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Martin Hilský –

Author of the new tome **Shakespeare's** England: Portrait of an Age

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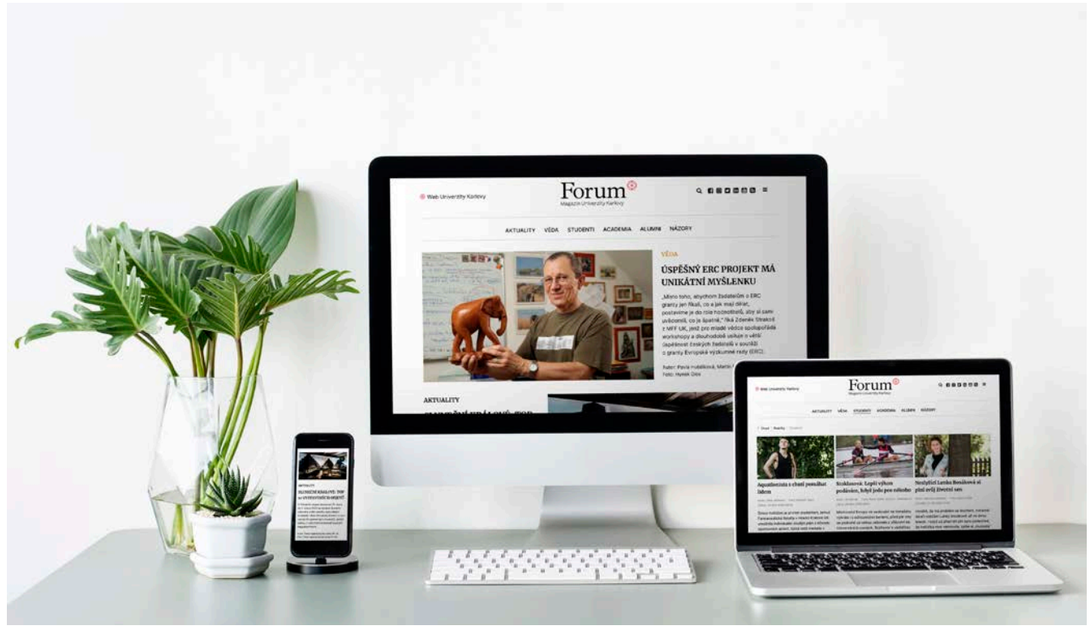

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Photo by Vladimír Šigut

Dear readers,

It's hard to imagine anyone looking back at the year 2020 with much fondness: a year of lockdown and the novel coronavirus. By the end of December, the virus will have claimed more than 1.5 million lives worldwide and the threat has not nearly passed. We are not out of the woods yet. But as The Economist put it succinctly on their cover a few weeks ago, for the first time, there is hope: the existence of promising vaccines.

On 2 December 2020 a date which will be remembered, Pfizer/BioNTech's Covid vaccine received authorisation for use in Great Britain. Finding any vaccine, let alone two or three in the space of less than a year (the others are Moderna and the University of Oxford together with AstraZeneca) is nothing less than remarkable: similar attempts previously took ten years and not ten months! While enormous logistical problems remain – and while it will take time for a majority of the population to be vaccinated – imagine for a moment the alternative: that the only certainty ahead was a harsh Covid winter. Winter is still coming but at least we know it can be weathered a little better: eventually the waves of infections will be quashed.

Finding highly effective and safe vaccines is confirmation, proof of the best we can achieve in science and education and in record time – showing that even grim odds can be surmounted. It was not an easy year but the fact that it could see a positive response such as this, should give us hope. The data and many investigations and ensuing research that come from investigating Covid and its origins will also be very important for the months and years to come and will help us tackle (as well as model for) future threats around the globe.

In effect, more responsibility lies with universities than ever: even before the latest results, we saw the crisis bring out the best in many: researchers and student volunteers and teachers who came forward, helping on the front lines or conducting valuable research as we reported in Forums 51, 52 and 8 and also in this issue (pages 16–21, 42–43). CU, across 17 faculties, redoubled its focus on distance learning, so that students could successfully continue in their studies and move forward. There has been, and continues to be, a considerable impact on our lives, on our livelihoods, the economy and public health – but schools pushed ahead, and the rest of us learned how to turn the odds in our favour: to stay safe and keep others safe even if it was "just" by social distancing, washing hands, and wearing a mask. Most understood the need to hang together to get through this, despite the difficulties. That too has been a positive.

With news of success, we can look forward to 2021 with more optimism than before; I also believe you'll find inspiration and optimism on these pages in stories about talented researchers, students, teachers and alumni in their respective fields.

For the cover story, we were thrilled to speak to renowned translator Martin Hilský, the author of a magnificent new work about Shakespeare's England. When we met in an area in Prague known colloquially as "Little England", he explained that London in Shakespeare's day was hit by the plague year after year after year. Then, they also suffered lockdowns and the theatres were closed – as they are now. They may have found hope in different sources, but it's worth remembering they had none of the advantages of modern science and medicine. And nothing like a vaccine.

Enjoy the holidays and stay safe. All the best in 2021.

Jan Velinger
Editor

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Martin Hilský:

Describing an entire age is, by definition, never complete

Professor emeritus of English Literature Martin Hilský is one of the country's most prominent translators of Shakespeare's plays and sonnets into Czech. In 2011, his translations were published in a single volume *The Complete Works (Dílo)*. Now, Academia has followed up with *Shakespeare's England: Portrait of an Age*. It is a fascinating and extensively researched book that should give readers an even deeper understanding of Shakespeare's work.

STORY BY Jan Velinger PHOTOS BY Vladimír Šigut

How did writing and preparing this book compare to *The Complete Works*?
The books are different in perspective. One is a translation of all his plays and poems and I had to deal with every word, including all of the definite and indefinite articles (laughs). One is focused on all of the details of language, whereas *Portrait of an Age* is rather a macroscopic, more global view. Each presented its own problems, but to put it very simply in one sentence, in the new book there is a radical change in perspective. Whereas *Dílo was* focused on Shakespeare's plays and language, the new book is about Shakespeare's time. But that time is defined broadly, not only Shakespeare's lifetime from 1564 until his death in 1616 but I had to deal with the English Reformation, which came before but into which Shakespeare was born. The time scope is from 1485 to roughly 1623 when Shakespeare's first folio was published. King James died just two years after that.

In an interview in the Melting Pot series, you suggested that you built up to writing this book over the course of 30 years.
That's true. When you translate Shakespeare, you cannot deal only with the language but have to take into account the contexts of the English and European Renaissance and that is quite difficult. Without the knowledge of the "background" – I don't like that word, by the way, although it is often used – but without the knowledge of that, the translation would suffer. And over the years, I dealt with those contexts. In the plays, they were the foil or the background and in *Portrait of an Age* they come to the foreground.

I did a lot of contextual study when I translated Shakespeare that helped me see important details and they allowed me to better see a landscape I had not fully known. However, it was a kind of personal discovery too, a pilgrimage. Still, work on the new book was immensely difficult I can tell you. Frankly, in writing a portrait of an age such as this, you realise that you can never write exhaustively or capture all of the aspects of any time because it is just too complex, and cannot be easily categorised. So it was difficult but also immensely rewarding. Because, you know, it reflects back upon the translations themselves. Now I can see Shakespeare's plays in a slightly modified light. I am not saying that I was wrong in my contextual studies before, but I noticed certain perspectives in writing *Shakespeare's England: Portrait of an Age* that I had not responded to previously.

It seems to me that you are offering to the reader a chance to deepen their knowledge and appreciation not only of Shakespeare's time but also his work.
That is the purpose of the book. It is not for the specialist but for a general audience. Sociologists, theologians, political scientists, readers interested in things like alchemy, will certainly find that there are aspects that are "incomplete" but the value should be in its holistic approach: the "whole" in this case is what is interesting and in Czech there aren't books in a single volume that would deal with so many aspects of his time.

The problem was twofold: on the one hand, I had to go into areas that are well known, such as the Reformation but on the other, when I dug deeper into context, the impact on all spheres of life including on imagination (not just religious but imagination as such) became clearer. The dominant theme of the book is people and their personalities. I wanted to write a portrait that would be peopled because you can never write an age without taking into account different groups, beginning with kings and queens and aristocrats and then going down the social ladder, to merchants and different professional groups, those who already practiced medicine, playwrights and writers and others. And of course, who was who, in the last section of the book, gives individual portraits of people then. Above all, the book should show changes in mentality. The English Reformation is key to understanding the English mentality, even today. You cannot understand English civilisation, the Elizabethan age, and the changing mind-set without it. It is meant to be interesting and exciting and I wanted to write it well and craft it almost as if it were a novel. Although based on historic documentation, it is a work based on imagination: to write it, you had to imagine the age.

One moment described in the book is Hic incipit pestis – Here begins the plague. One can't help but reflect on what we are going through now, although there are significant differences.
Those passages were written before the Covid–19 outbreak but there are parallels, I would say, in the psychology of the people. We now know how difficult it is to face a pandemic of this kind and it is a genuine crisis. At the same time, while the impact is similar, the plague was still much worse. It was worse because we simply live in better times: we have medical care that was not the case in Shakespeare's time. I mean there was basic medical care but it was not systematic or always available and medicine has progressed in a way that is miraculous since then.

Shakespeare himself lived through the plague several times during his life. In April 1564, the month and year he was born, the plague broke out in Stratford-upon-Avon. It is a well-known fact that his family's neighbours in Henley Street lost four children to the plague. Shakespeare survived. Later, when he was in London, the plague spread much more dangerously than in villages and in fact, almost every year from 1603 to 1610 there ↪

When you translate Shakespeare, you cannot deal only with the language but have to take into account the contexts of the English and European Renaissance and that is quite difficult.

were plagues. The measures taken were quite similar to what we are going through today: the theatres were closed, as they are now, and were only reopened after the plague subsided. An interesting aspect is the different ways the plague was interpreted and this goes back to the Reformation and its impact on all facets of life: everyone viewed it through a different perspective.

The Catholic view – or more radical Catholics – would see the plague as a "curse from God", punishment for the Reformation. All reformers, all English Protestants including Elizabeth I, were seen as heretics. The Protestants saw it as the opposite: as punishment for popery, still seen as alive in the minds of the minority. What you have really is a crisis of interpretation: if you ask the question "what was the plague about" you had two answers and not one truth but two kinds and that must have been extremely unnerving for ordinary people trying to find their way.

You had two opposite views, defended by strong arguments of faith. Today we know a bacterial infection was the real reason but in Shakespeare's time they had no such knowledge. What happened with plague happened in every aspect of life. There was not one Christianity any longer and there is a marked difference between the Catholic Middle Ages that was homogeneous and the new age which anticipated pluralistic thinking in religion and politics.

There are parallels again in different interpretations of Covid-19: just how dangerous it is, whether it would be defeated ahead of a second wave, and so on.
For some people I have spoken to, Covid certainly is a scourge but this time for what we have done to the environment and the ruthless exploitation of the planet. Which is one view out of many.

It was only when I had done about 30 plays that the idea of doing all of them became interesting. It was a kind of Mount Everest: halfway up, who wouldn't want to reach the top?

To turn back to Shakespeare: you translated your first Shakespeare play, *A Midsummer Night's Dream*, when you were 40 years old. Was 40 a good point at which to start?
I think it was. Being 40 meant that I had previous professional experience and also life experience, which helped a lot. I'd say it was just about right, not too early and not too late. I think that today my students would be more assertive and would try their hand at Shakespeare earlier, even during their studies, which would have been impossible for me. The advantage was that I had already translated British and American prose and I had also done a number of plays; Shakespeare, though, was a challenge of an entirely different kind. When I was asked to translate *A Midsummer Night's Dream,* it was a genuine turning point in my professional career. It changed my professional life.

You could not have known at the time that you would eventually translate all of his work as well as the sonnets.
My approach was to translate each play as well as I could irrespective of the time that it would consume. The investment of time and energy was immense, you know, and I never hoped, I didn't even think about translating all of Shakespeare, because one, it seemed impossible and two, it just wasn't my concern. I wanted to do each play and each sonnet as well as I could and it was only when I had done about 30 plays that the idea of doing all of them became interesting. It was a kind of Mount Everest: halfway up, who wouldn't want to reach the top? It's also very difficult to go down at that point. So I did it and I think I was lucky.

It took a lot of work to do all 38 plays "and a half" – because there is now a 39th play incorporated by *The New Cambridge Shakespeare* into their editorial plans. The great scholar Giorgio Melchiori considered Edward III the thirty-ninth play that should be "canonised", in a cultural sense. The play was written by six playwrights, Shakespeare one of them no doubt about it, and I translated the two scenes that were clearly done by him; all the same, I am not sure it should have been canonised. Thirty-eight is my definite number but Edward III is there as a definite option. For me it is an open and unresolved question.

Your love for the English language (as well as French) is well known, as is your love of dialogue. How do you capture the essence of Shakespeare in Czech? You said in the past that English is "untranslatable" and that translation itself is "an illusion"; could you elaborate?
That's a difficult question but an important one. My point is, translating Shakespeare and Shakespeare's English into Czech, is a very special kind of translation. By the way, I love the English word *translation* that is derived from the Latin root *translatio*, which means not only the literal translation but also *change*. When one character in *A Midsummer Night's Dream* says "Bottom… thou art translated" he means "Bottom… thou art changed" – into an ass of course (laughs). In Czech, I think the word *překlad* is misleading because it means a transfer or transplantation of meaning and that is a different thing. The second meaning of "change" is absent in that Czech word.

The difficulty is mainly because the English language *means things differently*. It sounds differently but most importantly thinks and feels differently than the Czech language. Languages indeed condition our ways of thinking and feeling in ways that are immensely important. The difficulty is enormous because you translate the English Renaissance into present-day Czech. You translate from an age that was completely different from our own, and you translate Renaissance thinking and feeling into Czech. And that's not easy. My credo is that translations of Shakespeare must never be literal; once you try to be literal, you make fundamental errors.

Hilský near Queen Anne's Summer Palace, a Renaissance building in Prague completed in 1565, a year after Shakespeare was born.

I advocate for a kind of free, no, *creative* translation. To put it into one sentence: for me to translate a sonnet, for example, means to first write a good Czech sonnet based upon and connected to the parent text. But there are differences: the music of the words is different. My attempt was to translate the *music* of Shakespeare's language, which was extremely interesting, into Czech, as well. Not all translators, or even very few, attempt this.

For me, the most difficult thing that happens in Czech translation is when you have a difficult, often paradoxical meaning combined with the inimitable music of English. You can't imitate it, you must replace the music. So these are some of the basic problems of Shakespeare translation. ↪

Professor emeritus Martin Hilský is renowned for his translations of Shakespeare into Czech, as well as for his work on productions with various theatre companies. He is a recipient of prestigious awards that include the Jungmann Prize, the Tom Stoppard Prize, and Czech Mind (in 2015). He received an MBE (Honorary Member of the British Empire) from Her Majesty the Queen Elizabeth II. for his lifelong contributions as a translator, writer and teacher. His public lectures on Shakespeare, writing and the art of translation remain extremely popular, whether in person or online.

What is one example of an especially difficult verse to crack? Where you had to obsess and then leave a sentence or passage aside and come back to it later when you had found an answer? In the past, you have used Sonnet 86 as an example.
The answer to this question would take about three hours (laughs)! Sonnet 86 is interesting: in the first four lines there is a particular wordplay on the words *womb* and *tomb*. It is a difficult sonnet, about a rival poet, and Shakespeare in fact says because of the rival poet that his mind – *the womb* in the sonnet, in other words his creative mind – has now been transformed into *a tomb* because the very fact there is a rival poet changed the situation into the very opposite. The problem is, these are beautiful words with the same sound, and tomb signifies death while womb, birth and life. And it's untranslatable. Because there is no possibility in Czech to combine the Czech words for womb and tomb – as well as the sound and meaning.

I gave up translating sonnets when I came across this one: it seemed impossible. But then I realised that there is one word in Czech, *kolébka*, which means cradle, and *lebka*, which means skull. One is inscribed in the other and out of this sudden insight (that happened at night and which I later developed into lines three and four) there was a happy solution that made sense. But very often, you do not find a solution at all. There are untranslatable passages that are usually based on beautiful music combined with multiple meanings.

Another example is from the comedy *Love's Labour's Lost*, which I love, the character Berowne says "Light, seeking light, doth light of light beguile". You know, this is difficult even for an English speaker I guess because light is used in three different ways. Moreover, it's a concert based on this diphthong "i". Since this diphthong does not exist in Czech, I substituted the "o" sound that is common in Czech and the music was somehow maintained and the paradoxical meanings were easier to match. Beguile does not mean *to kill* but my translation captured the essence: by reading too much you are ruining your eyes, therefore you ruin *the light* – not only in the sense of knowledge and enlightenment but also in a physical sense. There, it is necessary to add that the Elizabethan understanding of optics was different from ours: they thought that the eyes emanated some light and that if you killed that light you ended up in darkness. If you overdo studying, you ruin your eyes. These are details, but they are extremely important.

Translating is clearly an immensely creative process. You are also a professor emeritus and Charles University was your academic home for a long time. Do you still teach?
I don't: after 53 years I decided to stop regular teaching. I still have public lectures and they are, to my pleasure, well attended, and I always take great care to prepare them and it's very creative. I enjoy putting together the lectures and perform them the way I want but I don't have regular classes. For me, it was simply a vocation but it was a great experience. I very much liked the discussions I was able to have with students and the same way we have Creative Writing, which is an established institution now, I called my seminars Creative Reading. Reading is not mechanical and it is a creative task because you look for the meanings. It was in fact a common pursuit with the students: I tried to discover with them the meanings of Shakespeare and I hope this sense of adventure and exploring was interesting for most of them. This was my philosophy of teaching Shakespeare.

It is stimulating when you have younger people who bring a different perspective or to see them discover something you also discovered yourself at some point.
Absolutely. I always invited differences of opinion and I sometimes had to revise my own axioms because of students' fresh minds. You know, I was more experienced because I had read more, but their minds were fresh to new impulses. The one thing I was afraid of, and didn't want, was for teaching to ever become a routine affair. I am grateful to my students for their views and it was give and take, it was reciprocal, helping me realise things that might not have occurred to me had I been sitting at home.

If we turn to theatre, it must be particularly fascinating when your words are given new life onstage; you have also admitted in some cases that it can be an ordeal, when a production fails to meet the bar. When it works, however, it must be fantastic.
It is. It is quite different from translating or from writing a novel. The difference is that in the theatre you can hear the responses of the audiences. Writing or reading a novel is a private affair whereas theatre is always public and always political, by the way. It's always a collective effort. Audiences, to some extent, help to create the production. Actors will tell you that. Each production is different depending on who comes and how the audiences behave.

I see the audience as a huge part of the play, hundreds of eyes hidden in the darkness, and I realised the responsibility I had when my words were put onstage and performed. And it either agrees with your ideas or it does not. When it does, it is a great joy. If it doesn't, if the performance of language is not good it is perhaps because the director or actors do not believe in the importance of language and it fails. It's a matter of belief and you have to believe. And I do.

Language, especially Shakespeare's language, is important. When it fails in a performance I am really defeated and depressed. But I must say I am grateful because translating is a solitary job and thanks to this I went to theatres, spoke to directors and to actors and again there was some kind of feedback which helped. I called it the "theatre of language", which was again part of my personal journey and personal discovery. Shakespeare could write immensely good theatre but we are all involved in the theatre of language: whether daily conversations or the theatre, it is a fantastic thing.

Writing or reading a novel is a private affair whereas theatre is always public and always political. Audiences help to create the production to a certain extent. Actors will tell you that each production is different depending on who attends.

Welcome to the **machine**

Petr Plecháč, completing a Ph.D. at Charles University, made world headlines with his analysis of Shakespeare's Henry VIII. It was long accepted that the play was co-authored by playwright John Fletcher, but Plecháč's study – using machine learning – analysed word frequency patterns and rhythms to provide further evidence that the play was a collaborative effort. Henry VIII was not written by Shakespeare alone.

STORY BY Jan Velinger PHOTOS BY Luboš Wišniewski

Determining the differences required a granular approach by the academic, who explained the various aspects of the project, including why Shakespeare was so suitable for such an investigation:

"My Ph.D. thesis explored the possibility of using versification features – such as rhythm or rhyme – to help determine authorship or authorship recognition. I chose Shakespeare's Henry VIII for a number of reasons. For one, there was a lot of training data upon which to build, namely all of the plays by Shakespeare, John Fletcher and Philip Massinger (also posited in the past as a possible co-author), and many lines written in iambic pentameter.

"Second, a strong hypothesis already existed that Henry VIII was a collaborative work. It was long understood that this play was not solely by Shakespeare, so that made it a good choice. Finally, there is the fact that all of Shakespeare's work has been digitised. Those were all factors that led me to focus on this play."

In practice it meant separately inputting not only the play but extensive work by both playwrights (as well as Massinger, seen as a less likely candidate for co-authorship) into a machine learning system, and familiarising it with their individual approaches.

"The general principle was that I collected different works of the playwrights in around the same period that Henry VIII was written, and I trained the algorithm to recognise their styles. After this information was input, the trained model was then applied to Henry VIII. The first thing you do when you train the model is test how it performs on known data and you perform cross-validation. That means you leave out one play by Shakespeare and train the rest and then run it on the one that was taken out. And you do the same with Fletcher. And the model reacts and labels the data in cases where you already know the correct answer. This way, you can estimate the accuracy of the model and how reliable it is. In my case it was very reliable: in 99 percent of cases it was able to determine authorship correctly.

"When we talk about versification, it means focusing on stress patterns – bit strings that represent stressed and unstressed syllables. It's much easier today because these days we have very reliable software libraries that offer all kinds of machine learn- ↪

ing and the machine learning part is easier to implement through a few lines of code. What is more difficult, is extracting these bit strings, these stress patterns from a text, but I was lucky that I was able to use software that had been developed at Stanford University by Ryan Heuser that had even been tested on Shakespeare's work. There was evidence it would perform pretty well."

Those patterns are far too numerous and interconnected to ever be successfully mapped by humans – effectively an impossible and largely fruitless task. That is why machine learning proved so useful, especially since changes could be made to existing software that Plecháč used.

"It is possible to tweak existing software a little bit or to tune its parameters, this is annotation versus versification level. First, you need to label the data, you need to tokenise it, to split the text into words. Also you need to mark the stresses, which syllable carries the stress and which does not, and then comes the analysis – training the machine to recognise the work and that is where my coding began. Of course, I didn't code it from scratch and a mistake in some of the articles that came out about my work was that I used neural networks – I did not. It was a very popular technique in authorship recognition called support vector machine. And that is not my invention. I used general machine learning software libraries that were designed for this purpose."

In the end, his findings further cemented that Henry VIII was a collaborative work, as was first posited by James Spedding in 1850.

"There are tiny, tiny differences when it comes to the frequency of words: someone uses the definite article far more often, someone will use *by*, another *nearby*, and language is unconscious. Stylometry focuses on these tiny differences that are very hard for a human to detect. If you or I read Henry VIII, we can focus on different aspects, who uses *ye* more often than *you*, or feminine endings in lines, but this would occupy all of our time. As humans we cannot focus on hundreds of different details simultaneously. In the end, each scene, in each play, is represented by one thousand variables; each scene is represented as a vector in 1000 dimensional vector space."

Plecháč says he never expected his work to cause the sensation it did and says that is only good news for the field of Versification Studies, which have a tradition in Slavic countries like the Czech Republic but are virtually unknown anywhere else.

"Not that long ago, few people in English-speaking countries had heard of versification studies before so it is the first time readers heard about something like that. I never expected the article to cause such a sensation. I had gone to San Francisco for a conference and then learned from a friend that a major Hungarian paper had reported on my work, which was followed by CNN and then article after article around the globe. That kind of thing doesn't happen really very often to people specialising in versification. I received emails from some really big names, asking me to collaborate on future projects. So that has been very positive and the interest overall has been very important for the field."

Petr Plecháč, Ph.D., completed his first doctorate in theory of literature at Palacký University in Olomouc and his second, in mathematical linguistics, at the Faculty of Arts at Charles University. He made world headlines with his research of authorship in Shakespeare's Henry VIII. Plecháč works at the Institute of Czech Literature at the Czech Academy of Sciences and at the University of Basel.

Shakespeare's Henry VIII – How much do we really know?

Petr Plecháč's research has gone a long way in determining co-authorship but this "primer", by translator and Shakespeare expert Martin Hilský, fills in some of the blanks about the play itself. Hilský discusses a number of topics including the contribution of machine learning. It's important to note that there are details where we are still very much in the dark and which may never be known.

Professor Hilský:

A valuable contribution

We suspected for a long time and today it is understood that Shakespeare co-wrote *Henry VIII*. But that wasn't always the case. Many scholars still had serious doubts even after Spedding posited John Fletcher as the co-author in 1850. For a long time, the idea that Shakespeare had co-written a play was simply unacceptable for some distinguished scholars, whereas today we know it is true. The reason Petr Plecháč's work is so valuable is because it confirms – by a different means and different methodology – the co-author's participation. I am not a mathematical linguist, but the methodology was captivating, which is why it was picked up by everyone from CNN to MIT Technology Review.

The contours of Shakespeare and Fletcher's cooperation

We know very little about the actual collaborative process, almost nothing about the ways this co-authorship was organised. Did Shakespeare ask Fletcher to help him or was it the other way around? John Fletcher was a young playwright who was much more in fashion by then – we are talking about Jacobean England in the late period of Shakespeare's career. Who asked whom is an important question because it shows trust in the other person's abilities and shows where the power lay in the relationship. But we don't know. Who had the dominant voice? Who decided the plot?

Untruths

The original title was not *Henry VIII* but *All is True* and I find that very funny because in this play there is a lot that isn't true. Henry himself is not depicted at all as the architect of the English Reformation. Early on, Henry was a very charismatic king who later became a despot and tyrant who had two of his wives beheaded. But none of that is mentioned. You can say the play is only about the early part of Henry's reign from around 1520–1533 when Elizabeth was born (who became the legendary Elizabeth I). Was it a conscious decision by Shakespeare or Fletcher to ignore what came later? Did they debate the issue?

Fletcher's style

It is certain that his style was different but I don't know that you can compare whether one was "better", they were simply radically different and Fletcher's approach by then was more modern and more fashionable. One example: Shakespeare never wrote so-called romances – *Cymbeline, The Winter's Tale, and The Tempest* – until later, after 1608. That is because his company, the King's Men, had not only The Globe Theatre at their disposal later on but also the Blackfriars, a private theatre that enabled scenic effects needed in romances that would not have been possible at The Globe. The romances were very much dependent on visual, baroque effects and Fletcher was simply much better at this. He was younger, on his way up, so to speak, whereas Shakespeare, while not in decline, was nearing the end of his career.

Co-authorship was widespread – but only a handful of Shakespeare's plays were co-written

One thing that is important to point out is that in Shakespeare's day co-authorship was common. What is remarkable and hugely surprising by contrast is that so few of Shakespeare's plays were written in cooperation with anyone else. We do find co-authorship at the beginning of his career and at the end – but not in the middle. I have no explanation for this, except perhaps that Shakespeare was an actor as well, but roughly before 1605 he stopped acting and therefore perhaps he had more time for authorial cooperation and could spend more time debating with someone else.

The early plays are co-authored, obviously: *Titus Andronicus*, the first tragedy, was co-authored by George Peele (Shakespeare's older contemporary) according to contextual scholars [Editor's note: the matter is still debated and not a universally held view]. We know that Shakespeare alone wrote all of the major plays.

After 1605, comes *Macbeth*, which was co-authored by Thomas Middleton, especially the witch scenes, then comes *Timon of Athens* that is a very interesting cooperation with Middleton, who was a completely different type of playwright, much more satirical. Then you have *Henry VIII* and *The Two Noble Kinsmen*, the last collaboration with John Fletcher. That's it. The majority of Shakespeare was written by Shakespeare alone.

Med students **help again**

One of the most inspiring stories of 2020 has been how thousands of students volunteered to help in health care as the number of Covid-19 cases rose. Whether in the first wave in the spring or the resurgence of the virus in the autumn. Every day they put on protective gear, from plastic gloves to respirators, goggles and face shields. They help at testing sites outside hospitals, intensive care units (ICUs), senior homes, or as part of ambulance crews.

STORY BY Martin Rychlík PHOTOS BY Vladimír Šigut

Forum photographer Vladimír Šigut joined two such students from the First Faculty of Medicine as part of an ambulance crew helping in Prague just as cases began rising again. The main aim of the crews is to reach those who cannot make it to testing stations on their own. Sixth-year med student Jan Ohnisko coordinated calls from the central office while third-year Jonáš Paleček, in PPE, tested patients in the field. Šigut says the students are dedicated and more than up to the task even though it can be difficult: "These guys spend as much as six hours in full protective gear," he confirms.

Šigut, whose work you can see across the pages of Forum, spent many hours also photographing med students helping inside hospital facilities such as KARIM (the Department of Anaesthesiology, Resuscitation and Intensive Care Medicine) at the General University Hospital in Prague, where doctors and nurses fight to save the lives of patients in serious condition. Students Livia Faktorová and Ilja Bulat from the First Faculty of Medicine aided professionals, helping so that the professional staff can focus solely on the most important tasks.

Their colleagues, from CU's Third Faculty of Medicine, assisted at testing areas and other facilities: the university, after all, has a total of five medical faculties. Three in Prague, and additional faculties in Hradec Králové and Pilsen. Students from the Faculty of Pharmacy in Hradec Králové also contributed greatly to the fight against Covid–19.

CU's rector: We cannot give up

From the first days of the pandemic in March to the summer lull and resurgence in the autumn months, Charles University's Rector Tomáš Zima expressed enormous appreciation for students, hospital medical staff, researchers, volunteers, and others who contributed in what has been an unprecedented crisis. He highlighted these efforts in an address from Charles University's Carolinum on 17 November 2020 – an historic day in the Czech Republic marking the struggle for freedom and democracy in the years 1939 and 1989. This year, the focus was almost wholly on the continuing pandemic and the response.

Excerpts from Rector Tomáš Zima's speech: "In addition to grief and enormous hardship, the coronavirus pandemic has brought something else. I am talking about hope, about solidarity. The humanity that many are showing, the ability to help… and also the ability to adapt. It is these values that became apparent in our society immediately after the viral epidemic hit. The year 2020 has shown that it is not true that our civic society is dysfunctional. This spring woke civic society up and demonstrated its enormous strength and coherence…

"Let's thank the doctors, nurses and medical staff who have been working constantly… who no longer remember a regular weekend. In addition, they are being aided by more and more new volunteers – first and foremost, medical and other students, not only from the medical disciplines of our universities, who, regardless of their work duties, have understood where they are needed…

"We must not give up, and we must believe in a hopeful future. It's more important than it seems at first glance."

We were simply **lucky** we weren't the first hit

The US-based immunologist Václav Větvička says there couldn't have been more than five people on the plane when he recently traveled back to the Czech Republic. Because of Covid-19. As a scientist, Větvička has been outspoken about what we can – and should – be doing to stay safe. And really do we have any other choice before we get the vaccine?

STORY BY Jan Velinger PHOTOS BY René Volfík

The Czech Republic went from praise – for how it handled the first wave of the pandemic – to a cautionary tale. I know you are not a virologist but as a scientist you monitor developments: where do you think things went wrong?

I don't think that the government or decision makers did anything significantly wrong because they didn't do anything all that different from other countries. We have to remember that when the whole thing started around the world, the situation was different everywhere: Italy, France, Spain were the first and were very hard hit while here the virus spread later. We were simply lucky that we weren't among the first and that we were able to shut down everything, everywhere, before the situation got out of control.

Because it was the first occurrence, people didn't complain, either: they wore their masks diligently. Not like now, when you can be on the street and see half the people around you not covering their faces. People were more afraid and the situation stabilized quickly. Were we the best? I think is was pure luck, we were lucky.

Once the situation improved, political pressure grew and the opposition pushed for the country to reopen, saying the right to travel and should no longer be restricted. At the same time, the government *wanted* people back at work and for industry to recover, so they re-opened. Maybe a little too soon. But that's easy to say now: nobody really knew. You can look at Israel, which had a very tough lockdown and soon after they re-opened, the situation escalated again. Nobody really knew but each tried their best; the only difference is where countries stand now and whether they are better or worse off.

Isn't it odd, however, that we were so caught off guard by the resurgence of the virus in the fall, since there is an historic precedent? The Spanish flu. It is well documented that the second wave there was much worse.

I don't really like the terms "first" or "second wave" because the virus is around us and it behaves according to how much room it is given: if we lock down the country and everyone stays home, the virus won't be able to spread. But that's not treating the problem. Professionals know from studying the Spanish flu 100 years ago that they took similar measures. Some towns tried lockdowns while others kept everything open. In the United States, ↪

I know of two towns where they took opposite approaches and, in the end, there wasn't a great difference in the number of deaths. The town that locked down slowed the rapidity: instead of a large number of people all dying within two weeks, it took three or four months. It is a matter of spreading out the infection rate so it doesn't get out of control.

That is what we saw with Covid–19 in Italy, where at first they took the situation a little too lightly: I have a friend in the region of Lombardy, which was very hard hit in the beginning, and he told me something I will never forget. He said: "In the beginning we took it as a joke and went to bars, and went singing and to soccer games. Two weeks later we weren't able to build coffins fast enough."

We saw many countries go into renewed lockdowns or partial lockdowns this October and November: but there is hope now with the announcement of at least two or three highly effective vaccines. But the distribution itself will be complex, so I suppose the majority of us still have to hang tight and follow measures.

The vaccines really look promising, even when there might be some problems with the one by AstraZeneca. However, even with the fastest possible approval, it will take many months before we can reach substantial numbers of vaccinated people. We have to remember that vaccination will really work when approximately 65 percent of the population will be vaccinated. From the logistical point of view, but also from a manufacturing and manpower point of view, it will still be a nightmare. Therefore, we need to stick with possibilities we have right now, that means masks, safe distancing, washing our hands. The pandemic is not over and we still need to be very careful.

All that governments have right now is, more or less, to hit the brakes, and shut down, to prevent hospitals from being overrun with Covid patients. We have to be careful and wait until large enough numbers of people can take the vaccine.

We've been talking about the pandemic... how important is it to boost immunity at times like this: should we?

Absolutely, yes. The important thing to realise is that we are all different when it comes to our immune system: whether we are older or younger, in shape, under stress, whether we smoke, have a lot of physical activity – those things all influence the level of our immunity. Then there are other factors that are important: if you are fighting a virus, a lot depends on how large a viral dose you were infected with initially. It will never be the same amount. If you get a mild dose, the greater chance there is your immune system will be able to deal with it and you will experience milder symptoms or none at all. But there are things that you can do – you don't have to be idle.

You have conducted research into what are known as natural immodulators, specifically a substance or extract known as beta glucan. How much do we know about its effects?

Full research started decades ago but real research began in the 1950s and it took until around 1970 or 1975 before we really knew what was going on or might happen. We knew that it supports the immune system but had no idea how. From the 1970s, it was another 30 or 40 years of research; I spent 30 years researching beta glucan and it was a while before we learned which molecule it is, how it binds, which cells and which receptors, which signals are transferred, and so on. We now know the mechanisms, we know the target cells, and we know what beta glucan can do.

Shiitake mushrooms are a source, seaweed...

The major sources are yeast, mushrooms, grains, bacteria, algae where glucan is present in the cell wall. It has a supportive role in the cell structure, similar to the way steel wires are used to reinforce concrete. There are historical aspects behind the types preferred: in western society we are always drinking beer and eating bread, so we have a surplus of yeast; on the eastern side of the world, in Japan, China and Russia, they consider mushrooms a folk remedy. Here, we eat mushrooms for the taste but there they eat them for health. We are more inclined towards yeast glucans. Humankind has of course relied on using natural molecules for 6,000 years, something confirmed on tablets from Sumer, whether we are talking about plants or plant extracts.

While we may consume a lot of yeast, you actually can't get the benefits of beta glucan just by eating it, can you? It has to be extracted and therefore taken as a supplement.

Yes. If you just eat or drink beer you won't get the benefits: otherwise the Czechs would be among the healthiest of nations because we eat so many mushrooms and also drink a certain amount of unfiltered beer! When it comes to extraction, it has to be properly isolated and pure, and isolating glucan from the cell wall is not an easy process. In a lab or in the factory that means boiling it in sodium hydroxide at a temperature of 80 degrees Celsius. It's a relatively complex and tough process and purification comes after. If you just boil it in ordinary water, the glucan remains in the cell wall and our gastrointestinal system simply cannot absorb it from food during the short period it is in our system. Eating it won't work. It's important, also to point out, that pregnant women, or people who have had a transplant, should not use it.

Where has your research uncovered promising results?

I think where the research is the furthest when it comes to final results is in cancer: there is always lots of money for cancer research. Beta glucan also got a boost because several types of glucan were officially approved as a drug in Japan and have been used in cancer treatment there since 1983. Almost 40 years. So we are behind. They recognised that it works and chose to use it first and learn all the details of how it works later.

Western medicine is the opposite: we won't use it until we uncover every last thing about it. We've helped: we and others found and proved that when beta glucan is used together with anti-tumour molecular antibodies, it is more effective than using either antibodies or glucan on their own. You can significantly improve their effectiveness by using them together. There are around 50 or 60 clinical trials worldwide – in the US, Europe, Asia – where they are hoping to confirm similar results, whether it relates to GI tumours, breast tumours, lung tumours, and I am pretty confident it will be approved for use in cancer treatment in the west during my lifetime.

The pandemic has upended everything and forced us to adapt, in school that means distance learning. You studied at CU's Faculty of Science in 1970s Czechoslovakia, when conditions were very different and the country was under communist rule. How do you look back on your time at Charles University?

It was a very different period, not long after the Soviet-led invasion and that meant half of the professors were gone and there was a gap and we lacked their materials. With a few political exceptions, professors who remained tried very hard to help us. I saw it as a very positive thing. They taught us that doing science would be highly rewarding but also warned that there would be times when we spent months on something that would not work out. Despite such ups-and-downs, they taught us not to cry at home over a few lost months but to move on. That is something only a good teacher will tell you.

Professor Václav Větvička teaches at the School of Medicine, Department of Pathology, at the University of Louisville, Kentucky in the United States. He graduated from Charles University in 1978 and received his Ph.D. in 1983 from the Czechoslovak Academy of Sciences, Institute of Microbiology. He is the author of several monographs and a member of the Czech Immunological Society and American Association of Immunologists. He specialises in research of the immunomodulator beta glucan.

The important thing to realise is that we are all different when it comes to our immune system: whether we are older or younger, in shape, under stress, whether we smoke, have a lot of physical activity – all influence the level of our immunity.

Look who's listening: How babies **learn** languages

Kateřina Chládková is one of the few researchers in the world who study the earliest stages of language acquisition, which means she is often in contact with babies – even in the maternity ward. Her aim is to find out how we learn to speak from the very first moments of life. Thanks to CU Primus programme funding, she and her team discovered that babies learn to differentiate vowels and their length even before birth. In other words, while still in the womb.

STORY BY Pavla Hubálková PHOTOS BY Vladimír Šigut

Researching the "language of babies" sounds like an oxymoron. A contradiction.
It's true, babies can't tell us very much by speaking *(laughs)*. What we do, is research their brain activity, their EEG signals, or monitor how they respond to different sound sequences by looking or moving their heads. This is only a small part of the project, however: our research goes much further, incorporating computer modelling, programming and statistics.

How did this project get off the ground?
I had worked on speech processing and learning in adults and older children since my master's degree in the Netherlands, but I was very attracted to how we acquire language at the earliest age. Only a few labs are focusing on this subject, yet it is crucial: language differentiates us from others and defines us as human beings. Having a better understanding of early mother tongue acquisition could even help with how we learn foreign languages in the future. Back when I was doing my doctorate, my advisor and mentor asked me where I saw myself in five years. I automatically replied that I wanted to set up *BabyLab* in Prague. I was able to do it two years ago because we got Primus funding from CU.

What is it like working with babies?
It depends on their age. In one project, we focus on newborns in maternity wards. We take the babies and their mothers to a quiet room, where they get a cap with electrodes and special headphones. We then play various sound sequences and measure their brain activity. Newborns sleep through the whole experiment while their mums read or do something else. Older children, who no longer sleep as much and are much more active, are invited to our laboratory, where we play them various sounds and pictures, and watch how they react, looking and moving their heads.

Generally speaking, what do we know about early language acquisition?
So far, relatively little. There aren't very many research teams looking at acquisition from an early age. We are also the only ones studying the acquisition of Czech in such small children. Previously it was thought that babies were born as "universal listeners", tuned only to the native rhythm and intonation and that they acquired the specifics of their native speech sounds, recognising the vowels A, E, I, O, U in Czech, a bit later, during the first six months to one year after birth. What we learned in our project is that they actually start to learn them in the womb. It is also known that newborns can distinguish the voice of their mother from another woman's voice. Babies can also distinguish the mother tongue from foreign languages or other sounds. Newborns even cry in the melody of their mother tongue: French babies cry with a rising intonation, while German babies have a declining one.

Are there any elements that are specific to Czech?
Compared to other languages, Czech is different in that it distinguishes vowel length: the words *rada* and *ráda* have completely different meanings [Editor's note: rada means advice while *ráda* means to like or love]. And that then makes it hard for Greeks or Spaniards to learn Czech. In Spanish, *casa* and *cása* have the same meaning. What we learned is that Czech children start to distinguish not only vowels, but also this length difference, even before birth.

It's amazing that you are able to map this; could you describe it more?
We play the babies various sequences – non-specific sounds, phrases, syllables, but also whole words and sentences – and from the EEG signals we evaluate in retrospect whether their brains reacted differently. We also model and simulate many things on computers. Not everything can be measured ↪

Kateřina Chládková, Ph.D., works at the Faculty of Arts and at the Institute of Psychology of the Czech Academy of Sciences. She spent many years abroad at universities in Amsterdam and Leipzig. Thanks to internal support from the CU Primus programme, she leads a multidisciplinary and unique team studying the acquisition of language from the earliest age.

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There had long been a belief among pediatricians and speech therapists that children should not speak two languages because it was said to cause delayed development. Fortunately, this has been refuted.

directly. In addition to linguists, neuroscientists, pediatricians and psychologists, our team includes physicists and computer scientists.

Are there languages that are actually "harder" to learn?
Not one's first language. Of course when learning other languages, it depends on how similar the native language is to the new one. Czech is "intonation monotonous", which is why it's more work for us to come across well in English. At the same time, it shows how important it is to sound good. For example, children prefer to play with children of the same dialect. According to other research, it also turns out that people trust those with a foreign accent less… This would be a huge disadvantage in the context of the coronavirus pandemic and online scientific conferences, where body language isn't visible and you only rely on sound. After all, wartime spies focused particularly on the flawless pronunciation and prosody – the melody and rhythm – of foreign languages in order to blend in.

Can you give some advice on how to best learn a foreign language?
Like a baby does – listen, observe and try to understand a foreign language situation in a real context. And ideally you won't even speak for the first six months, and definitely not read and write. Then you pick up the accent and a feel for the language like a native speaker. But I understand that that is a highly impractical way to do it: there aren't many people who have that kind of patience or time. Of course, an accent can be re-learned but it takes much more effort.

Is there such a thing as "being wired" for foreign languages?
A musical ear helps when learning languages. But one doesn't have to be a trained musician at all. It's enough to have an ability to perceive rhythm and melody. Correct intonation is more important for listeners than flawless grammar. That's why Dutch people sound like native English speakers even if they make grammatical mistakes: both languages are rhythmically and melodically similar.

What about bilingual families? How does speech acquisition work in those cases?
There had long been a belief among pediatricians and speech therapists that children should not speak two languages because it was said to cause delayed development. Fortunately, this has been refuted. Bilingual children may have a seemingly slower start because their vocabulary is divided into two languages. But they soon catch up and they have lifelong benefits from it.

Would listening to foreign language recordings during pregnancy help?
This is exactly what we plan on focusing on in one of our upcoming research projects. It may help if a woman regularly speaks two languages during pregnancy. Theoretically, listening to recordings in foreign languages every day could also have an influence, but scientists still have to verify this empirically. But if a child is really going to acquire more languages, they must be exposed to them after birth as well, and in a social context, which means in communication and interaction with a real person. Mere recordings will not be enough.

What are your next plans?
We're getting ready to study the influence of dialects. In the case of premature babies, we will research when exactly in perinatal development humans start to learn about the individual sounds of their mother tongue.

What do you see as the limits of your research? What are some limitations?
Not having enough babies *(laughs)*. This was one of the tricky parts in the Netherlands, for example. In the Netherlands or Great Britain, you go home a couple of hours after giving birth, so almost no research into speech in newborns takes place there. In the Czech Republic, parents have so far been quite passionate about this local and new research and we've had no lack of volunteers so far (well until the epidemic locked everything down of course). That was a very nice surprise for me. It's also an advantage for us that it's common in the Czech Republic to stay in the maternity ward a couple of days after giving birth, which gives us room to conduct research.

What rats **dream** about in their sleep – and why it matters

Sleep is Karel Blahna's focus of research. At the Biomedical Center at Charles University's Faculty of Medicine in Plzeň, he looks into how the brain's sleep activity changes in sickness and health. He was able to put together a team and conduct research thanks to support from CU's Primus programme.

STORY BY Pavla Hubálková PHOTO BY Hynek Glos

Even as a medical student, Blahna was fascinated by sleep – not as a state of rest but as a state of neuronal activity, in which certain parts of the brain, such as sensory inputs, are turned off. "In sleep, the brain works in a different mode, and there can be various pathologies and differences between a healthy brain and a sick brain," he says. A correct understanding of the mechanism of diseases is key to a better understanding of the illness and possible treatment.

Alzheimer's disease

In his research, Blahna focuses primarily on the study of Alzheimer's disease and schizophrenia. "We measure brain activity at the level of individual neurons in the hippocampus and prefrontal cortex in laboratory rats," he explains. The hippocampus plays a key role in learning – especially in episodic memory – meaning for events in the context of place and time. During sleep, information from short-term memory in the hippocampus is then stored in long-term memory in the cortex.

The Pilsen team focuses on a certain type of cells – hippocampal pyramidal neurons called place cells – that specifically activate depending on the environment. The place cells' activity then forms a special cognitive map (a map of one's environment stored in the brain), according to which it is possible to determine retroactively where and how the animal moved during waking hours.

"Animals play back information about how they moved in their environment in their sleep: you could say they 'dream' about it – and that's what we measure," the neuroscientist says. "When animals are in a new environment, the new information is played back more intensely. We also know this from everyday life: a new environment is a much stronger stimulus for all of us than our everyday commute to work," he explains. In experiments, scientists first monitor the activity of animals' brains when moving in a new or already familiar environment, and then compare this record in samples of animals that are healthy and sick. In their sleep, they observe how this spatial memory, encoded by the activity of the place cells, is reactivated and replayed.

"In animals with Alzheimer's, we expected a disruption of activity of place cells during their actual movement in the environment. Instead, what we found was that significant changes did not occur until playback during sleep. In healthy specimens, the entire trajectory of the run was played back – the complete information was stored. But in sick animals, only short fragments were played back," the scientist confirms.

Gaining experience abroad

Blahna describes himself as a neuroscientist-physiologist who enjoys learning how the brain works, but at the same time wants the new knowledge to be useful. Which is why, in addition to basic research, he works together with his colleagues, Karel Ježek and Petr Telenský, to research new drugs.

How he spends the day in the laboratory varies depending on the phases of experiments. "Our experiments include training animals before and after they are operated on for study, the measurements themselves and then the subsequent processing and analysis of data, which often takes considerably longer than the experiment itself," he says.

Working with laboratory animals – especially sick specimens – requires a fair amount of patience: "The measurements themselves are technically demanding and require a lot of time. In addition, we study older rats that suffer from Alzheimer's disease, so they remember poorly, have difficulty learning and sometimes just don't feel like exploring their surrounding environment," he says about the sometimes humorous woes of laboratory work. But he wouldn't trade lab work and conducting experiments for anything: "I enjoy being able to discover all sorts of things and I learn something new every day."

One recommendation for any student considering a scientific career? Hands-down, experience abroad. He himself spent five years as a post-doc at IST Austria. Eventually, an offer from his former teacher, Karel Ježek, now his friend, was too interesting to turn down, so he returned to the Czech Republic.

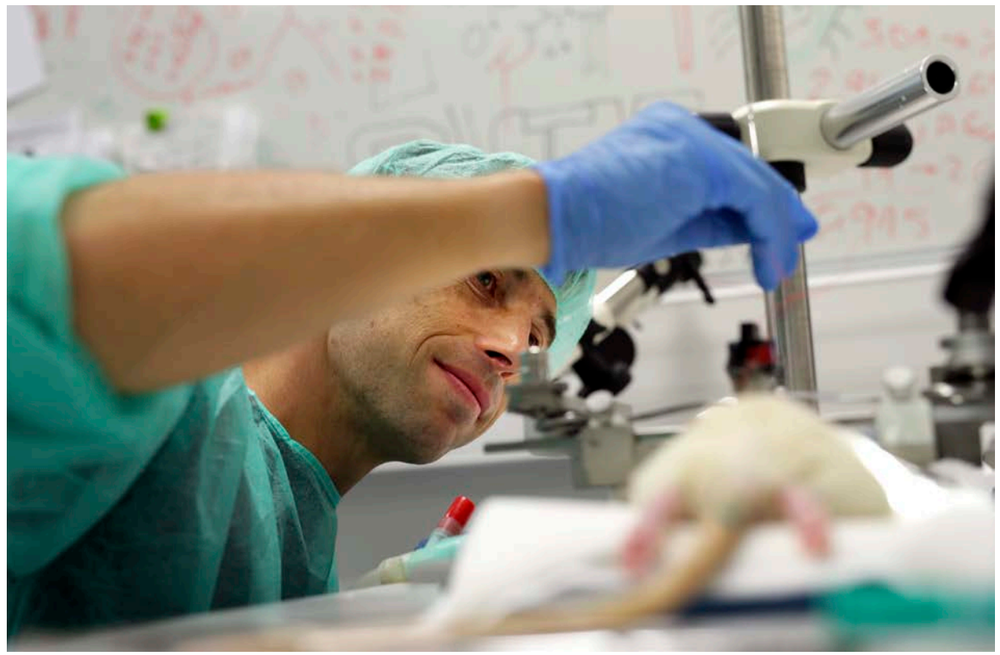
"I didn't need long to decide. The Biomedical Center is a modern institution. It has excellent equipment, there are a lot of great students and scientists there, and they speak English because there are also a lot of foreign colleagues," he says. "Thanks to Primus, I can continue research I started abroad," he adds. Another recommendation? Changing majors during one's studies, or at least getting interested in other fields, in order to gain a broader overview beyond one's "bubble."

Sleep is beneficial for the scientist, too

According to Blahna, it is important to have other activities beyond science: "You don't get innovative ideas or find solutions to complex problems only in the lab: they also come when I'm out in nature, when I'm riding my scooter or doing artistic work." Art is his passion: he is a photographer and is learning to do drypoint printmaking. A few years ago, he started learning piano – just for fun. "I used to write short stories, but I no longer have the time. Now I spend my free time with my family and children," he says.

Interestingly, he sometimes sorts out outstanding problems in his sleep. "I think I somehow programmed myself to do that, thanks to my research," he says, laughing. He adds that he has to write down new solutions immediately after waking up otherwise the idea would dissipate and be lost. He also has plans in his head for new scientific publications he has to figure out. "Getting Primus internal support was a major commitment and until I've completed all the publications, I won't sleep easily," he says with a laugh.

MUDr. Karel Blahna, Ph. D., works at the Biomedical Center at the Faculty of Medicine in Plzeň. He spent five years as a postdoctorate researcher at IST Austria. He received internal CU Primus support for his research into the sleep dynamics of neural networks in sickness and health.



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Mysterious engineers of the ecosystem

There are more than 3,000 species of termites, and their combined mass is greater than the combined mass of all human beings on the planet. They're best known as pests that can gnaw through your house, but only in recent years has more research been done into their significance for the ecosystem. Faculty of Science graduate Aleš Buček is researching their evolutionary development and kin relationships on the Japanese island of Okinawa, widening our knowledge of the six-legged insect.

STORY BY Pavla Hubálková PHOTOS FROM Aleš Buček's archive

How exactly does a Czech scientist get into termite research in Japan?
I got into it through my friend and colleague, Jan Šobotník, who studies termites and has his own research team at the Czech University of Life Sciences Prague. At first, Jan and I knew each other more from the pub. We'd never done a project together, but the more he told me about termites, the more interesting the subject sounded. Termites are essential for the cycle of organic matter in the tropics and subtropics, and yet we actually know very little about them. Towards the end of my doctorate, I started working on a termite project which I then took to Japan.

Why there?
During my studies I met the Belgian Tom Bourguignon, who researches termites. And he started a new research group in Okinawa, and he offered me a postdoctoral position, which I accepted.

What's it like to live and work there?
Okinawa is a bit like Robinson Crusoe's island. The southern third of the island is densely populated – with about a million people – but the rest is subtropical evergreen forest. If you want to go anywhere else, you have to fly. Everyone handles the conditions differently: it suits some while others suffer from a feeling of isolation after a certain amount of time. I live a lot within the bubble of an international research institute that was begun from a green field. I don't have experience with a truly Japanese institute – they're probably significantly more Japanese than the Czech ones (laughs). I've heard that for a foreigner they're quite inhospitable environments.

Why, is it due to the language barrier?
Yes, the Japanese often do not speak English. I only have Japanese friends within the institute. And I've been studying Japanese for two and-a-half years, but understanding it is complicated. In Japanese, for example, there are a lot of honorific registers, and completely different words are used depending on the level of honorifics. I can now usually say what I need, but I don't understand most of the answers (laughs). The Okinawa Institute of Science and Technology (OIST) has an advantage in this: the official language is English and most scientists come there as foreigners into an unknown environment and that unites people and brings them together.

To come back to termites, why is it important to study them?
Termites are the engineers of the ecosystem. They feed mainly on wood or the organic material in soil, such as clay, and they are the main decomposers of dead organic matter. In the Czech Republic, earthworms, mushrooms and wood-boring beetles perform a similar function. In warmer areas, termites are notorious as pests that will "eat your house." Globally they cause damage estimated in billions of dollars. This is why most research focuses on how to eradicate them. Only recently have we begun to understand a little more about their crucial role in nature.

There aren't termites in the Czech Republic?
Not yet, but it's probably only a question of time until they start appearing in the Czech Republic due to global warming. To survive, termites need the temperature to be above 10 degrees Celsius long-term. Southern Moravia and Prague already have average annual temperatures of around 10 degrees, and fewer and fewer days are below freezing. So it's likely that they'll settle here eventually. Even so, we can remain calm for now: termites in the Czech Republic will have a rough time due to our four seasons.

How important are termites to ecosystems where they are endemic?
Very! Compared to how inconspicuous they are. For example, in experiments where all termites are chemically exterminated, and that place is compared with a controlled area without intervention, significant changes are observed. Termite-free areas contain more dead organic matter, less plant germination, and even cause lower yields of agricultural crops such as grain. The negative effects of termite extermination are particularly pronounced during periods of drought.

What else should we know about termites?
They are most widespread in the tropics and subtropics, and there are more than 3,000 species. Although they resemble ants, they're actually a group of cockroaches that live socially. Like bees or ants, they live in colonies. The size of workers and soldiers ranges from a few milimetres to a maximum of two centimetres. Queens are significantly larger, and can grow up to 10 centimetres in length. Workers and soldiers live for weeks to months while queens can live up to 30 years. Some species of termites have developed chemical weapons and will commit suicide if threatened. Their bodies literally explode, releasing a fluid that turns toxic outside the body, destroying the enemy. ↪

Okinawa Institute of Science and Technology Graduate University (OIST)
Founded in 2011 as a greenfield organisation. At first the institute struggled to attract top scientists to such a remote location, but thanks to its excellent facilities and institutional funding, it soon became an attraction for researchers from all over the world. Research and teaching takes place in English and foreigners make up more than 60% of all the scientists and students.

What is your current research about?
I'm doing basic research: describing the evolution of termites and their kin relationships, which will help us understand their importance for the ecosystem. We have described a kinship tree of nearly seventy selected termite species and a time scale of major events over 150 million years of termite evolution that can be derived from fossil evidence. With our article published in *Current Biology*, we have quite dramatically changed the accepted hypothesis of changes in symbiotic relationships during termite evolution. It's probably still a long way to go before our knowledge is applied directly into practice, but it is the most basic knowledge that we've lacked so far.

What specifically did you come up with?
Based on sequenced termite transcriptomes and other information, we created a kinship tree from which we can derive a lot of information. For example, it was previously known that 50 million years ago there was a sudden evolutionary change in the intestinal symbionts of termites – one termite lineage lost their wood-digesting protozoa and replaced them with bacteria that enabled them to utilize organic material from soil. This led to the most evolutionarily successful group of termites, which today make up more than 80 percent of current termite species. Earlier hypotheses assumed this change occurred through an evolutionary intermediate step – "cultivating" symbiotic fungi or bacteria outside the body, in "gardens" inside termite mounds. This "cultivation" is really practiced by one developmental branch of termites. We proved that it was not a common intermediate step of all lines, but only a "side" branch.

What are the next research plans?
I'm currently writing grants and looking for a position to set up my own research group. I still live in the dream of an academic career, even though there are few positions and there is considerable competition. I have now submitted a Czech Science Foundation Junior Star grant, which I would work on at the Czech University of Life Sciences with a small team with international cooperation.

What would your research team do?
Thematically I want to stick with termites, and I want to continue researching the organisms that live in symbiosis with termites. Which aren't just the microorganisms in their intestines. I want to study genetic changes in insects that have adapted to life in termite mounds. Many species of beetles and flies live as parasites or harmless "roommates" in termite nests. At first glance, it is striking for these species that several times in evolution they have independently gained similar adaptations for life inside the termite mound. It almost looks as if the evolution of these flies and beetles was predictable. Which is a great opportunity to study the role of determinism versus randomness in evolution.

Aleš Buček and Tom Bourguignon (left) in the field with a termite nest.

Aleš Buček with larvae of Acherontia atropos, the (African) death's-head hawkmoth, which he worked with as part of research into pheromone communication at the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences.

As a scientist, what's a typical day for you?
Nowadays, I don't spend much time in the laboratory. Most of the time I sit at the computer. Although I'm not a computer scientist or programmer by education but am self-taught, I spend a lot of time on analysis and data processing. But I always try to have other projects that get me into the lab. And the most beautiful is field work, where we always go "termite hunting" for two to three weeks at a time. Just before the first lockdown in the spring, I spent two-and-a-half weeks in Cameroon, last year in Madagascar, and one long-term project is underway in Malaysia. But the total amount of field work comes to roughly a month and-a-half per year.

How is fieldwork conducted?
It always depends on the project. Usually we collect specimens of as many species of termites as possible for further genetic analysis. A long-term experiment is underway in Cameroon and other tropical areas, where we observe the amount and diversity of termite species and how termites affect processes in the soil.

How do you look back on your studies at Charles University?
I remember them only in a good way. I met many great people there. I graduated in biochemistry from the Faculty of Science, where we had a lot of compulsory lectures. I don't know if it's changed since then. Looking back, I would have appreciated more freedom in choosing subjects. I found myself wanting more biology.

After your bachelor's degree you worked in laboratories in the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences. What did you do?
I dealt with the language of insects, how organisms communicate using chemical substances – pheromones.

Where do you get your inspiration?
I find the greatest source of inspiration in nature. When a person is out in the field, many things come to mind. Another inspiration for me is of course reading and talking with my colleagues (ideally over a beer).

What do you enjoy besides science?
I like to climb and hike in the mountains, which can't exactly be done here in Okinawa. But I've started diving, and I really enjoy it. I often go in the morning before work. I could jump off the balcony straight into the sea where I live - if it wasn't so shallow. There's a coral reef 50 metres from the shore, which offers incredible diversity that is very similar to the tropics. I'm a little bit sorry that termites weren't evolutionarily successful enough to colonise the sea as well. So it's hard to combine diving with my work (laughs).

Aleš Buček, Ph.D., studied biochemistry at the Faculty of Science and worked at the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences, where he researched pheromone communication in insects. He currently works as a post-doctorate at the Okinawa Institute of Science and Technology Graduate University in Japan, where he researches the evolution and kinship of termites at the genetic level.

Unafraid to address the “elephant in the room”

“Instead of just giving ERC grant applicants advice, we put them in the role of evaluators themselves so they better realise what they need to fix,” says Zdeněk Strakoš of the Faculty of Mathematics and Physics. The mathematician regularly organises workshops for young scientists to boost their chances in applying for European Research Council grants. Strakoš has excellent qualifications for the task: he himself helped identify original European scientists in the fields of computer science and informatics for years.

STORY BY Pavla Hubálková and Martin Rychlík PHOTOS BY Hynek Glos

The ERC, which awards the most respected and generous scientific grants in Europe, has been in operation for more than a decade. How did you get on board and end up leading one of its panels?
Around 2008, I got an e-mail from Brussels saying that a new grant institution was being created and that I was being invited to serve on one of its evaluation panels for advanced grants. At first, I thought it was spam, but I didn't delete it. Later, I returned to the letter, read it again – and got a little scared.

For what reason?
From the context, it was clear that this was something new and unique, and that these would be exceptional grants. I thought to myself "What am I going to do there? I'll only be an embarrassment, not only to myself, but to the entire Czech Republic!"

So what happened?
I didn't reply for a week *(he laughs and pours tea in his attic study)*. I asked people around me whether anyone knew anything. Nobody did. In the end, I wrote back very carefully that I was willing to take the job but was not entirely sure that I was the right person. Their response was a contract.

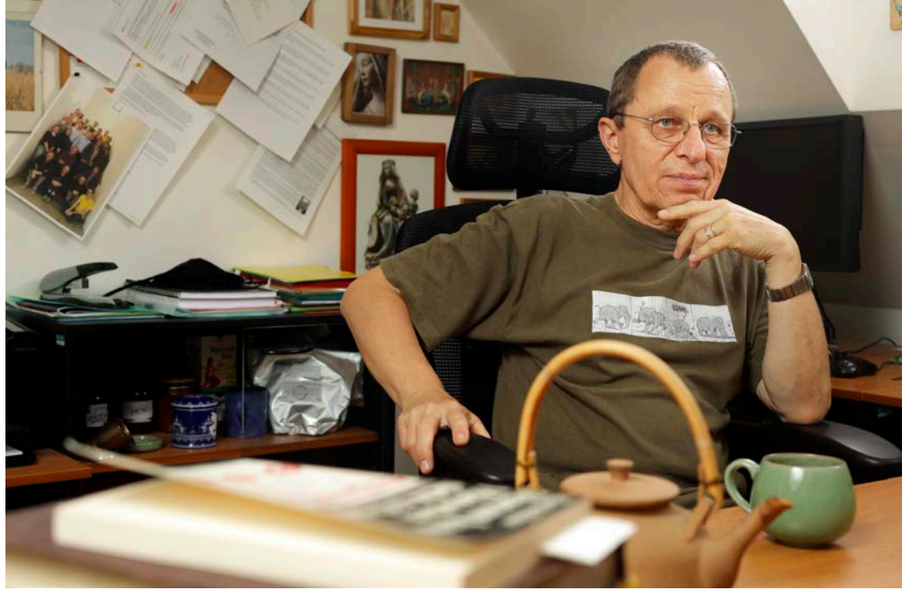
How specifically did your work for the ERC start – did they send you candidate projects?
I got the first set of around 40 applications for evaluation. I understood five of them very well as they were from my field. The next five, I was still in the picture, but the rest of the projects were quite distant from my usual focus. I wrote to the chair of the panel that I wasn't sure that I could properly evaluate the other 30. She answered very briefly: "You're a member of the panel, so do the job!"

That sounds uncompromising. How did things turn out?
When I received the evaluation results from my other colleagues on the panel, a great weight was lifted from my shoulders. I had hit the mark in the vast majority of cases. What a relief! I don't mean it in a pompous way, but I realised that I had a gift for quickly recognising whether a project was interesting and above all, promising. It didn't come just like that: it was the result of my approach to work as well experience I gained in the USA.

You worked at Emory University. What was the job?
The first year I took over a previously announced lecture in my field. They wanted to build a strong group focused on computational mathematics and repeatedly announced a search for a permanent position in the field, but they had not been successful. After a while, they offered me a permanent position. I turned it down because my wife and I felt strong ties to our home country. They mentioned a short notice period after which I could leave, but I didn't agree to it because I thought taking tenure and then leaving after two years wouldn't be the proper thing to do. They appreciated my openness, even if they didn't understand my stance. In the end, we agreed that I'd stay there for some time, help to found a group and then return to the Czech Republic.

Could you describe it in further detail?
In addition to the standard responsibilities, I had to help identify suitable candidates for the newly formed group. I reached out to some of them myself. Out of close to 400 applications, my task was to suggest those whom I proposed to invite for an interview, and to justify my suggestion to the department's management. There were four members of the search committee, but I was alone working in the given field, which made it difficult. Still it was a good experience, one which later suited me very well when evaluating ERC grants.

Along with professors Pavel Exner and Tomáš Jungwirth, you were one of the highest-ranking Czechs in the ERC. Do you know who recommended you at the time?
I don't. All they told us was that they were looking for co-workers who "did original things." The nomination was for three active years, but the contracts are always for one year; they didn't have to be renewed. Two panels always take turns: One year a panel is active and evaluating, and the other year it is "asleep." So I did that for a total of six years. Then I became chair of the panel for a year.



Why didn't you continue?
I was asked to and they sent me a contract, but I turned it down. I felt that I couldn't continue doing it well anymore. You know, the ERC and especially leading the panel really requires quite a lot of energy and by then I wanted to pay more attention to my students and my own work.

But you continue to work on ERC grants, or more precisely, on helping applicants. Since 2010, the Technology Centre of the Academy of Sciences of the Czech Republic together with Charles University, has held workshops and information days that you have co-organised. How did that cooperation come about?
On the way from Brussels, from one of the evaluations, two of my neighbours on the plane were talking about the ERC and directly in relation to the Czech Republic. I began to smile even though I tried not to and I started talking with Petra Perutková-Fedorová. You can call it a lucky coincidence. Together, and with the help of many others, we gradually brought the current system of support for applicants to life.

We've come several times to see how the workshops are run. It's tough training for scientists who want not only to take part in the competition for grants but to get support. How many people have gone through your workshops?
Many. I haven't kept count. I'd estimate two-thirds, maybe more, of Czech ERC applicants have taken part or at least consulted their project remotely with us. Instead of just telling them what they should do and how they should do it, we first put them in the role of evaluators themselves, so that they see things in a different light and see where the mistakes are. When they do the workshop tasks properly, they understand what has to be changed and how.

There is a lot of talk about ERC grants – what makes them so unique, aside from the generous funds successful applicants can receive?
Scientists themselves determine what they want to investigate: no one prescribes anything to them. The ERC creates space for leaders who can take responsibility for others. I really love Saint-Exupéry's book *The Wisdom of the Sands*, where there's a character who is the only geometer (or geometrician) in the entire empire, who is humble, wise and *knows*. Thousands of interpreters are not and cannot match him, but their work is also of great value; ↪

"Scientists themselves determine what they want to investigate: no one prescribes anything to them. The ERC creates space for leaders who can take responsibility for others."

ERC grants

Awarded by the European Research Council from the EU budget. They are exceptional grants that aim to support exceptional science. Emphasis is placed on completely new ideas that can significantly influence a given field, push boundaries or even open new research perspectives. There are five types of ERC grants that can be applied for currently. *Starting* (for independent young scientists), *Consolidator* (young scientists consolidating their own research teams), *Advanced* (top scientists), *Synergy* (groups of several researchers) *and Proof-of-Concept* (early application support).

Strakoš' "elephantophilia"

Zdeněk Strakoš is fascinated by elephants and collects statues and images of the animal. "As a child I came across a book called *Eye of the Peacock*, where the main character is an elephant who leads an expedition to save a young child. I used to read it all the time," he laughs. Even now there is an elephant on his t-shirt, as part of a comic strip. "I love this comic strip. It always warns me not to walk around like a hotshot with my nose stuck up in the air, or life will find a way of taking me down a notch," the professor says. The shirt was given to him by his children. He received another gift from his colleagues for his 60th birthday whereby he got to be an elephant caretaker for a day at the zoo. "Scrubbing an elephant with a 20-centimetre brush is really hard work," he recalls. Although he deals in "high mathematics" and its computational applications, he has to write his notes by hand. "I tell students: use a pencil! If you don't write with a pencil, the systematic order of thinking, thoroughness, and ability to capture the essentials, are weakened," says Strakoš to the younger generation that prefers tablets and PCs.

without them, the resulting work would not have been possible. The callings are not the same, but they have a common goal. The success of one is not detrimental to the other but the opposite. Their combined input is beneficial to all. However, unfortunately I don't think it's always seen that way.

Is it possible to summarise what a successful ERC project looks like?
A successful project should be based on a unique idea that is well formulated and explained. It doesn't matter that you don't know exactly how things will turn out, and it almost doesn't matter how many publications will come out as a result. You have to be able to describe the direction and what you will do, *when*… You have to be credible to reach the goal you have set, as evidenced by previous results. The text must be consistent and clear. A great idea is not enough. The difference between being funded and not being funded can depend on the slightest detail.

Some successful CU researchers have received internal Primus funding to set up their own research groups, and at the same time (or subsequently) ERC support. Do you see any connection there?
Primus is an excellent thing, and great credit goes to Professor Jan Konvalinka, the vice-rector for science and research. Having a Primus project can greatly help ERC applicants. Nevertheless, the Primus recipients who are not successful with the ERC also make me happy. Thanks to Primus and long-term preparation for filing an ERC project, they re-evaluate their approach to their research, ask difficult questions and are not afraid to go after the answers.

Is that why a motivational bonus was created at Charles University?
Exactly. When ERC grant applicants work intensively with us, we know how much time and energy they have put into preparing their proposal. Submitting a strong project contributes to the school's good reputation. The environment is changed by deeds – and we want to show that honest efforts are appreciated.

During its entire decade of existence as an institution in the Czech Republic, only around 40 researchers have gotten ERC grants. Why is the success rate of Czech applicants so low?
Mainly it's through a misunderstanding of the ERC concept under the influence of the domestic environment, shoddy applications based on lack of knowledge or pride, and sometimes also due to external circumstances. Errors can occur also in ERC evaluations, sometimes also affected by bias. An appeal is considered only from a formal point of view, and usually they refer to "scientific opinion." I'm truly allergic to that phrase. Science is a rational discipline; an opinion must always be founded on a logically constructed argument, otherwise it has no weight, regardless of whose name is signed to it. But let's not make excuses due to external circumstances.

Do you see a shift for the better in the applications submitted from the Czech Republic?
Certainly! Applications are at a much higher level than they were at the beginning. But our competition is not stagnating, either. I do not have the slightest doubt about the abilities of our people, teams and the quality of their ideas, but the Czech system continues to be stultifying, focused on reporting and "objectivised criteria." There is a desperate lack of support from individual workplaces. We cannot reap what we have not sown.

What can CU do to win more top grants?
Charles University has done a lot – the difficulty is in the workplaces. It's certainly not easy to go through the changes that ERC grants can and do bring to workplaces. But if ERC researchers and top foreign researchers are not welcomed and supported in our environment, we cannot have more of them. This is a simple equation.

From your perspective and professional experience, how do you see the current state of science?
Fragmentation is a disaster: we are ceasing to understand each other. Scientists don't have time, they don't go into depth, they don't read. Increasing pressure on the speed of results leads to superficiality and thoroughness suffers. Science becomes a business: it isn't always important whether something is an undistorted fact or a proven and correctly interpreted statement put into the right context. Often what's important is doubtfully measured success, citations, at the price of incomplete arguments or even the conscious concealment of difficulties. Authors are afraid to discuss mistakes, lack of clarity and shortcomings. It simply isn't "advantageous." Results showing errors and gaps are marked as negative. This is logical nonsense, created by associating the critique of the result with the critique of the author. Some of the results I have contributed to show serious and widespread errors. Some colleagues tell me, only half-jokingly, that I'm their *conscience*. I'm not. We each have our own.

Do you have hope for the young generation?
If I didn't, I wouldn't be working so hard with them! The community of young people around the ERC is wonderful. It's the water of life for me. I also love my students. I am a grateful tiny part of Charles University whose duty, to quote the school's founder the King and Holy Roman Emperor Charles IV, it is to work so we can "be proud to invite others from abroad to participate…" This includes – and promotes – a change of perspective: from "Czech science" to "science in the Czech Republic" that is increasingly respected in the world.

Zdeněk Strakoš is a professor at Charles University who has worked at the Faculty of Mathematics and Physics since 2006. He graduated in mathematics at the Czech Technical University in 1981, then worked at the Academy of Sciences (then the Czechoslovak Academy of Sciences), where he obtained scientific degrees. With two breaks, he worked from 1991 to 2000 in the USA. He deals with numerical and computational mathematics. A monograph from 2013 called *Krylov Subspace Methods, Principles and Analysis* Press (co-authored by Jörg Liesen) and published by Oxford University Press, has become one of the basic references in the field. He is the recipient of several awards and distinctions including Donatio UK and Fellow of SIAM.

Med students can **benefit** greatly from scientific training

Hematologist Jan Trka grew up in a family of teacher-scientists, so from an early age science was an integral part of life and work. Maybe that's why he became the head of the scientific-diagnostic laboratory at the Motol University Hospital in Prague, and is now the vice-dean for science and research at CU's Second Faculty of Medicine.

STORY BY Pavla Hubálková PHOTOS BY Vladimír Šigut

When Jan Trka graduated from Charles University's Faculty of Pediatrics (today the Second Faculty of Medicine), his plan was to focus on endocrinology and childhood diabetes at the Second Pediatric Clinic at Prague's Motol University Hospital. But things turned out a little differently: "I was assigned to hematology instead and it was there that I met Professor Starý, who was a tremendous inspiration and became my lifelong mentor in the field," Vice-dean Trka says.

"Both of my parents are nuclear physicists, and in addition to teaching at the University of Chemistry and Technology in Prague and at the Faculty of Mathematics and Physics, they conducted research, so I grew up in a scientific environment." For Trka, continuing in science was an "obvious" path to follow. After completing medical studies, he automatically applied for doctoral studies in molecular genetics. "We wanted to introduce new treatment protocols, which required the introduction of new diagnostic methods: new laboratory techniques for determining genetic aberrations," Trka, who gained experience in Austrian and British laboratories, explains.

Those same labs inspired him to found CLIP (Childhood Leukaemia Investigation Prague), a diagnostic-research laboratory at the Second Faculty of Medicine and Motol University Hospital. "We began with just two people in one small room and gradually grew. Today, we're headquartered on two floors and there are more than forty of us, students and employees alike. Trka heads the molecular genetics laboratory (which together with the cytometry laboratory) comprises CLIP.

The link between diagnostics and research

Even after more than 20 years of operation, CLIP remains a unique workplace known worldwide. "Diagnostics has gone through tremendous developments. Thanks to modern techniques like transcriptome sequencing, we can determine a disease's genetic nature in almost all patients today. On the other hand, it can still be difficult detective work sometimes. While sequencing the human genome is far easier now, it is more difficult to process and interpret the data that is obtained," he explains. Bioinformaticians and statisticians are therefore indispensable. "They help us to process data. Yet despite this, insurance companies and grant agencies have still not gotten used to the fact that those professions need to be funded as well and that it is necessary to invest in new servers to store data."

When it comes to labs in the Czech Republic, there are some that have the same or even better technical equipment and tools, but CLIP remains number one in diagnostics.

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Thanks to modern techniques like transcriptome sequencing, we can determine a disease's genetic nature in almost all patients today. On the other hand, it can sometimes still be difficult detective work.

"We receive samples from all around the Czech and Slovak Republics because we have unique knowledge and experience," he says with pride. In addition to routine diagnostics, CLIP is also involved in clinical research: recently colleagues succeeded in mapping an entirely novel subtype of leukaemia, with results being published in the prestigious journal *Blood*. Trka says the success received great feedback from experts in the international scientific community.

The head of CLIP doesn't miss clinical work; he says diagnostics are also part of treatment. Those in diagnostics know patients only as "numbers", which means there is a certain buffer or emotional distance compared to those dealing with patients and personal stories up front. "The one thing I do miss is contact with children and parents: I enjoyed talking with them and explaining treatment to them," he says. Now he provides guidance or help to students at the university.

Trka serves as the vice-dean for research at CU's Second Medical Faculty. While much has changed since the beginning of his career, he still sees room for improvement. "Med students lack the basics of scientific work. Nobody teaches them how to read scientific articles, how to critically evaluate the results of studies, how to recognise quality and non-quality work, how to think about data and how to present it," he says. He co-organises an annual faculty conference, aimed at helping students and young doctors to present the results of their own scientific work, and to learn what their colleagues are up to, all in a friendly atmosphere. The event isn't exclusively about science. "This year's programme included the traditional Motol Mile run, a cultural performance by the duo Rudiš-Malijevský as well as a lecture by the Rector for Projects and Publishing Jan Royt entitled *Death and its reflections in Fine Art*.

Renaissance man

His friends and acquaintances know him as a "Renaissance man" although he's the last to admit it. "I feel more like the Czech cartoon character Pytlik the Beetle (Brouk Pytlík), a character who is daring but often rushes in, sometimes too soon," Trka says. His professional life revolves around far more than "just" medicine: he was also in charge of organizing a classical concert series at the Second Medical Faculty. "This tradition of holding classical music concerts was started by Professor Josef Koutecký (who died in 2019), and it was a great honour to continue with it. I enjoyed selecting the compositions, creating the programme and communicating with the musicians."

Trka loves modern art and his love of art also pervades his work: he often creates posters for various events, logos and his "mouse comics" will be familiar to anyone who has ever visited the CLIP lab. "My favourite artistic movements include American abstract expressionism, the 19th century German Romantics, the Czech surrealists, as well as modern abstract art and American pop art. After traveling in Asia, I was happy to bring back Japanese and Korean woodcuts," Trka says, adding that he visits galleries whenever he travels.

Trka also visits sports stadiums while abroad. "I've played competitive softball all my life. I first got into it as a kid at university's Albeř summer camp and I immediately liked it." A lover of sports, he has played competitive volleyball, likes to ride bikes and practices boxing to keep fit.

"And even though it doesn't look like it, I play basketball, Trka – a long-time NBA fan – says. He also likes to zip through town on his bright red Vespa scooter.

Professor Jan Trka is the Vice-dean of for science and research at the Second Faculty of Medicine and the head of the CLIP laboratory. He graduated from the CU Faculty of Pediatrics (today the Second Faculty of Medicine) and earned his doctorate in molecular genetics. He works in hematooncology, especially in molecular genetic markers and the diagnosis of acute lymphoblastic leukemia. He loves art and sports.

CAR-T versus childhood leukaemia

Dr. Lucie Šrámková is a shining example of how the results of research can be successfully used in clinical work: she works at the Department of Pediatric Hematology and Oncology at the Motol University Hospital and at the Second Faculty of Medicine. She specialises in the treatment of acute childhood leukaemia and at the same time is also a researcher; her advisor in the field of molecular genetics was Professor Jan Trka.

Thanks to Šrámková, a revolutionary treatment method that uses so-called CAR-T cells is already being used in the Czech Republic. CAR-T-assisted immunotherapy harnesses the power of the immune system. The patient's T-lymphocytes (immune system cells that have a natural ability to identify and destroy tumour cells) are prepared and "reprogrammed" with the help of genetic modifications to more effectively and to specifically identify and destroy such cells. "I first encountered this new treatment concept at a conference in 2015: it seemed like science fiction at the time – a revolutionary and fascinating treatment method," the hematologist says.

Dr. Šrámková recalled the time when they had a young patient in the ward whose disease had returned even after a bone marrow transplant. Radiation and chemotherapy were ineffective and not helping. "I boldly wrote to three places in America where I knew they were testing new treatments. One of the facilities agreed to include the child in a clinical trial," she says. The patient flew to the United States, where he underwent CAR-T treatment – and survived. Being able to take part in the trial saved his life.

"That motivated me to negotiate the possibility of introducing the treatment here in the Czech Republic. Which succeeded after five years. Now with the help of CAR-T cells we are already treating two other patients," Šrámková says. She believes the new approach is the right one: "In the future we're counting on CAR-T cells being used to try and destroy dozens of types of hematooncological and solid tumours."

Clear masks are essential if you can't hear

The idea to sew face masks came to her long before they were widely needed during the pandemic: more than a year ago Faculty of Arts student Kristýna Šimralová attended a lecture on opportunities for the Deaf, showing how even tough barriers can be overcome. She opted to make face masks with a clear window, allowing the Deaf and hard of hearing to see and read lips, in hospitals where masks were worn.

STORY BY Marcela Uhlíková PHOTO BY Vladimír Šigut

Šimralová learned about transparent masks on the internet, when she was researching specialised medical items such as amplified stethoscopes. Making masks was something she wanted to do: all she needed was her own sewing machine. She sewed her first mask in August – a few weeks ahead of the Covid second wave.

The student admits that she learned a lot on the fly but her masks are thought through down to the last stitch.

How did things come together? There was a personal reason: Šimralová learned three years ago that she was suffering from hearing loss. Needing to read lips to communicate successfully is something she understands first-hand.

If we go back to that first mask: you had almost no experience sewing, yet you were combining two very different materials: fabric and plastic. Wasn't that hard?
I have to admit that I had no idea how to approach it at first. I got it in theory (laughs). I had read a lot of recommendations and watched instructional videos. I didn't want any surprises. But after I made my first mask, I took it to the Tamtam Centre for Children with Hearing Impairment. Seeing a person laugh or smile through the mask, how happy they were, was wonderful. Just as importantly, the plastic folio did not "fog up" which is sometimes the case with such masks.

That first success convinced me to continue. I decided I would make more and give them to my fellow classmates and friends, in short, to anyone coming into contact with deaf people. I bought a lot of fabric and began making many more.

Who got your masks, when they were ready?
My classmates got masks from the first batch at the beginning of September. I also offered my masks on facebook and a tutorial to sewing circles, so anyone who wanted could try their hand at it. Overall, my masks were met with positive reactions although there were some who didn't understand why they were transparent and thought they looked awful. I think they missed the point and even an explanation didn't help. Just now I am taking 100 masks to Tamtam where I told them I can also offer masks to parents of deaf children and parents who may be deaf themselves.

How long do you intend to keep it going?
As long as necessary and as long as I can manage. I'm in my third year at university, so I will have to write my bachelor's thesis, as well as complete essays and other requirements. But so far I have been able to manage both. Right now I've got another 50 masks at home almost completed where I have to add the ear loops. By the way, if there's anyone out there who has extra fabric just lying around they would like to donate, or want to pitch in to buy fabric, that would help a lot. Until now I have covered the costs myself. But if anyone is interested in helping, they can get in touch: kristynasimralova@gmail.com.

Kristýna's tutorial

How long does it take to make a single mask?
I don't know how long it takes to make a single one but 50 take two days nonstop. I sit down at the sewing machine in the morning and continue until night. Then repeat. Of course, I occasionally get up to stretch or have a bite to eat. The toughest part of the process is making the "windows". Cutting out the windows – and preparing the plastic folio for sewing – takes three hours alone.

Would you recognise your work easily among other face masks?
Right now, I think I am the only person in Prague making masks like these, so yes. I doubt there would be anything similar from anyone else. I tried to make a bunch of visually different masks which also reflected the season. In the summer, there was an interest in blue masks or floral designs or polka dots. It's also nice when the mask matches the wearer's clothes.

When you are not studying – or sewing – what do you enjoy?
I like taking part in diplomacy simulations. These are simulations where you represent one side of a given issue and try to reach a resolution with different "state representatives". I used to take part as an organiser, which meant preparing materials for discussions for about 15 team members. The last I did was a Pilsner Diplomatic Simulation.

Distance learning this year didn't leave me much opportunity to take part, so I had to miss it. I also wasn't sure I would be able to follow everyone because of the face masks. Most participants in such simulations have been people without hearing problems. I know my team members really well and I don't think it would have been a problem to join, had I wanted.

What do you get out of the experience?
A lot of those who take part are inspirational young people with a broad understanding of issues. I might not look like someone interested in politics but it is also about more than just that. I started taking part in simulations back I high school. My first task was representing Canada and later, at the Prague student summit, Albania in NATO (in English) and later Belgium in the EU. In another simulation, I represented Ethiopia on the United Nations Human Rights Council. In real life, I visited their government website so often for information, they blocked me! They probably thought I was conducting cyber espionage (laughs).

Would you be interested in a career in diplomacy, then?
I want to work as a psychologist for the Deaf, in short, to provide help not only in Czech sign language. I don't think there are many deaf psychologists for an estimated 500,000 hard of hearing and 10,000 deaf people. Actually, I only know about two. I think it's very important for a psychologist working with the Deaf to understand the community and culture, to know sign language, to know their needs, and to be able to understand what they are going through.

Kristýna Šimralová comes from Sokolov. She is in her third year of Deaf Studies at the Faculty of Arts at Charles University and in her second in Psychology. She enjoys writing, drawing and reading specialised literature. She says she is a perfectionist who won't quit in the middle of a creative endeavour until it is finished.

From makeup at the starting line to **slamming** through the mud

In her third year at the Faculty of Education, Tereza Neumanová is a woman of contrasts: someone who lives for the bike but also hopes to teach one day. Who has no qualms about grinding through the mud but carefully applies makeup before every race. Last year was one of her toughest yet she clinched two National Championship road race titles in the Elite category (mass start and time trial). At the UCI Mountain Bike World Cup in Nové Město na Moravě she was the best Czech female competitor in the U23 category.

STORY BY Jitka Jiřičková PHOTO BY Miloš Lubas

You have been doing sports since you were a little kid but eventually you had to settle on just one, right?
My parents' approach was to let me try everything: swimming, gymnastics, athletics, hockey, tennis, and ballet and also skiing, speed skating and cycling. As a kid, I went to an arts-based elementary school where I enjoyed painting and music. I think I never tired of sports because of my range of interests. Cycling came out of speed skating (at first it was only a complementary sport). That said, I had been racing since childhood. When it came to attending high school, I had made up my mind to stick with bikes. The choice was between studying in Jablonec nad Nisou or Nové Město na Moravě. Nové Město won out. And because during the winter lots of cyclists cross-country ski to stay in shape, that's what I had to learn next [Editor's Note: Nové Město is famous for cross-country skiing and is one of the locations on the FIS World Cup circuit].

How hard was it to pick up?
It was difficult at first. The first autumn, we left for three weeks of training and competition in Sweden and I cried a lot because everyone else had been racing since they were small and here I was learning for the first time. It's a very technical sport. But those first six months taught me a lot: I was on my own, which at 16 came as a bit of a shock, but it was rewarding just the same.

What bike races did you compete in as a kid? And what disciplines do you compete in today?
The earliest event was the Drahanská Highlands Cup, a series of races not far from Brno, which was not far from Třebíč where my family is from. We used to ride there every other weekend with my sisters. Then, I began competing and taking part in races – and championships – around the Czech Republic. I made the junior national team and have been a member of the squad every year since then. Since I was small, I competed on mountain bikes in XCO which is a discipline in the Olympic Games, and then I added XCE – sprints – and XCM marathons. I also compete in road races but there aren't as many of those races as I'd like. I also used to race at the velodrome, but gave that up and now use the indoor track mostly to stay in shape during the winter.

What was the toughest point of your career so far?
Last year, because I had problems with a bladder infection related to bad positioning of the bike saddle in time-trial races. We didn't have access to the bikes for training and got them only a few days in advance. It was the first time I was forced to withdraw from big races mid-season for health reasons. Three weeks into the season this year, I suffered an elbow injury when I was hit by another rider.

What is the take-away for you?
I try not to think about the risk of injuries or to worry – which could have a negative effect. But I don't seek out dangerous situations and I am happy when I feel technically in control on the bike.

Have you ever wanted to throw the bike down when things didn't go your way?
If you've won once, it's a feeling you never forget. And it's something you want to experience over again. That's the greatest motivation for me.

Do you suffer from nerves ahead of competition?
I get nervous before every race but I am used to it by now. Not being nervous would be a mistake: being a little on edge helps me focus.

When did you feel best?
It might seem strange but it was also last year. I didn't have any expectations and almost every weekend I was surprised by how well things went. The best was winning the National Road Race Championship in the Elite category.

How difficult is it for you to combine university studies and your sports career?
The first year was a little confusing before I figured out how things worked. I try and absorb a lot while in class and to catch up on the rest on evenings ahead of exams. I'm in my third year but I am not planning on taking my final exam this year. I am very happy to have found a balance between my studies and sport. My studies may have been slightly slower than they could have been, but I'm getting there!

You are studying at the faculty of education: do you expect to teach one day?
I do. I know that I will enjoy it and have the right abilities for the job. After I graduated from high school, I wanted to continue studying but it's true that my sports career was number one. I asked other sportspeople for advice and if they could recommend a good faculty. The Faculty of Education has been very accommodating: I have an individual study plan and even when competition requires me to be away for a three-week stretch, I am able to do both. My first two years went by without any problems. I am studying social sciences and physical education which is great for me: one-half is theory, the other practical. At school I can focus on learning and relax a little too, getting away from constant training.

What were the last few months like in terms of racing?
In October, I was very busy abroad. It was quite a strenuous end to the season in road cycling World Championship in Imola, then there were two World Cup events in Olympic cross-country, the World Championships at Leogang, in Austria, and finally the European Mountain Bike Championship at Monte Tamaro, in Switzerland. The season is now over but I am back to training to stay in shape. Over the winter I train between 20–25 hours a week: downhill, cross-country skiing, and hitting the gym.

In photos you seem to be a woman of contrasts: you are a workhorse on the bike, unafraid to get in the mud, yet at the starting line you always look great.
It's true that I like to accent my feminine side next to the boys on the team: we all wear the same team jerseys but I don't race without at least a little makeup. Doing my make-up before an event is even kind of a ritual and I think I look a little nicer too at the starting line.

This year, sports, like everything else, where heavily influenced by the pandemic: how did you get through the first wave?
The first state of emergency was hard. When things improved, things got brighter and we could plan for races again. We were lucky: we began riding again fairly soon and were able to train individually. Without the fans at races, it was a little lacklustre. When you are doing well in a race, they encourage you to keep going and you're not alone on the track.

Tereza Neumanová was born in Třebíč in 1998. She went to a high school with a strong sports programme in Nové městě na Moravě, knowing she wanted to continue as a racer. She used to ride for Dukla and later for Česká spořitelna Accolade. Her best career results include the National Championship in the women's elite category last year.

What **tattoos** tell us about life behind bars

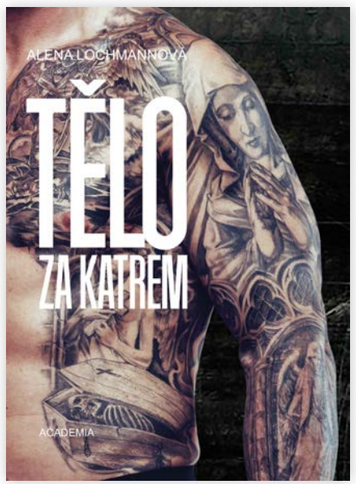
Cultural anthropologist Alena Lochmannová is a CU graduate and the author of *Body behind Bars*, a remarkable ethnological monograph examining tattoos and body modification in Czech prisons. Based on hundreds of interviews conducted over more than five years, her study casts light on a world most of us cannot imagine. Tattoos, the author says, not only map the prisoner's journey but reveal the shape of their soul.

STORY BY Jan Velinger PHOTOS BY Michal Novotný

Alumni Forum 9

You yourself have and love tattoos (which you kept hidden from prisoners for the sake of this study). Do you remember the first time you saw a tattoo?
I first began noticing tattoos at an early age. I was surrounded by people who had tattoos but the first time I think I was four or five years old. As children we spent a lot of time at the local pond and there was a fisherman who was often there in the summer. He didn't say much but we liked him and had a kind of natural respect for him. But my grandmother didn't want him speaking to me and would always drag me away. She called him an "old criminal." When I asked why, she pointed to his tattoo: a heart with initials on his hand that I think it had merged with other tattoos. I think a lot of people remember seeing tattoos for the first time and have a similar experience, regardless of age, place, or gender.

You took your initial fascination much further: you made tattoos the subject of extensive ethnological research.
The focus at the beginning was different and the result, now published, was something I couldn't have imagined when I started. I visited jails because I was interested in the kinds of tattoos convicts had. I was interested in what partial symbols meant and wondered if any symbolism had survived at all. Not only did I get the answers, but my ethnological study allowed me to uncover just how important body modification is in the "second life" of convicts. How non-verbal communication plays a role. I focused on what the convict's body tells us about life behind bars, about the shape of his soul, and the extent to which a person's identity is inscribed in their tattoos. That was the main focus.



Body behind Bars
Alena Lochmannová
In Czech, 353 pages
Academia 2020

You call it a "transformation".
Yes, it is. The act of getting tattooed is a transformation and feeling physical pain is an important part of it. Tattoos can range in meaning from a declaration of status to signifying gender (regardless of whether you were born a biological male). Sometimes prisoners will tell you that a tattoo "means nothing." But there is always some meta-communication potential simply because tattoos are not allowed in Czech prisons. The very act of getting an illegal tattoo behind bars, an act that is punishable by the authorities, sends a message.

An illegal tattoo can not only complicate a convict's time in jail, it can also jeopardise their chance of getting an early release. So behind bars, every tattoo in prison is important, even one that is only ornamental. At the same time, you have to perceive the person's whole body: how they move or carry themselves, as well as where they fit in. You can have a very rigid code of tattoos and symbols, for example, when it comes to Russian-speaking inmates. There, you can't just get any tattoo you like, especially if you haven't merited it. The tattoo you can get within such a gang depends on your past and on your criminal career. There is a deep-rooted and traditional symbolism and a "correct" coding grid among Russian prisoners which is fascinating.

It reminds me, in a way, of outlaw motorcycle gangs where you have patches on your leather jacket that you have to "earn" and each one has a meaning.
In Russian gangs you definitely have to earn a tattoo and even more importantly you have to ask: there is a very rigid hierarchy. In every prison among Russian gangs there is a high-ranking member who has to approve, or even ask further up the chain in the outside world, for it to be approved.

In your research, tattoos that convicts had before they went to jail weren't important, correct? Only the ones they got while they were there?
Yes. Often you would have inmates who had none and I learned that they would get their first tattoo within months of beginning their first sentence and imprisonment, obviously connected with the change in their identity behind bars. They would see others who had them and then choose to get one themselves. If someone cared about aesthetics in tattoos before they were jailed, they might make the effort behind bars also, to get original

There are multiple reasons for getting a tattoo and it is significant that most inmates get their first tattoo within a month or so in jail. Their first, but definitely not their last.

colours, or the best technical tattooing they could, and would wait for a capable tattooist. But if you were someone who didn't care about quality even outside, who had amateur or homemade tattoos already on parts of their body, I think you took a similar approach in jail. The bottom line is that in the outside world, tattoos are more of an aesthetic matter. Behind bars, they are more about context and the message they send. Collective identity is very important and a tattoo shows which group you identify with.

You mentioned pain...
If you have ever seen some of the tattooing tools used behind bars, you'll understand. Imagine a homemade tattooing device made from parts of a spoon, or a pen or a toothbrush, connected to a power source. And instead of needles, you have steel brush wires. And yet, sometimes this results in amazing tattoos in the positive sense of the word. There are multiple reasons for getting a tattoo and it is significant that most inmates get their first tattoo within a month or so in jail. Their first, but definitely not their last.

Some of us are wary of going to even a regular tattoo parlour and would find the conditions in prison terrifying, I think.
Zero hygiene, there is really zero. Although even there, there are exceptions: it depends on the tattooist. Some don't care and will use one needle for multiple prisoners, which is of course why it is illegal, because of Hepatitis B and C and other illnesses. But there are some who do their utmost to match the regular process outside: who clean the skin, who use aftershave as a disinfectant, who burn the tip of the needle first, and apply a cream to the skin afterwards, and somehow in that weird world of prison try their best to replicate conditions in the outside world. Some prisoners of course, were professional tattooists before.

Once you get a tattoo behind bars, is this something that should be visible, that you want to "announce" to others? Or is it enough, among the prison population, for others to know or simply have heard that you have it?
It depends. My first impression was that they were meant to be visible, such as the use of a teardrop by one's eye, because of the connotations. [Editor's note: a tear can designate a life taken – a murder]. But if we are talking about banned hate symbols like the Nazi swastika, those might not be as visible. I saw one on a person's chest, above their heart. There are also inner lip tattoos, also not meant to be seen right away. Right-wing extremists will try and hide their tattoos and will tell you that their tattoos are only for them.

In prison it isn't that smart to be public about a new tattoo which is barely dry, unless you really want to provoke the guards. But in cases where they are more visible, it usually relates to status. That can mean either higher status but in some cases also the opposite: you can be a victim, tat- ↪

As a mother, it wasn't easy for me to hear many of these things. But as a researcher I had to set my own feelings aside. It didn't always work. There were moments when I felt I had failed as a researcher but not as a human.

tooed against your will, punished by fellow inmates for something that you did. These tattoos are often on the face, and can be everything from lines to depictions of male or female genitalia.

Readers can see many of the different types of tattoos in your new book. Right-wing extremists have all kinds of coded language, cryptic numbers and acronyms, it seems.
Yes, they use numbers but also colours and words and tattoos of their personal deeds connected to fascism. They are more and more sophisticated. So while many have the common ACAB, which stands for "All cops are bastards", the right-wing has coded the message, for example, as 1312, where the number signifies the place of the letter in the alphabet. In the past, a prisoner might have had a tattoo of a Klansman with his hand raised or the letters KKK but that has often now been replaced by the number 311 (meaning 3x the 11th letter in the alphabet). So they go deeper and deeper and the symbols go beyond runes or the swastika. Prisoners around the world, not here, sometimes pretend ACAB means "all cats are beautiful" or "all colours…"

You conducted hundreds of hours of interviews: what was it like to interview inmates, some of whom were in jail for life?
Most were quite willing and were fairly open. It took a while for them to trust me a little more and to show me tattoos of hate symbols or of their crimes and talk openly about what was going on behind bars. At the same time, they also often lied. The discrepancies in information over time were obvious, I'd ask some questions again and the answers would be different, and their stories varied from fellow inmates or prison guards. I think for them this was an opportunity to boost their egos and I think it is not unusual that people try and present themselves better than they really are. We all do that, in a way, even outside. In all, I did 205 interviews, including with guards and prison psychologists and others, 128 were with prisoners. That was the other side of the coin.

What kind of crimes had prisoners committed?
It differed quite a lot. I met some who were in and out of jail for lesser crimes and people who had been sentenced to 20 years with 17 years left on their sentence. I met people who had attacked others, or had stolen things, and I met hitmen who had been paid to murder someone. There were people from the Russian-speaking community, in jail for drug-related crimes, and I even met rapists who had hurt women or children. It was a question I had to deal with and I had to think about it a lot. A friend of mine, a prison guard who helped me, said I would have to be able to cope with the things I would learn – or quit.

But sometimes there were things that were hard to accept: a hitman who swore he would kill the people who sent him to jail once he got out. He was one of the very first interviews I did and it was like jumping into very cold water. But I had to push ahead. I would develop rituals whenever leaving jail: I would put on headphones and would listen to music as I headed home. But sometimes I spent a week or two at prison dormitories and just look at the prison in the distance. Sometimes I could think of little else. As a mother, it wasn't easy for me to hear many of these things. But as a researcher I had to set my own feelings aside. It didn't always work. I had a rule not to talk about my research with my family, but there were moments when I had to with my partner, so I broke it. There were moments when I felt I had failed as a researcher but not as a human.

This work was the basis for your doctoral thesis at Charles University: how did you enjoy CU and how much did the school contribute to your becoming a professional researcher? I ask because you famously had a strong reaction to how cultural anthropology was taught elsewhere.
In fact, I originally began my doctoral studies at another university. After one of the prominent representatives of the Department of Anthropology there told me that research could be done just as well from the desk, I realised that I did not want to be a part of such an institution. I needed to be part of an institution where research is understood, where it was not about the quantity of publications but their quality. That's why I applied to CU and I am very thankful that I was allowed to study there. It may come across as very critical, but to put it bluntly, an ethnologist who does research from their desk is a disgrace to the academic scene. At least for me. Ethnology is about cognition, about entering the unexplored or even an explored field. It is about observation, about understanding and using one's own optics to depict what is happening. Ethnology is about opening one's heart, listening and trying to understand. You can't do ethnological research in a week or a month or even in half a year, and if you do, it probably won't be worth anything. I need people for my research and it's fascinating for me to gradually uncover their world, which is quite often so different from mine.

Thanks to who I am, I meet people I would probably never otherwise meet. And they share with me what they might not have shared under different circumstances. This is what I enjoy: the dynamics of building an albeit short-term relationship, collecting data, analysing my findings, trying to understand. And that's exactly what Charles University allowed me to do.

Alena Lochmannová, Ph.D., is a Czech ethnologist and economist whose primary research interests are representations of bodily modifications of (not only) convicts serving a prison sentence, including techniques for their execution and symbolic meaning, convicts'second lives and the question of identity in a total institution. Her research also focuses on the issues of radicalization and extremism, suicides and farewell letters. Lochmannová is the Vice-dean for Internal and External Relations at Faculty of Health Care Studies at the University of West Bohemia in Pilsen.

Rolling with the **punches**

He has degrees from three universities, worked for a couple of years for the Office of the Government of the Czech Republic, lectures at CU's Faculty of Law, and works with the Academy of Sciences and universities in Helsinki and Copenhagen. His next ambition, though, is decidedly non-academic: he wants to fight in mixed martial arts (MMA). Meet Petr Agha.

STORY BY Jiří Novák
PHOTO BY Vladimír Šigut

"A lot of us form premature opinions about things we've never even experienced or tried. Some people think, for example, that martial arts are unnecessarily brutal. Maybe fights and training sessions are brutal, but you're constantly pushing the boundaries of what you're able to take and what you can deliver. You gradually accept it, and your body and mind adapt," says Petr Agha about aspects that attract him to martial arts.

His opinion? That people should be exposed to situations outside of their "comfort zones." In his case, that means outside of the academic environment: "It's a bubble." Most of his colleagues at the Faculty of Law understand his love of martial arts at least a little: "It might seem strange to some while some kind of like it, while others condemn it," Agha says.

His path into the ring took quite a long time: as a child, he was not an avid athlete. "I always preferred books and stories. It's true that I tried tennis, and then I played basketball in school. At the time, my coaches said I played primarily with my head, which only confirms that my relationship with movement has never been completely positive," the rugged lawyer laughs.

Street fighting in Belfast

His desire to try contact martial arts really matured after his experience in Belfast in Northern Ireland, where he spent 14 months on a scholarship from the British government. "Even years later, there are clear consequences of the Irish struggle for independence; the city still has a slightly aggressive atmosphere. All it takes is a couple of drinks and suddenly forgotten wrongs are awakened. Local toughs attacked me three times in the street just because they wanted to fight. I never felt threatened back in Prague or Brno, so this was a shock. And I felt like I should learn how to defend myself in situations like that."

After returning to Moravia, Agha typed "boxing Brno" online and chose a local *Muay Thai* boxing club. "Boxing seemed ideal to me in the beginning. I thought that it'd be the least physically demanding," he says, laughing about his naïveté. Nothing could have been further from the truth: "I nearly passed out during my first training session. The next day I came back thinking I'd get over the fatigue but it turned out I couldn't get out of bed! My back was out and I ended up in hospital on an IV drip," he admits. Two weeks later, Agha was back and he has scarcely taken time off from the world of martial arts ever since – "In a short period of time I lost almost 15 kilos and it felt really good."

I nearly passed out during my first training session. The next day I came back thinking I'd get over the fatigue but it turned out I couldn't get out of bed! My back was out and I ended up in hospital on an IV drip.

Van Damme's old stomping grounds

On another scholarship – this time in Antwerp, Belgium – Agha found another gym for his training sessions. "I lived in a neighbourhood they called the Gaza Strip." To the left of the main street the upper class and scions of wealthy families enjoyed their lives, and on the other side people lived in far more modest conditions. Arabs, Bulgarians, Poles and Jews – a very multicultural environment! There was a local gym, *Bushido*, which was known as home for only the hardest tough guys there are. It was in a kind of garage, and was led by a man who started in '80s kickboxing alongside the action film star Jean-Claude Van Damme. He trained several world champions," Agha recalls.

"It was hard, but I learned a lot. I ran into a number of great fighters there. One of my sparring partners was Jamal Ben Saddik." [Editor's note: the Moroccan-Belgian heavyweight kickboxer nicknamed Goliath, who was number two in the world last year]. Although he worked in Antwerp for three years, he never signed up for a proper fight. "Training was itself so brutal that I honestly never even thought about a real fight."

Paradoxically, it was not there but back in the Czech Republic that Agha suffered fairly serious injuries: Luboš Raušer, the world champion in Thai boxing, hit him in the head so hard with a kick that it cracked his skull. "At that time I really stopped and thought to myself that martial arts might not be the right thing." After that, he gave up training for a while and didn't get back in the ring until he moved with his family to Poděbrady, some 60 kilometres east of Prague, where he took up classical boxing at a famous local venue.

Victories and defeats

To date, Agha has three official boxing matches under his belt. In the very first, he learned that even with excellent physical training, the hardest part is overcoming mental barriers. "Boxing manager Dan Vencl says that when you get in the ring, you lose up to 70% of what you trained for: your mind is suddenly paralysed. Imagine you're standing in a packed hall for the first time, they play the ringwalk song, the lights are shining, and 900 people around you are screaming! I was so out of it that after the match I didn't even recognise the referee in charge," Agha recalls. He overcame the pressure and won on points.

Since then he has boxed in two more matches, winning one and losing the other. In 2016, he came up short against Václav Mikulášek – a tough guy with the nickname of Baba Yaga, now waiting for a long-awaited cage match with the best-known fighter in the Czech Republic, Karlos Vemola. "Even though I lost at the time, I didn't really mind because I was satisfied with my performance overall. The worst part is when you feel like you haven't prepared enough for a fight. When you let yourself down," he says.

The fighter only sees classical boxing as an extra but not his main focus: Thai boxing is where his heart truly lies. Ultimately, his goal is to go even beyond that, to get into the cage in an MMA match. "Boxing and Thai boxing are basically sports where you can hide behind your gloves, exhale, get stuck in a clinch… But MMA is closest to a real struggle for life. And that's what attracts me the most: the rush of adrenaline and the fact that everything is at stake. It's an intense struggle on a knife's edge."

Petr Agha has been involved in martial arts for 10 years now, and aside from the cracks in his skull, he has broken ribs three times, his nose once, and has suffered problems with his knee. But he wouldn't trade it for anything in the world: "You really have to 'swim' in a slightly tougher environment. While it is tough, he says it is not true that martial arts lead to aggression but the opposite: fighters get their aggression out and acquire discipline and greater respect for others. Above all, Agha says fighting teaches participants to "roll with the punches" which he says is "absolutely essential" in life.

Petr Agha, Ph.D., lectures at the Department of Political Science and Sociology at the CU Faculty of Law. He is the author of several books. He graduated in law from Masaryk University in Brno, from Queen's University Belfast and from the University of Antwerp. He has also worked on the issue of human rights as a contributor to the Office of the Government of the Czech Republic from 2003 to 2008. He is also, newly, a visiting lecturer at the University of Copenhagen.

Troja's IMPAKT on teaching and conferences

PHOTOS BY Vladimír Šigut

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Charles University opened its IMPAKT pavilion at the northern part of the Troja campus of the Faculty of Mathematics and Physics at the beginning of June 2020. Its name is an acronym for the Czech words for the Computer Science and Mathematics Offices, Auditorium, and Library, Troja.

Even if a lecturer lowers their voice to a whisper in the new auditorium, you will still hear them at the very back. The wall behind you absorbs sound and, thanks to triple pane glass windows, any outside traffic noise is effectively muted. We wanted to have the best possible audio-visual equipment, without any wires and cables visible: the majority of them are hidden in more than 700 compartments under the floors. If you put all of the wiring back-to-back, it might connect the two most distant facilities of Charles University in Plzeň and Hradec Králové.

The building is barrier-free and furnished with modern equipment; the outside of the building is lined with a material that changes the site's overall look according to weather and light conditions. High-capacity HVAC equipment was also installed, along with a heating and cooling system using deep wells and heat pumps. A high-capacity data network is also used here.

For teachers at the Faculty of Mathematics and Physics, the pavilion's greatest benefit is its capacity: the large auditorium can accommodate up to 250 people. Thanks to this, it is no longer necessary to hold lectures of basic courses for students in the same year in parallel, and subsequent classes can now be held in one of 10 other classrooms with a capacity of 20–36 seats, four of which can alternatively be used as fully equipped computer labs.

Work on the new site began in 2011. The final building inspection before IMPAKT was officially opened came in February 2020. The total costs of the project were approximately CZK 325 million. The Czech Ministry of Education helped significantly with funding, and the faculty itself contributed approximately CZK 50 million.

Prof. RNDr. Ladislav Skrbek, DrSc.
Vice-dean for development
Faculty of Mathematics and Physics

Sankhuptah's altar

Not all beautiful artefacts come from the tombs of important dignitaries: Sankhuptah was a low-level official who had only been given a simple brick tomb. But quite a surprise awaited archaeologists when, in carrying out their research, they came across an exceptional artistically-executed altar lying directly in front of a sacrificial niche. On it, there was room for all the basic commodities the deceased would need after death. Two "pools" were used for water and beer, and a circular plate was supposed to carry meat, bread and fruit. Stone-cut utensils for cleansing and a table with oils then provided the requirements for the sacrificial ritual. All this was surrounded by sacrificial formulas, the name and titles of the deceased and his likeness. Equipped in this way, Sankhuptah could successfully enter the afterlife.

The top **five** artefacts you need to see

Generations of Egyptologists and archeologists who made remarkable finds at Abusir dreamt of their discoveries one day being presented in the Czech Republic. Not in photographs, films or videos but for visitors to see in real life. Almost close enough to touch. The dream came true in September 2020 with Kings of the Sun opening at the National Museum in Prague – a major exhibition which lasts until early February 2021. Forum highlights five of 100 items that should not be missed.

STORY BY Martin Rychlík, Czech Institute of Egyptology at the Faculty of Arts
PHOTOS FROM THE Czech Institute of Egyptology at the Faculty of Arts, National Museum

Statue of King Neferefre

King Neferefre is sometimes playfully referred to as the Tutankhamun of the Old Kingdom. Like Tutankhamun, his name had long been known but the details of his rule and his tomb had remained a mystery. That is, until the 1980s, when Czech Egyptologists uncovered his unfinished burial complex below the sands at Abusir. The discovery of a set of royal statues, an extensive papyrus archive, a number of cult tools and the remains of the decoration of a nearly completed mortuary temple were most unexpected finds. The news caused a sensation: the location had previously been written off as having already been thoroughly investigated by researchers.

Iufa's canopic jars

It wasn't just through sacrifices and the mortuary cult that eternity could be secured. An essential condition for entering the afterlife was the preservation of the body of the deceased. Mummification served this purpose. At the beginning of Egypt's history, it consisted of a natural process of drying bodies in the desert sand, but over time turned into an artificial, ritualised transformation of an ephemeral body into an "eternal" body. This included the removal of the internal organs from the abdominal cavity and their subsequent embalming. The heart was of essential importance; it was where the soul and conscience were believed to be located, and it was returned to the already dried body. After appropriate treatment, the liver, stomach, lungs and intestines found a place in four containers called canopic jars. These were vessels with wide necks and lids in the form of the deceased or the four sons of Horus.

The statue of Nefer, the scribe

Statuettes of scribes documented from the time of the Old Kingdom can be counted on one hand. But none of them had a text engraved with a sacrificial formula on a papyrus scroll spread out on his skirt, as Nefer had. His statue was found along with others in the so-called serdab – a place designated in the tomb for statues of the deceased – in his stone tomb. In ancient times, thieves broke into Nefer's serdab in search of valuables in the grave goods. They examined the statues a little and damaged some of them, but the majority of the statues remained in excellent condition. What the ancient thieves left at the site as unimportant was discovered several millennia later. Professor Miroslav Bárta's team discovered the site in 2012 under sand drifts, and their exceptional find made history in both Czech and Egyptian Egyptology.

The face of Princess Sheretnebty

Who was Princess Sheretnebty, whose name, statue and body were hidden in the sand in Abusir for several millennia? Why was she buried in an unfinished burial chamber at the bottom of a deep shaft, possibly without lavish grave goods? Who was her husband and the family who stood behind him and made it possible for him to marry a royal daughter? Despite amazing finds such as the discovery of a set of statues of Princess Sheretnebty, archaeology sometimes resembles detective work and raises more questions than it answers. This too is an important aspect of successful archaeological research, which is full of questions and theories about kings, princesses, powerful officials, influential families and the ties between them.

Life at CU

Faculty of Science turns 100

24/6

One of Charles University's most famous faculties, the Faculty of Science, turned 100 on 24 June. In its first year, in 1920, the faculty had 850 students while today almost 5,000 are enrolled, studying subjects such as biology and chemistry. Marking the anniversary, Rector Tomáš Zima highlighted recent successes such as the founding and operation of BIOCEV lab – a joint project between Charles University and the Academy of Sciences.

New professors named

2/7

In July, eighty academics and experts from universities around the country officially received the title of professor at a special ceremony at the Grand Hall at the Carolinum. Twenty-eight of the professors, six of them women, are employed at Charles University.

16/9

Symposium at Carolinum honours Holocaust victims

In September, the Carolinum hosted a symposium called *Nezapomeneme* (We will never forget) honouring the memory of victims of the Holocaust in World War II. The event saw an accompanying artistic contest announced for elementary and high school students. CU's Vice-Rector for Conception and Quality of Education, Radka Wildová, said it was essential for the younger generation to learn in class about the Holocaust and its legacy.

CU women's team triumphs in "University Eight"

18/9

Charles University's female rowing team clinched the sculls title for a second year in a row. Traditionally, teams from eight separate universities compete. This year, a number of CU's top rowers could not take part because of Covid-19; team member Lucie Stoklasová, a student at the Faculty of Physical Education and Sport, said that even when the chips were down, the school's rowers ranked among the very best.

Karel Raška receives extraordinary Neuron Award in memoriam

28/9

On September 28, the Day of Czech Statehood, the Neuron Endowment Fund awarded extraordinary Neuron prizes. One of the recipients, Karel Raška (1909–1987) was honoured in memoriam for his role in the eradication of smallpox. His son Ivan, a professor and biologist at the Institute of Biology and Medical Genetics, said he was extremely happy his father's contribution was being remembered. Smallpox, one of the world's deadliest diseases, was eradicated in 1979.

GeneSpector, a subsidiary company of Charles University making use of technology developed at the school, introduced new kits for faster and safer laboratory detection of Covid-19 and influenza. The kits make use of a special fluid (called viRNAtrap) to preserve virus samples, rendering them safe for further analysis.

6/10

GeneSpector introduces new Covid detection kits

23/10

An outdoor exhibition at Prague's Old Town Square marked the anniversary of the Battle of White Mountain (6 November 1420). The battle, which took place at the start of the Thirty Years' War – was decisive for the next 300 years of Czech history. The author of the exhibition, CU's Vice-Rector for Projects and Publishing Jan Royt, said it was important to mark the milestone and to reflect on the impact.

Exhibition marks 400th anniversary of Battle of White Mountain

Faculty of Medicine in Plzeň marks 75th anniversary

The Faculty of Medicine in Plzeň celebrated 75 years since its founding in 1945. During that time, the faculty produced more than 10,000 doctors! Dean Jindřich Fínek thanked colleagues for their contributions in the field of health care and joked that "turning 75" was a perfect excuse to celebrate "almost all the time."

27/10

Rector expresses hope on grim Czechoslovak Independence Day

28/10

Charles University's Rector Tomáš Zima and fellow university representatives met at the President T.G. Masaryk Memorial at Prague's Hradčany Square on the 102nd anniversary of the country's founding. In his speech, Rector Zima described the alarming rise of coronavirus cases and overall situation as "serious" but expressed hope that Czech society, with its values, would tackle the crisis. On the same day, state honours went to historian Petr Čornej, long associated with Charles University, and Jiří Jelínek, the head of the Dept. of Criminal Law at CU's Faculty of Law.

16/11

CU's Rector Tomáš Zima was formally "passed the baton" from Sorbonne University's Jean Chambaz. "Originally, we hoped to meet with our colleagues here in Prague, but we transferred all of our activities online due to the coronavirus pandemic," Zima explained. His colleague, Vice-Rector for European Affairs Lenka Rovná, said that one positive was that restrictions had redoubled emphasis on the digitalisation of education and learning, which was one of the 4EU+ original goals. The 4EU+ Alliance was formed three years ago with the aim of improving cooperation in education, research and mobility. During its presidency, Charles University will be focusing on quality of education and opening alliance activities to a broader number of students.

Charles University takes up presidency of 4EU+

Czechs mark Struggle for Freedom and Democracy Day

17/11

Due to the pandemic, representatives of Charles University marked November 17 in smaller delegations this year. Over the course of the day, Czechs honoured the courage and sacrifice of students and others who stood against the Nazis in 1939 and the communist regime in Czechoslovakia on the same day 50 years later. Rector Tomáš Zima, along with the head of the Czech Academy of Sciences Eva Zažímalová and Vice-Rectors Jan Royt and Milena Králíčková, laid wreathes and flowers at the Hlavkova dormitory. Politicians, members of the academic community and members of the public also paid their respects, many of them online because of Covid-19.

Charles University joins UNICEF campaign

20/11

Charles University joined UNICEF's global campaign on the occasion of World Children's Day, in recognition of every child's right to food, water, protection and education. "The consequences of the Covid-19 pandemic threaten an entire generation of children. Limited access to medical care, educational failures and a deepening of poverty in some countries can have fatal consequences for children," UNICEF director Pavla Gomba said.

Faculty of Medicine in Hradec Králové also turns 75

The Faculty of Medicine in Hradec Králové was established in November 1945 as a branch of the Prague Faculty of General Medicine. Today it is an integral and unquestionable part of Charles University. "History is binding for all of us and challenging tasks lie ahead," Dean Jiří Manďák said, adding it was imperative to uphold the current "high level of the faculty and to develop all its roles as best as possible in the coming decades."

25/11

Czech European Researchers' Night focuses on robots

27/11

The end of November saw the return of the hugely popular Czech European Researchers' Night, this year with many events online because of Covid-19. More than one hundred institutions including top universities were involved and Charles University was proud to be a part of it. This year, the event focused on the theme of Humans and Robots in the form of online presentations, discussions, competitions, and virtual workshops.

Professor Zdeněk Strakoš
Photographer Hynek Glos took a series of portraits of the mathematician in a classroom at the Faculty of Mathematics and Physics. The trickiest thing was that the mathematical formulas on the board behind him had to make sense. Besides mathematics, the board also features a quote from the Bible... and a little elephant.

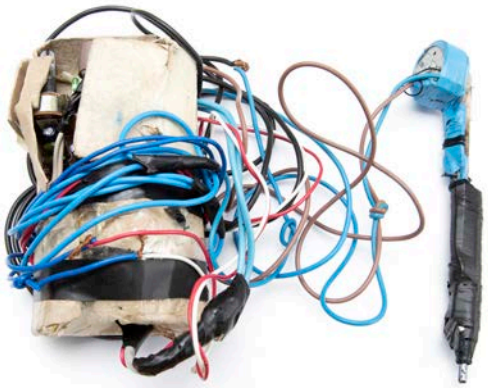
Dr. Anežka Kuzmičová
Photographer Martin Pinkas took portraits of the children's reading expert at a popular Prague park. Because Kuzmičová was close to home, she brought her daughter Meda along. That put her in great spirits. Pinkas wanted leaves blowing in the wind but that wasn't easy. He then used "leaves" from a children's book to make the scene work.

Forum's calendar for 2021

In this year's calendar we profiled key figures at Charles University, each making a difference in their field. Here is a behind-the-scenes look.

Dr. Ruth Tachezy
Michal Novotný was certain he didn't want to take portraits of the outspoken virologist in a white lab coat. He lucked out at BIOCEV when they came across a conference room with seating marked per Covid regulations to separate attendees. Tachezy happily suited up in PPE for a series of portraits that perfectly accent (or cap) the kind of year it's been.

Dr. Markéta Supa
Vladimír Šigut knows a lot about handling pressure and coming up with solutions. Dr. Supa soon had to be elsewhere, while her husband and their little boy were "trapped" circling nearby in their car, unable to find a parking spot. A couple ideas didn't really work, but then the photographer noticed a part of the room where it just clicked. The writing was on the wall, as they say.



Imagine a homemade tattooing device made from parts of a spoon, or a pen or a toothbrush, connected to a power source. And instead of needles, you have steel brush wires. And yet, sometimes this results in amazing tattoos in the positive sense of the word.