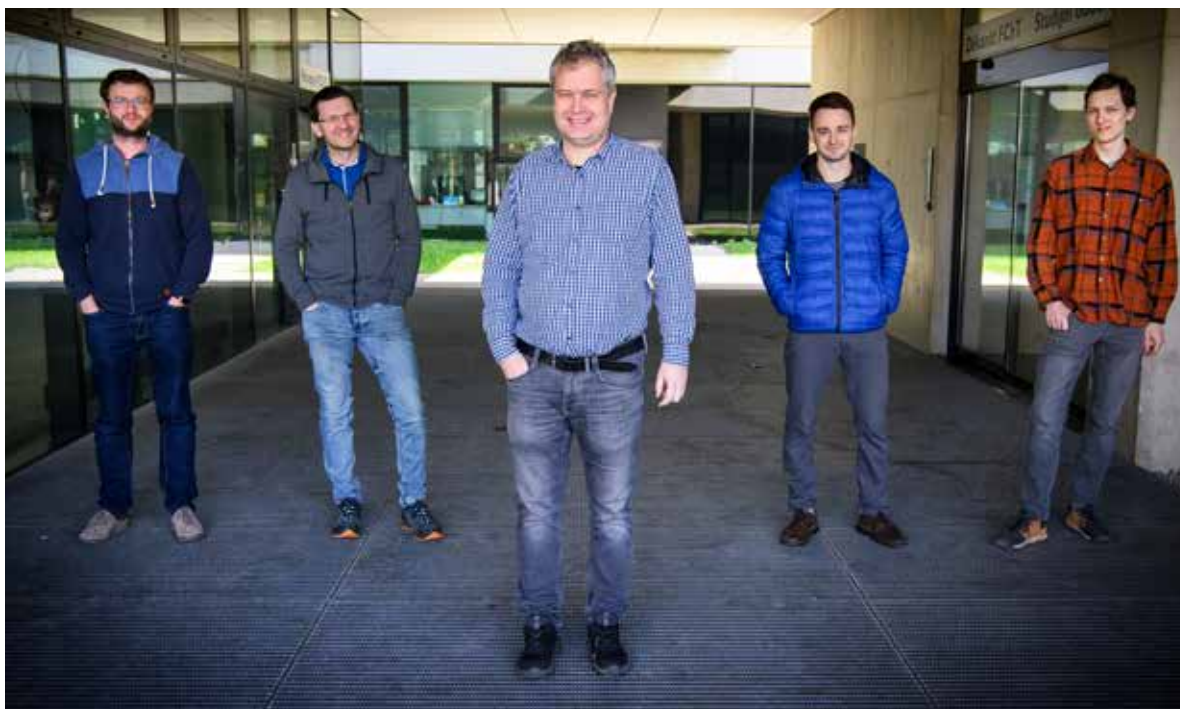
Our additive is tested in the field. Specifically, speed and travel range are tested. Our partner company adds our additive to different mixtures for ski waxing, and it is quite demanding to find the right one. They prepare several pairs of skis where mixtures with different amounts of our additive are applied. The tester then goes on the track with one pair of skis. They go downhill, do around 2 kilometres, and then there is an electric eye to measure the speed. They take the skis off, put on another pair and do the same.

❺ Have you taken an active part in such testing?

It would kill me. Testing is really demanding in physical terms.



“We all agreed that hydrophobic properties are the most important properties for our use. To give you an illustration, a drop of water on a Teflon pan just spreads around. And we wanted to get the same for the ski bases used today.”



In addition to doc. David Veselý the team includes prof. Ing. Roman Jambor, Ph.D., Ing. Miroslav Novák, Ph.D., Ing. Michal Aman, Ph.D., and Ing. Michal Srb.



🕒 **For professional athletes more is needed than just applying the wax and getting on the track, right?**

Definitely, professional waxing requires expertise. I have seen how skis are prepared and it is a craft.

🕒 **Does that mean that the additive will not be available for amateur athletes?**

It will. For amateur use, we will prepare the liquid form that can be sprayed on the base and the skier is ready to go. Having said that, we need to test the mixtures first to avoid a situation where someone sprays it on their skis and they will not run. Once all the fine-tuning is done, it will be possible to manufacture and sell the products. But that is the role of our partner.

🕒 **Many cross-country skiers have a set of waxes, choose one according to the weather conditions and go. Is that no longer the case?**

What is offered in the shops tends to be different these days. Many of the waxes are liquid. And that is actually the most successful form for us as well. Our additives work best with liquid uses. They can also be applied to paraffin waxes, which is what many skiers know.

🕒 **What brought you to such research?**

At the very beginning, I was approached by Mr. Tischer, one of the first graduates of our faculty.

He wanted us to help him increase the lubricity of cross-country skis. And since my expertise covers silicone resins and polysiloxanes, we started with the application of the substance. In fact, we are developing it for Mr. Tischer.

🕒 **Is it just you in the research team?**

I started the work with polysiloxanes and siloxanes based on silicone. Later, Dr. Novák and Professor Jambor joined the team, who moved it further with their expertise in more complex organometallic compounds. Recently, we have taken on board Dr. Michal Aman and Ing. Michael Srb.

🕒 **How does it feel to witness the origin of such a substance?**

Well, it feels good. My ambition is to do research in partnership with the businesses, which makes this rather complex research progress so much more relevant and brings it closer to something with real potential.

🕒 **Are there any limits of the research in such fields?**

It is impossible to see the limits now. Due to the ban on PFAS, it is an emerging field and it is hard to predict when the boom of experimentation will be over. Some substances will take over, but it is hard to say now already when that will be.

CV

doc. Ing. David Veselý, Ph.D.

(1975)

- David Veselý works at the Department of Paints and Organic Coatings of the Institute of Chemistry and Technology of Macromolecular Materials.
- He researches the formulation of coatings and organic coatings by synthesis of anticorrosive pigments and study of mechanisms of oxopolymerization reactions.
 - Over the past two years, he and his team have been working to improve the lubricity of polymeric surfaces and composites. This may, for example, make cross-country skis go faster, and it is environmentally friendly.
- The research earned him the 2023 P-ping award of the Pardubice Business Incubator for the Top Innovation category.
- The University of Pardubice owns a Czech patent covering the mixtures with the new additive.
 - He likes spending his free time with his children.

Writing our history since 1950

STORY BY Zuzana Paulusová : PHOTO BY Adrián Zeiner

There was chemistry at the beginning of everything. The year was 1950, and thanks to chemistry, The Chemical College (later known as the Institute of Chemical Technology) was founded. What started as a single field of study has expanded, and six more fields of study have been added, making it a modern higher education institution with a new visual identity. The University of Pardubice and its campus have much to offer their students.

The studies of Chemistry in Pardubice have a well-rooted history. However, fields other than Chemistry emerged and wanted to become autonomous. After the turbulent changes in 1989, everyone believed that something would change here as well. The 1990s saw the establishment of the Faculty of Territorial Administration (later transformed into the Faculty of Economics and Administration). The next faculty to be established was the Jan Perner Faculty of Transport, whose establishment in Pardubice, a major railway junction, was facilitated by the split of Czechoslovakia. On 31 March 1994, the name officially changed to the University of Pardubice, which became the 6th university in the Czech Republic.

New campus

The university continued to develop in a dynamic way and the establishment of new faculties in the new millennium went hand-in-hand with the new programmes being offered. The Faculty of Arts and Philosophy was established, followed by the Faculty of Restauration based in Litomyšl, the Faculty of Health Studies, and finally the Faculty of Electrical Engineering and Informatics, established in 2008.

When new premises on the right bank of the Elbe river, near the university dormitories, were acquired in the 1990s to enable university expansion, it was clear that they would turn into a modern university campus one day. It is a small city which grows in size at the beginning of each semester and hosts around 7 000 students studying at 7 faculties. The campus has changed considerably and the environment for students, teachers, and other staff is continuously improving.

New construction to follow

Within two years, the Faculty of Health Studies will finally get a new building after waiting for convenient premises for a long time. It will be closer to the campus and also to the Pardubice Hospital, where students do their internships. The Faculty will be located at what used to be the Telegrafía factory. However, it turned out that renovation of the building would not be sufficient. Its structural condition was so poor that it could collapse, leaving no possibility of renovation or reconstruction. The survey revealed that the foundation had been undermined by water for a long time and lacks the required bearing capacity. That is why the university opted for plan B: A new building will be developed on the original premises (of the Telegrafía factory). But the legendary brands of Telegrafía and Tesla, of which the locals are so proud and which are undeniably linked to the place, will not be forgotten. „We have been discussing with the architects how to keep certain elements referring to Telegrafía. At the moment, we are considering a prominent gable facing the overpass or an artistic replica of the chimney, or possibly other features,“ says Petr Gabriel, Bursar of the University of Pardubice.

By the end of 2024, the University will announce a bidding procedure to select the construction company. Then the actual construction will begin. If all goes well, the construction should be finished in two years' time. The new building faculty building should welcome would-be nurses, paramedics, midwives, and radiological assistants in 2026.

The image features a large, dark grey, stylized logo for the University of Pardubice. The logo consists of a large 'U' on the left and the letters 'UNIVERSITY OF PARDUBICE' on the right, all rendered in a modern, sans-serif font. The logo is set against a background of a wooden structure, possibly a walkway or a bridge, with a wooden railing. In the foreground, several red balloons are visible, some with white text on them. The background shows a building with blue windows and bare trees, suggesting an outdoor setting. The overall aesthetic is modern and dynamic.

University of Pardubice

MODERN – DYNAMIC – WITH TRADITION

We create ideal study conditions for the well-rounded development of young people to improve their ability to succeed in life.



Podcast of the University of Pardubice



Interviews with inspirational people

Listen to it right now



on Spotify