

LIU MAGAZINE

ISSUE TWO 2023

MATERIALS SCIENCE KEY TO A SUSTAINABLE FUTURE

Researchers with the long term goal of making
materials on demand via knowledge-based design
Pages 15-17

CARPENTRY SKILLS WITH POTENTIAL TO CHANGE PEOPLE'S LIVES

Sebastián Mateu, alumnus from
Malmstens, followed his dreams
even though people around him
told him it was impossible
Pages 7-9

STUDYING THE ROLE OF BACTERIA FOR BETTER HEALTH

Two research groups aiming to
find out how babies' gut bacteria
impact their future health
Pages 4-6

li.u LINKÖPING
UNIVERSITY

JUBILEE DOCTORS • SAFE AUTOMATION • SCHOLAR AT RISK • DIGITAL GOVERNMENT • SUSTAINABLE FORESTRY • DOGS' BEHAVIOUR



Increased internationalisation – but carried out with caution

L leading a university is sometimes like steering a large ocean liner. It is such a large and complex organisation that it often takes time to change course, and there are many things to take into consideration. Sometimes the sea is calm and without the slightest hint of waves. But suddenly, the wind can start to blow and conditions change completely. You may know where you are going, but circumstances along the way can change, and quickly.

Regardless of the circumstances, we should always sail in international waters. A large and wide-ranging university such as LiU should be visible internationally, and we have, therefore, long worked with the concept of internationalisation. We are a university that collaborates but also competes with others in a global market. We want to be an attractive university and attract the best students, teachers, and researchers to achieve success. But we cannot solve the great challenges of our time without

helping each other and establishing links with other higher education institutions, both nationally and internationally. Support for internationally recruited personnel and collaborations, for example within our prioritised geographical regions, is currently in focus and will lead to several changes in order to achieve the strategy and vision we have set for 2030.

But internationalisation must take place responsibly. We have war in Europe, a superpower has attacked a neighbour and the whole world is affected. Our response includes supporting academia in vulnerable countries, receiving researchers through Scholars at Risk and reviewing our collaborations. Yes, we want to achieve our goals, but we need to do so with caution. Just like when we steer our ship out on open water.

The country's university and university college vice-chancellors recently urged the government to rethink shorter terms of office for university and university college boards. The decision was motivated by the security situation,

which we believe we are already handling competently. To try to influence or reduce the independence of higher education institutions, our so-called autonomy and academic freedom, with reference to international events is a dangerous path to take. As captain, I follow the rules to steer the ship, but the voyage will not be better or safer if someone else tries to take over navigation. As Vice-Chancellor, I think the same way — we do not need mistrust of each other, but still better cooperation to defend academic freedom and human rights even in times of unrest.

JAN-INGVAR JÖNSSON, VICE-CHANCELLOR
rektor@liu.se





- 4 Researching gut bacteria**
Can the "right" bacteria guard against disease?
- 7 Carpentry skills with life changing potential**
Alumnus Sebastián Mateu followed his dreams.
- 10 Una studies dogs' behaviour**
She googled courses in animal behaviour and ended up in Linköping, Sweden.
- 12 Actualities**
Viveka Adelswärd donates millions inspired by her own experiences as a doctoral student.
- 14 Heart full of cricket**
An elite athlete student striving for healthcare for all.
- 15 New materials key to sustainability**
Research opens for new knowledge when something previously thought impossible is shown to be possible.
- 18 The future of automation**
How can AI-aided automation in air traffic control be as safe as possible?
- 20 Democracy and digitalisation**
The SeGRID programme teaches young professionals about digital government.
- 22 Research**
They created the world's first wood transistor.
- 24 Linköping University's first jubilee doctors**
Meet three former students at LiU promoted fifty years ago.
- 26 Sustainable forestry in the Amazon**
A trip aiming to deepen the understanding of the greenhouse gas fluxes from Amazon trees.
- 29 Challenging doctorate studies**
"I get to take more responsibility here than in a normal job."
- 30 "Don't kill another human being."**
Mohammad Sajjad Afsharzada is a scholar at risk.
- 32 Elena Shabrova went from LiU to Google**
"Studying at LiU gave me the opportunity to work for a fantastic international company."
- 34 Lithe Blås 50 years celebration**
The first student orchestra at Linköping University celebrated with concerts.
- 35 Alumni**
Crime fiction expert releases her third novel.

CORRIGENDA

THE MEDICAL PROGRAMME

The Medical Programme is taught in several locations. As of semester 6 (not 7 as stated in our previous issue), the programme is offered not only in Linköping, but also in Norrköping, Jönköping and Kalmar.

THE BERZELIUS SUPERCOMPUTER

In the previous issue of LiU Magazine, the Berzelius supercomputer was erroneously named Sweden's fastest supercomputer. It is the second fastest, and its current computing power equates to 470 petaflops for AI calculations after an upgrade.

LIUMAGAZINE

ETT INTERNATIONELLT MAGASIN

 LiU magasin är Linköpings universitets tidskrift för sina tidigare studenter (alumnier) och andra som är intresserade av universitetets verksamhet. Vi berättar om forskning i världsklass och om studenter från olika delar av världen som läser eller har läst på LiU och detta är det årliga internationella numret med texter på engelska.

ADDRESS

Linköping University
SE-58183 Linköping
Sweden

EDITOR-IN-CHIEF

Anna-Karin Thorstensson – 013-28 13 02
anna-karin.thorstensson@liu.se

TRANSLATION

Anneli Mosell & Simon Phillips

GRAPHIC FORM

Milton – www.milton.se

SUBSCRIPTIONS

Fredrik Andersson – 013-28 25 29
alumni@liu.se

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Sebastián Mateu
Photo: Anna Nilsen



PHOTO SHUTTERSTOCK

Can the “right” bacteria really guard against disease?

Did the bacteria in your guts when you were a baby impact your risk of future disease? Researchers at LiU are aiming to find out. We have talked to two research groups studying whether diseases such as type 1 diabetes and allergy could be prevented by promoting the right bacteria early in life.

TEXT **KARIN SÖDERLUND LEIFLER**

Bacteria have been with us throughout human history, and we have evolved together. We swallow and are exposed to various substances that end up in our guts, where an army of immune cells are waiting, ready to defend our bodies.

“You could look at it as mutually assured destruction in our guts. We could get killed if there wasn’t a balance between the permanent bacteria and our immune system which is in direct contact with the gut bacteria. Of course, they learn how to handle each other,” says Johnny Ludvigsson, professor of pediatrics and pediatrician.

So, what is the role of bacteria in maintaining health? One way that researchers have tried to answer this question is by creating mice without gut bacteria. Such studies on animals show that a normal gut flora is hugely important for immune system development and for preventing immuno-related diseases. When it comes to humans, there are still no clear answers to what is cause and what is effect.

THE MOMENT A BABY IS BORN, bacteria move into the guts. The gut bacteria composition changes a lot in a baby’s first year.

“The gut flora changes as the baby’s



PHOTO: CHARLOTTE PERHAMMAR

Malin Bélteky, LiU PhD student and medical doctor.

diet changes from breast milk or formula to solid food. When babies start crawling and putting things in their mouths, they come into contact with even more things that impact their gut bacteria composition,” says Malin Bélteky, LiU PhD student and medical doctor.

She and her supervisor Johnny Ludvigsson research why some children develop type 1 diabetes when their immune system destroys the cells that produce the hormone insulin. Those affected have to inject insulin for the rest of their lives to regulate blood sugar levels. ▶

“Type 1 diabetes is by far the most life-threatening disease among children and young people in Sweden,” says Johnny Ludvigsson.

A RECENTLY PUBLISHED STUDY by the LiU researchers and a US research group examined the gut flora of a small group of 1-year-olds who developed type 1 diabetes later in life and compared it with that of children who stayed healthy. The children were matched for maximum similarity in possible impacting factors, such as genetics, breastfeeding and later eating habits. The study is part of the major ABIS (All Children in Southeastern Sweden) study, where researchers monitor 17,000 children born in the late 90s to investigate the role of gut flora in several autoimmune diseases. It turned out that there were important differences in gut flora composition at age 1 between children who later developed insulin-dependent diabetes and healthy individuals.

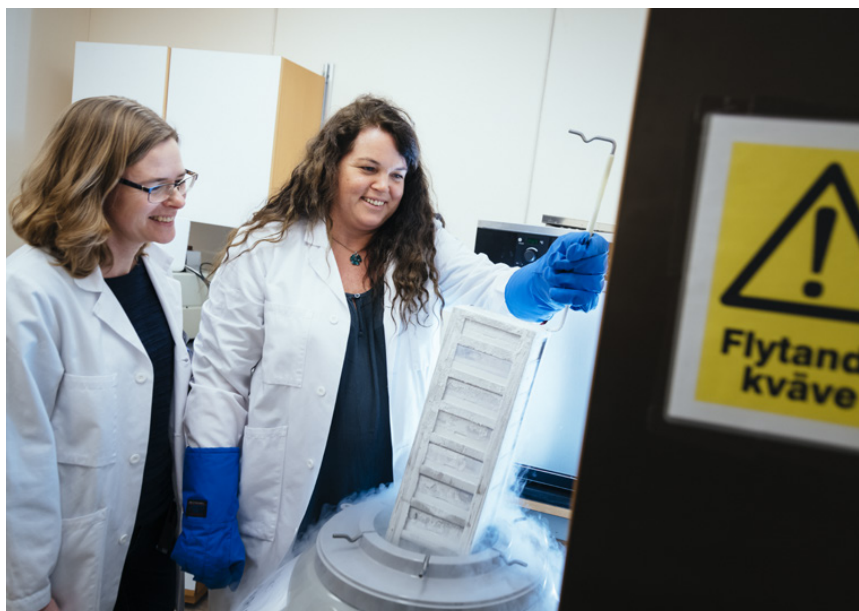
“It’s impressive that we can see a link between gut flora at age 1 and something that happens on average 13 years later. This is an indication that our immune system sees dramatic change early in life,” says Johnny Ludvigsson.

“Any attempts to prevent disease from developing must be made very early,” says Malin Bêlteky.

Maria Jenmalm, who researches allergic diseases, thinks along the same lines. She and her colleagues were among the first in the world to show differences in gut flora in babies’ first months between those who later developed allergies and those who stayed healthy. This indicates that our early years set the stage for what will happen later. Maria Jenmalm is particularly interested in whether it would even be possible to prevent allergies, by promoting beneficial gut flora as early as possible.

HOW WE ARE BORN SEEMS TO MATTER – the gut flora in babies born by Caesarean section differs a lot compared with those born by vaginal birth. Maria Jenmalm’s research has shown that the differences were linked to changes in the babies’ immune response function.

“Nature seems to have solved this by



Camilla Janefjord (left), principal research engineer and Maria Jenmalm (right), professor of experimental allergology.

facilitating the transfer of bacteria from mother to baby through vaginal birth,” she says.

A 2016 American study on four children born by Caesarean section involved using a compress to transfer vaginal bacteria from mother to baby. This very small study received much attention, and expectant parents began asking for this treatment.

“Scientific basis on the effects is needed before you start treating many children in this way. You have to weigh risks against benefits, to provide better advice on this much in demand procedure,” says Maria Jenmalm.

She is one of the researchers behind an ongoing Swedish clinical study led from Karolinska Institutet. The question is whether it is possible to counter the impaired supply of bacteria resulting from Caesarean section. In addition to vaginal flora, the study will also involve transferring gut bacteria from mother to baby, to mimic what happens in vaginal birth. Over a two-year period, the study will examine developments in the children’s gut flora and immune system and whether they develop any allergies. It will be a few years’ wait before we know.

But would it be possible to impact the

risk of disease even before birth? In another study, Maria Jenmalm and her colleagues are examining the effects of giving pregnant women supposedly beneficial bacterial supplements, known as probiotics, from week 20. The babies are then given the same supplement for a year. The researchers will then monitor the children to see whether the bacteria impact their risk of developing eczema, the type of allergy that occurs at the earliest age.

“The study is still ongoing, so we don’t know yet. But we have noted interesting changes, such as in mothers’ immune responses during pregnancy,” says Maria Jenmalm.

Many huge questions still remain unanswered. What exactly is a “good” gut flora? Could gut flora composition be a direct cause of disease much later? And how much can we ourselves impact our invisible life companions? According to Maria Jenmalm, some of what is said about gut flora in relation to various diseases should be taken with a pinch of salt.

“In some cases, patients may have an inflammation or be under treatment that impacts gut flora. It’s important to be aware that some claims may be exaggerated.” ■

PHOTO: DAVID BROHEDE

THE MALMSTENS PROGRAMME

Malmstens Linköping University

Founded by Carl Malmsten in 1930. Since 2000 part of the Department of Management and Engineering at LiU, and since autumn 2009 located on Campus Lidingö. Provides training in furniture design, cabinetmaking and furniture upholstery.



CHANGED SEBASTIÁN'S LIFE

TEXT **ULRIK SVEDIN** PHOTO **ANNA NILSEN**

PEOPLE AROUND ME SAID IT WAS IMPOSSIBLE. AND MY PORTFOLIO HAS TO BE THE UGLIEST THEY'D SEEN. BUT I WAS ACCEPTED INTO THE MALMSTENS CABINETMAKING PROGRAMME, ON LIDINGÖ.

Those are the words of Sebastián Mateu, alumnus from Malmstens, Linköping University. For him, the programme and his craftsmanship were door openers. Like when he was asked by the Chilean Embassy to make a gift for the President of Chile before a state visit to Sweden. Given free reins, he chose to construct a beautiful wooden box with several layers, which he made three copies of. The inner layer contains a tube holding dried, smoked and ground chili. The spice merquen, typical of the Mapuche people, the indigenous people of Chile.

"I handed over the box to the President and sent a similar one as a gift to the King of Sweden. I think it's wrong of the Chilean state to sell off the indigenous people's land. And the gift allowed me to say this without offending the President, because I had invested my time in making it."

He has kept the third box. It is shaped like an oblong cube and made of beech, ash and padouk with a fantastic joining of the wood fibres. The fit of the outer lid causes the air inside to puff when the box is closed.



"If it's not this fit, it hasn't been made by me!" he says, laughing out loud.

The gift led to contacts with a furniture conservator in the presidential palace in Santiago, and visits to the palace.

"And I've been to Chile and held seminars on furniture carpentry, among other things, at the Diego Portales University in Santiago.

Sebastián Mateu came to Sweden from Chile, aged 16. He grew up working.

"My mother worked in the kitchen at a golf club, and already at age 11 I started to

work as a caddy. We lived in a poor area. There was drug dealing among young people on the streets. And on the golf course, children of the same age in nice clothes came to play."

Work characterised his childhood. But he learned to play golf. Something that became important to him in several ways.

"As a caddy, you always have a club in your hand and someone to watch and try to imitate. I had an aptitude for golf and a winner's mind," he says.

His family decided to move to Sweden, and he enrolled on a furniture carpentry programme at Bolandsgymnasiet in Uppsala, and almost graduated.

"It wasn't that easy. I had always worked during my childhood and then I came to Sweden where you didn't do that at all. I had actually envisioned a career in golf. Even back in Chile, I had won some competitions. But I didn't have the discipline. I just trusted my talent and practiced too little."

The youth in him stepped forward and wanted to live life instead. He dropped out. But a meeting with his teacher some time later was decisive.



Small boxes, with a perfect fit.

“He praised my craftsmanship and said: ‘Come back to school on Monday.’”

Sebastián Mateu graduated and was looking for training in furniture carpentry. In the end, there was only one programme he wanted to attend. It was Malmstens’:

“But everyone around me said that it was basically impossible to get in.”

How did you pluck up the courage to apply?

“That’s probably my best advice: You have to apply, otherwise you’ll never get in! I didn’t know much about Malmstens and had nothing to fear.”

The first semester was tough. He soon considered giving up.

“Everyone was so incredibly talented. I’ll never make it! But those were my own prejudices. My parents have no higher education. In some way, you have a cultural baggage.”

For Sebastián Mateu, things turned around.

“There is a very good atmosphere at Malmstens. You help each other, and you talk about crafts all the time. We met artists who inspired us. I began to understand what I wanted myself. Why I was there, and why they chose me.”

Why?

“It wasn’t because of what I had produced before. It was for my dreams, my plans. I have something to say. I decided that my furniture should tell a little story!”

How does theoretical knowledge, studying arts and crafts at university level, work?

“You learn a lot about other artisans, modern as well as historical, and how to recognise different styles. But also how to understand the properties of the wood, to know, for example, how a table top will behave.”

Sebastián Mateu enjoys working on projects and always has several going on simultaneously. He wants to convey craftsmanship and applied arts to others. That is why he runs two podcasts and holds online workshops on veneer work and cabinetmaking in Spanish and Swedish. At the same time, he is active on Instagram. During the week, he works at



Plastered finger.
“This normally never happens, and it had to happen when you’re here!”

Hantverksslussen, run by Uppsala City Mission, where he supervises people who manufacture wooden products.

“I’m good at that. Pedagogy and social work. Explaining and structuring a series production and making it easy to produce. Those who for instance are training for a return to work after a long sick leave mustn’t get stressed. If I share my knowledge in a good way, they will have the same chances to develop.”

Do you think woodcraft can make us better people?

“Yes, to one hundred percent I think so. You must understand the process in everything. You make a piece of furniture that can live as long as the tree has lived. But you can’t assume that there will always be trees growing, or food on the table.”

He has opened a small workshop in

his home in central Märsta, north of Stockholm, where he can work, give courses and bring in guest craftsmen. He shows his inlay saw with its fine blade cutting through paper-thin wood. It is currently central to his own work. In a brand new project, he wants to make graffiti inlay motifs.

Sebastián Mateu bursts with different stories about his craft. He received a silver medal for his journeyman’s piece in connection with the journeyman’s certificate awarding in Stockholm City Hall. After that, he was also awarded Fabrikör JL Eklund’s Great Craft Scholarship of SEK 150,000.

“Malmstens has changed my life. Golf taught me not to sit around and wait to be discovered. Now the same thing applies. If anyone is to care about my artwork, I have to go out and tell them about it,” he says. ■



Sebastián Mateu

Does: Craftsman, cabinetmaker, alumnus of the cabinetmaking programme at Malmstens, LiU. Runs a business and the podcast Hantverkardagboken, and also lectures on cabinetmaking.

Age: 37 years.

Family: Wife and two sons.

Lives: In Märsta.

Spare time: Likes spending time with his family, playing golf, woodcarving, baking sourdough bread and pizza.

See more: www.ekorremonbler.com

UNA IS LIVING HER DOG DREAM

She did a little bit of everything at home in Greece, but knew all along that she wanted to study animals, especially dogs, and their behaviour. A simple Google search led her to LiU, and she has now completed her dream education.

TEXT **BJÖRN STAFSTEDT**

PHOTO **ANNA NILSEN**



Imagine dreaming as a child of studying, being close to and working with animals, but not really knowing how to go about it.

There is a clear path to becoming a veterinarian. But Una Kranzelic was more interested in studying what animals do and why they do it. She especially wanted to focus on her favorite species: dogs and dolphins. But were there really jobs associated with this? And what education would be suitable?

Una followed a winding road of different jobs and educational choices until, approaching the age of 30, she decided to reevaluate her life and what she wanted to do. With a clear vision in mind, she googled courses in animal behaviour and ended up in Sweden, studying Applied Ethology and Animal Biology at Linköping University.

"I knew this was the one for me and it actually exceeded my expectations. It's even better than I imagined. So, yes, I'm very lucky," Una laughs.

Unfortunately, the pandemic had a big impact on Una's first year of education, so her planned study trip to South America in year two was cancelled. Instead, when it was time for her degree project, she got a scholarship to Hungary and spent nine months at Eötvös Loránd University in Budapest.

"I knew this was the one for me and it actually exceeded my expectations. It's even better than I imagined. So, yes, I'm very lucky."

"It has the best dog research right now in the world. They have the greatest lab for doing all kinds of dog experiments. Yes, it was quite nice and very interesting, too."

Una describes days in the lab that sound like heaven for a dog lover. Before the tests, the dogs need to calm down and be focused, which requires pampering and cuddling. And after the tests, they want nothing more than to play.

"It can be challenging mentally for them, but generally it's quite fun. None of the dogs were stressed or anything like that. We made sure that they were familiar with everything and felt good. You have to be calm yourself and wait for

them to just calm down. But after the test, of course you have time to play."

So, what did the tests involve? What has Una written about in her master's thesis "The role of texture in object generalisation in typical dogs (*Canis familiaris*)"? What was a typical day at the lab in Budapest like?

"At first it was about finding dogs, usually through inquiries on Facebook. Then waiting for the dogs, or rather their owners, to finish work for the day. Most of the tests were done in the evening or during weekends."

The 19 dogs were released one by one into a 30-square-metre room and observed by four cameras. They would then choose one of two items to take back

to their owners. It was then determined whether the items chosen had a particular shape or texture. They were not balls or dog bones, but "neutral" objects cut into different shapes and covered with different materials that the dog could not associate with previous experiences. Una's conclusions indicate that, unlike human infants, the dogs in the study appeared to rely less on object shape and more on texture for object generalisation. While texture seems to have played an important role in their ability to generalise objects, it is possible that other factors such as colour and smell were also involved.

"One aspect could also be that the

materials themselves have different odours, so that could also influence their choice."

Una is often asked which dogs are the most intelligent. Those who find it easiest to learn new things on command are called "Gifted Word Learners" (GWL), and are usually border collies, which is one answer to the question. In Una's study, however, border collies were not assessed as GWL but as "typical dogs" (T-dogs), to be used in later comparative studies.

"Dog owners are similar to parents who think that their own child is the smartest. From a scientific perspective, that's not actually the issue. You can train the dog very well, and think 'Oh, my dog is the smartest', but that's a very different criterion. Some dogs can pick up cues very easily from their owners, so they will do certain things that will look very, let's say, smart or intelligent. But that doesn't mean that they are more intelligent."

Una wants, somewhere and in some way, to continue working with animals, because she is so fascinated by their behaviour. The increasing use of dogs in, for example, healthcare and elderly care can open new avenues. It is not just their superior sense of smell that is used for detecting everything from drugs to cancer, their trust and the sense of safety they provide are also appreciated. An example is provided by veterinarians who "hire" dogs to calm other dogs during visits to the clinic. And wherever Una ends up, there are sure to be dogs.

"Unfortunately, since I travel a lot, I don't own a dog yet. But I plan to in the future. First get a dog and then a family!"





The award winner: "This research is a window to the secret processes in the brain"

India Morrison, senior associate professor in cognitive neuroscience, has won the Onkel Adam Award for 2023 for her outstanding research at the Faculty of Medicine and Health Sciences at Linköping University (LiU). One of her research areas is how touch and pain affect our behaviour.

In their motivation, the jury highlights India Morrison's "innovative and outstanding research into how touch and pain control, or are controlled by, emotional and social factors". She was among the first in the world to show that when we witness somebody else being subjected to pain and we experience "empathetic" pain, the same area in the brain is activated as when we experience similar pain ourselves.

"One of the things I find interesting is that the areas in the brain that react when we witness somebody else's pain are also



PHOTO: EMMA BUSK WINQUIST

involved in preparing us to act and move. I've long been fascinated by the connection between emotions and movement. To me, research into pain and touch is a window

to the secret processes in the brain," says India Morrison, senior associate professor in the Department of Biomedical and Clinical Sciences at LiU.

In her research lab, the Embodied Brain Lab, she combines hormone measuring with cognitive tests and MRI scans of the brain.

India Morrison will receive a sum of SEK 250,000 and will accept the award at the Linköping University Academic Celebrations on 27 May.

The Onkel Adam Award was founded in 2020 through a generous donation to the Jubilee Foundation at Linköping University from a descendent of Onkel Adam, Bengt Normann. The aim of the award is to promote medical research at LiU and to honour the memory of Onkel Adam, the pen-name of well-known 19th century physician, author, writer and politician Carl Anton Wetterbergh, who lived in Linköping.

Join us in nominating LiU's best teacher!

PHOTO: ANNA NILSEN



Ingemar Ingemarsson

On 25 May 2023, nominations open for Ingemars Lärarpris, Sweden's largest teaching award. Co-workers past and present, students and alumni who have been taught by or been the colleague of a teacher have the opportunity to nominate a candidate.

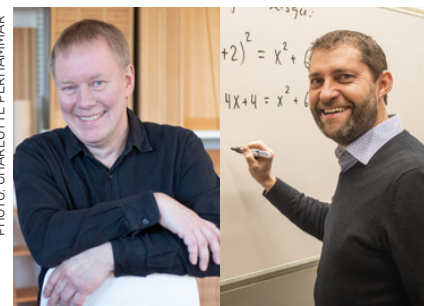
The award is given to a dedicated and talented teacher who is making, or who has made, a major contribution to education and its development at LiU. The award is Sweden's largest individual teacher prize, amounting to at least half a million Swedish kronor.

Ingemar Ingemarsson, professor emeritus at LiU and co-founder of the medical technology company Sectra, is the man behind the award. In 2017 he established a foundation, through a donation of more than SEK 18 million, where the prize is funded by dividends.

The prize is being awarded for the third time. The previous recipients are Leif Burman and mathematics teacher Daniel Carlsson.

Ingemars lärarpris
in SwedishIngemars lärarpris
in English

PHOTO: CHARLOTTE PERHAMMAR



Leif Burman and Daniel Carlsson

PHOTO: MAGNUS JOHANSSON

Viveka Adelswärd donates millions for research communication getaways

PHOTO: MAGNUS JOHANSSON



Viveka Adelswärd's SEK four million donation to Linköping University is inspired by her own experiences as a doctoral student. Her aim is to recreate, on a small scale, the environment and atmosphere she was part of, but which may have been somewhat lost with the growth of the university since then.

"It was so much fun in the early 70s, when the first steps towards becoming a univer-

sity were taken. It was all very small, and we all knew each other," Viveka Adelswärd, nowadays professor emerita in conversation research, recalls.

Following her studies in Nordic languages, she taught at the institution of higher education that would soon become Linköping University, and after some time became a doctoral student at Tema K, studying human communication from a cross-disciplinary perspective. With great enthusiasm, she paints a vivid picture of her time there. Doctoral students in various subjects often got together and teachers were never far away.

Her experiences from a cross-disciplinary environment have now inspired her to donate SEK four million to Linköping University. The money is to be used for annual communication-themed getaways, where doctoral students in humanities and social sciences can meet to discuss their research and how it can

matter to others. Experienced researchers, hopefully also from outside Sweden, are to be invited to give talks.

"I get the impression that many doctoral students in subjects dear to me are quite lonely," says Viveka Adelswärd, who hopes that these getaways will serve to change this.

The first four-day research communication getaway for doctoral students, organised as a trial run in the summer of 2022, was successful. The idea now is that it will be organised once a year for the coming five years, or as long as the money lasts.

LiU hosted lecture on sustainable and interdisciplinary research

This spring the Division of Environmental Technology and Management hosted an open lecture titled "Pick and Mix Circular Economy and why we love it" as part of the Interdisciplinary Networking for a Sustainable and Circular Economy (IN-SCE) project funded by the ECIU SMART-ER program.

The event attracted around 50 participants from different European countries, and aimed to promote cooperation and co-creation among ECIU universities by sharing and discussing the state-of-the-art in circular economy and sustainability research at Linköping University.

"Such networking meeting, as we had in Linköping, is very useful, not only because it provides insights about colleagues' research, but also because it



PHOTO: TEKSMA BUSEVA

allows sharing of the experience of working with the business. By sharing the best practices of our work on the circular economy, we can identify the synergies in further collaboration, which are the basis for systemic circular change," says Viktorija Varaniūtė, project leader and associated professor at Kaunas University of Technology in Lithuania.

Recordings from the event are available on liu.se



PHOTO: CHARLOTTE PERHAMMAR

Animal welfare award to Per Jensen

Per Jensen, professor of ethology at LiU has been awarded the "UFAW Medal for Outstanding Contributions to Animal Welfare Science". His work in domestication, epigenetics and stress has been at the forefront of ethology research for a long time.

"I am very happy for this award. Previous recipients include my role models and most important colleagues", says Per Jensen.

UFAW stands for the Universities Federation for Animal Welfares and is an international independent scientific and educational animal welfare charity and membership society.



Sai Shivani Devata is a LiU student who studies biomedicine. A few years ago, she got hooked on cricket, and now the sport has stolen her heart.

With a heart full of Cricket

TEXT TERES WRAMELL PHOTO THOR BALKHED

Sai Shivani Devata was raised in Helsingborg by Indian parents. “We’ve always watched cricket. It’s part of life for us,” says Shivani.

So, one day in 2020 when she heard about Malmöhus Cricket Club, she decided to give the sport a try. And it went well. So well that she was selected for the Swedish women’s national team the following summer. She has now played two tournaments for the national team.

“My heart beats for cricket. I love it.”

Shortly after being selected for the national team in 2021, she moved to Linköping to study the International Bachelor’s programme in Experimental and Industrial Biomedicine and became part of LiU Elitidrott (LiU Elite Sport). This is a collaboration between LiU and the Swedish Sports Confederation that provides an opportunity for those who want to combine an elite sports career with academic studies, thereby enabling the pursuit of dual careers.

An elite athlete student receives support in the form of a paid training card at Campushallen in Linköping or at a gym in Norrköping, and the opportunity to adapt their studies to their sport. This can, for example, involve being given the opportunity to submit work later and change lab times.

“I want to improve my fitness and train at Campushallen every day,” says Sai Shivani Devata.

She has also recently started training with the Linköping Cricket Club men’s team.

Her sights are set on the future. She dreams of contributing to valuable research in cancer biology and of starting a non-profit organisation in India that will work for gender equality and healthcare for all.

But first she wants to take her cricket playing to the next level.

“I want to get more chances to play for the national team and I want to play for clubs in other countries like the Netherlands, France or England. It will take a lot of training, but you have to give 100% if you want to succeed.”



Materials science at the service of humankind



Artificial nerve cells, electronic plants, cheap solar cells and new types of diodes are all examples of materials science conducted at Linköping University. Igor Abrikosov, professor of theoretical physics, is convinced that research and development of new materials is a major key to a sustainable future.

TEXT **ANDERS TÖRNEHOLM**
PHOTO **MAGNUS JOHANSSON**

Igor Abrikosov explains: “If you look at the seventeen UN sustainability goals you don’t see materials mentioned explicitly. But if you take a deeper look, materials can be the solution to virtually any one of those goals”.

He is director of the strategic research area Advanced Functional Materials (AFM; the result of the Swedish Government’s research bill that focused on materials science) which has Linköping University as its host. The ambition of AFM is to accelerate material development both for commercial applications and as a base for future research.

But let us begin at the beginning.

The first material we as humans seem to have taken an interest in is stone. At least that is what is left from the first

human beings in archeological digs. Through the use of materials, we as humans have discovered new ways of altering our surrounding to fit us better.

“Materials science is important in the whole history of mankind. If you remember your elementary school lessons, we have the stone age, the bronze age and so on. This indicates the importance of materials”, says Igor Abrikosov.

Almost all leaps in human history, from the first stone axe to the industrial revolution to your connected mobile phone, have to do with materials. There is a line, with materials as the common denominator, from the first humans hunting mammoths to you reading this article on digitally printed paper.

However, developing a new material is a slow process. So even though progress ►

has been exponential since the stone age, it takes, at best, twenty years to develop a new functional material today.

Traditionally, materials science is based on a trial-and-error approach, also called an Edisonian approach, where you test a vast number of combinations of elements in the lab before reaching the desired result.

But the researchers at AFM take a different approach. Their goal is to change the process from fundamental research to application.

“If we can move from this trial-and-error approach to, what we call, a knowledge-based design, we can shorten the development period significantly. From twenty years to maybe four or five. Then it will even be possible to make materials on demand. This will be a game changer”, says Igor Abrikosov.

Today, when an engineer needs a new material, they go to a catalogue of existing materials and choose. The material chosen may still not be optimal for the application, but is as close as it can get right now. In the future, however, Igor Abrikosov envisions a scenario where engineers can order on demand a material with certain properties that best match the application requirements.

He believes that the great enabler of this accelerated development is a critical mass of knowledge. And within AFM there is no shortage of knowledge. Around a hundred and fifty researchers from several fields are connected to the research area, which provides a base for developing new ideas. Combined with new tools such as artificial intelligence, machine learning and theoretical simulations, this will enable the researchers to scan a lot more possible materials before they go into the lab and actually make the material.

“The material universe is pretty much unexplored so far. There are a lot of things that can, and need to, be found”, says Igor Abrikosov.

The research conducted in AFM spans from applied research that could be seen on the market as soon as in a few years’ time, to the very most fundamental research that explores the limits of physics and chemistry, but has no apparent use at the moment.



An example of that is a study recently published in *Nature Chemistry* to which AFM researchers made significant contributions. According to Igor Abrikosov, the discovery of an aromatic nitrogen anion in very complex potassium-nitrogen compounds synthesised at high pressure, is a breakthrough discovery. Although it has no immediate apparent applications, something previously thought impossible is shown to be possible.

This opens for new knowledge and new perspectives and could be very important for future applications in medicine or chemical engineering.

“It’s very important to understand that we must preserve all layers of research, fundamental, strategic and applied. Think about the discoveries made in the middle of the last century like the use of silicon. Without it, it would be impossible to have the technology we have today”, he says.

Furthermore, materials science is a platform for other research areas. For instance, space missions would not be possible without advanced materials. And the medical field is greatly in need of new materials—if you want better implants you need to find materials that mimic bones, if you want better MRI images you need better contrast agents and so on. In the industry, you need to find coating materials that are harder and stay sharp for cutting tools. And in quantum computers, you will need materials that can host quantum bits.

Materials can even be used as models for studying cosmology and the fundamental properties of our universe in the palm of your hand.

All this combined may help us understand our world as it is today, and the actions needed to make the best of it. Igor Abrikosov is convinced:

“Materials science is key to a sustainable future. Without it, we would be nowhere near where we are today.” ■

The article mentioned:

Aromatic hexazine [N₆]4⁻ anion featured in the complex structure of the high-pressure potassium nitrogen compound K₉N₅₆.

Dominique Laniel, Florian Trybel, Yuqing Yin, Timofey Fedotenko, Saiana Khandarkhaeva, Andrey Aslandukov, Georgios Aprilis, Alexei I. Abrikosov, Talha Bin Masood, Carlotta Giacobbe, Eleanor Lawrence Bright, Konstantin Glazyrin, Michael Hanfland, Jonathan Wright, Ingrid Hotz, Igor A. Abrikosov, Leonid Dubrovinsky, Natalia Dubrovinskaia.

Nature Chemistry (2023) DOI: 10.1038/s41557-023-01148-7

Three AFM researchers

PHOTO: THOR BALKHED

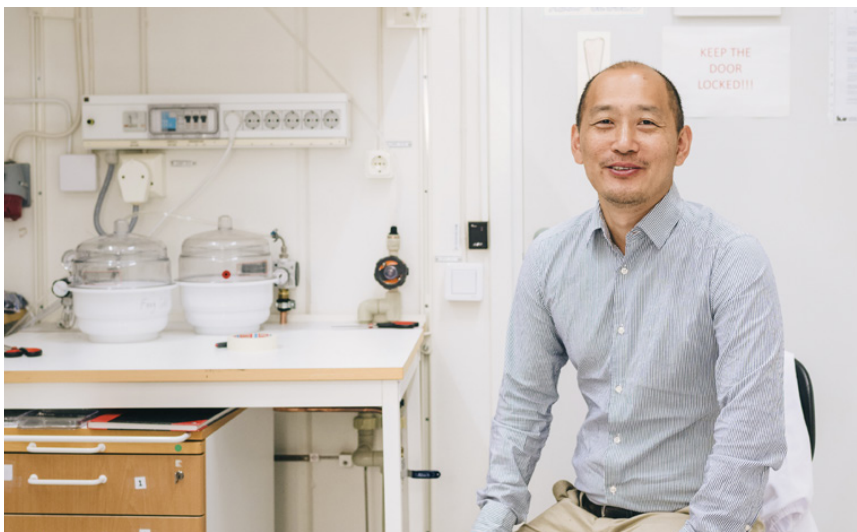


Eleni Stavrinidou

Associate professor at the Laboratory of Organic Electronics.

Connecting plants with electronics sounds like science fiction. But it is possible. Eleni Stavrinidou's research revolves around electronic plants and ways to monitor and control them through organic electronics. She has also shown that it is possible to store energy in plants.

PHOTO: ANNA NILSEN

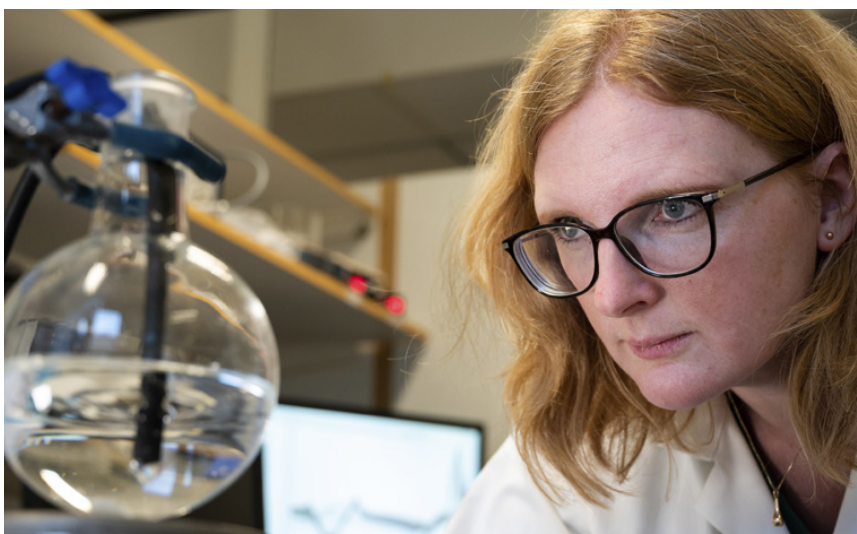


Feng Gao

Professor at the Division of Electronic and Photonic Materials.

Perovskites are crystalline materials with huge potential to contribute to solving the world's energy shortage. Both low-cost solar cells and new types of diodes are possible to make with this material. Feng Gao's research focuses on increasing the stability and efficiency in them.

PHOTO: OLOV PLANTHABER



Emma Björk

Associate professor at the Division of Nanostructured Materials.

Materials with pores only a couple of nanometres in size have great potential for drug delivery, sensing, and catalysis. Emma Björk explores how the materials' performance can be optimised in each application by altering their composition, pore structure, and morphology.

AVIATION AI

Automated systems collaborating with humans will be better if they get to know the user through artificial intelligence compared with traditional systems that the user has to learn. This is shown in a recent research project involving air traffic controllers. The results indicate how future systems should be designed.

TEXT **ANDERS TÖRNEHOLM**
PHOTO **THOR BALKHED**

We are becoming increasingly dependent on computers and automation, both in and outside work, while systems are becoming increasingly advanced and thereby more difficult to understand.

Even experts in their fields may have difficulty understanding why an AI or automated system acts in one way or another. When an increasing number of functions are automated, this can cause problems in collaboration with humans. It all comes down to trust.

A recently finalised Horizon 2020 project, MAHALO, which included researchers from Linköping University, investigated how future AI-aided automation in air traffic control can be as safe and user-friendly as possible. The researchers investigated both an

explained traditional automation which behaves as the software developers intended and an adaptive system based on training AI on the individual.

“Think of Spotify or YouTube recommending new entertainment based on what you have listened to and watched earlier. You can design other systems in a similar way. The idea is that you as an individual will come to the conclusion that you understand why the system acts as it does,” says Carl Westin, researcher at the Department of Science and Technology.

To test which of the two alternatives for air traffic control automation was the best, 34 air traffic controllers were put through simulations of real situations where the degree of adapted automation varied between low, medium and high. All air traffic controllers performed the tests 18 times randomly.

UTOMATION



MAHALO

MAHALO stands for Modern ATM via Human/Automation Learning Optimisation. The project was financed by the EU framework programme Horizon 2020 and coordinated by the consultancy company Deep Blue. The project partners were Linköping University (the Department of Science and Technology, the Department of Computer and Information Science), Delft University of Technology, the Center for Human Performance Research and the LFV Group—Air Navigation Services of Sweden.

Read more about the project at mahaloproject.eu

Read more about projects within the same research area at ivis.itn.liu.se

The results show that a system that gets to know the user through AI is the best way forward.

“All humans have a personality and a unique way of behaving. The advantage of AI systems is that they can take this into account. This means that we can learn more about ourselves through AI, and discover new things about ourselves and our behaviour. This is the great benefit of AI right now,” says Carl Westin.

His field of research is called human factors, and his focus is on human interaction with automation from a physiological as well as a psychological perspective. He is also a commercial airline pilot, which comes in very handy in this project.

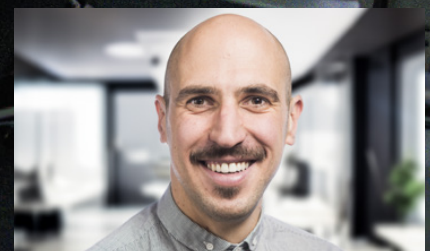
Air traffic control is currently an almost entirely manual decision system, where people with many years of training and experience make many decisions in a

short time. Also, communication with all pilots needs to be crystal clear for air traffic to function safely.

Although the potential for automation is very high, letting AI take over this task completely is not on the cards, according to Carl Westin. The limitations do not lay with the technology, however. The issue is how much automation can be trusted.

“The consequences would be huge if anything were to go wrong. There is an enormous safety protocol to comply with in air traffic control, which means that new methods have to be tested thoroughly. There is also very little competition in the field, which slows down developments,” he says.

Carl Westin makes a comparison with the automotive industry, where competition is fierce and changes in vehicle automation are implemented much faster. For better or for worse. Progress



is made, but at the same time systems that are not yet ready may be found on our roads because car manufacturers need to keep their market shares.

But change will come to air traffic controllers also, albeit slower.

“AI is on the rise everywhere, and the big hype now is digital colleagues. This means that there must be a symbiosis between man and machine. But when technological advances are so fast, it is easy to forget the human who is going to use the system.” ■

We are changing the world from our little corner

The SeGRID programme teaches young professionals about digital government and democracy

For the seventh year in a row, LiU is offering the summer course SeGRID, a training programme on sustainable digital government for young professionals in the Western Balkans and Eastern Europe. "The participants develop their knowledge, when we demonstrate that inclusive and sustainable public values can also guide the digital transformation" says Elin Wihlborg, professor of Political Science and course manager of SeGRID.

TEXT **KARIN MIDNER**

PHOTO **TEIKSMA BUSEVA**



Listen to the podcast "Aspects of Democracy". Researchers talk about potential key aspects of sustainable democracy.

SeGRID builds on LiU's long-standing interdisciplinary research on digital government. The primary focus is on how governmental agencies implement, use, and develop digital systems and services to be usable, legitimate, and cost-effective for administration and public services towards citizens and others. SeGRID is funded by the Swedish Institute as part of Swedish democracy aid and contributes to core aspects of democracy, such as democratic participation, civil society, and human rights.

"Sweden is often regarded as an international role model for democracy, trust and inclusion, with impartial, accessible, and trustworthy welfare services and public administration, and managed with a low level of corruption. From this background, we build digital government in more sustainable ways" says Elin Wihlborg, professor of Political Science and course manager of SeGRID.

THE RESEARCH TEAM COLLABORATES internationally, and in addition to academic publications also collaborates with public organisations and civil society to promote digital competences and sustainable digital governance. Today, several research projects focus on inclusion and

impartiality as well as the use of AI and robotics in public administration.

"This work warms my heart, and we know that we are changing the world from our little corner. Our research counts. Promoting and building democracy, inclusion, and sustainable digital transformations for the future is encouraged, to develop knowledge," says Professor Elin Wihlborg.



"This work warms my heart, and we know that we are changing the world from our little corner." says Professor Elin Wihlborg.



Participants from a previous SeGRID summer school learn and share experience on digitalisation and democracy, through study visits, workshops and as here in a lecture at Campus Valla at Linköping University

OVER THE YEARS, THE COURSE HAS EVOLVED based on positive feedback, growing experience and expanding networks.

“We are a competent and hardworking team of PhD students and lecturers who have learned so much by developing and offering this course. I’m so impressed by our engagement, development and flexibility and not least all networks we build. Despite the additional workload and numerous practical challenges, the team finds this work both exciting and rewarding”, says Elin Wihlborg.

SeGRID was also running during the pandemic. At that time, a lot of the course was online. And that is something that the team has been holding on to. Today, they are offering an online module before the participants come to Sweden, with lectures and workshops, so they can focus on visiting places and networking when in Sweden.

“SeGRID contributes to real progress in democratic processes by raising skills and strengthening young people who want to work towards peace and development”, says Elin Wihlborg.

There is now a network of over 300 SeGRID alumni who strive to promote sustainable digital government. The SeGRID team maintains contact with the alumni through open lectures and a podcast on the LiU website.

SINCE THE INVASION OF UKRAINE, there has been both personal support and fundraising to aid those in need. For instance, former participants are now working in the Ukrainian public administration remotely from Poland, and we are developing research together.

“By maintaining contacts, we collaborate on research, build new knowledge and competencies, and further enhance the course's impact. We asked one of the participants from Ukraine how she managed just when the war had started. She said that she was ok, she had got a lot of digital learning from Sweden, and she had also learnt yoga when she was here. Both those skills are very important to her, in different ways”, Elin Wihlborg says, and continues:

“Sharing our knowledge in this way benefits both the participants and us who work on this. We must all contribute to and care for democratic governance, especially in the digital transformation of democracy and public services, which have to be accessible and open to new forms of deliberation and data sharing. We experience Swedish society through their eyes during study visits here in Sweden. They notice and draw our attention to things that we don’t think very much about, as we take them for granted. This is a vital opportunity for us as researchers and for our society to take small steps towards a more sustainable digital democracy, and we are proud to make LiU a forerunner in this important work.” ■

SeGRID - Sustainable e-government - Resilience, innovation and democracy

To be admitted to the programme, participants must have an academic degree and be younger than 35 years old. They are welcome to apply if they have a position in public administration, government, or a civil society organisation working towards democracy and transparency.

Participating countries in the Western Balkans:

Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, Serbia.

Participating countries in the Baltic Sea Region and Eastern Partnership Countries:

Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, Sweden, Ukraine.



The world's first wood transistor

Researchers at Linköping University and the KTH Royal Institute of Technology have developed the world's first transistor made of wood. Their study paves the way for further development of wood-based electronics and control of electronic plants.

"We've come up with an unprecedented principle. Yes, the wood transistor is slow and bulky, but it does work, and has huge development potential," says Isak Engquist, senior associate professor at the Laboratory for Organic Electronics at Linköping University.

In previous trials, transistors made of wood have been able to regulate ion transport only. And when the ions run out, the transistor stops functioning. The transistor developed by the Linköping researchers, however, can function continuously and regulate electricity flow without deteriorating.

The researchers used balsa wood to

create their transistor, and could show that it is able to regulate electric current and provide continuous function at a selected output level. It could also switch the power on and off, albeit with a certain delay—switching it off took about a second; on, about five seconds.

Possible applications could include regulating electronic plants, which is another strong research area at Linköping University. One advantage of the transistor channel being so large is that it could potentially tolerate a higher current than regular organic transistors, which could be important for certain future applications.

"We didn't create the wood transistor with any specific application in mind. We did it because we could. This is basic research, showing that it's possible, and we hope it will inspire further research that can lead to applications in the future," says Isak Engquist.

Extreme earners are not extremely smart

People with higher incomes also score higher on IQ-tests—up to a point. At high incomes the relationship plateaus and the top 1% even score slightly lower on the test than those whose incomes rank right below them. This suggests that one cannot infer high intelligence from high income, shows a new study from Linköping University.

The researchers combine wage data from Swedish population registers with scores from cognitive ability tests taken from military conscripts at age 18-19.

The relationship between cognitive ability and wage is strong for most people across the wage spectrum. Above a threshold wage level, however, wage ceases to play a role in differentiating individuals of varying ability.

Above €60,000 annual wage, average ability plateaus at a modest level of +1 standard deviation. The top 1% earners even score slightly worse on cognitive ability than those in the income strata right below them. This is an important finding, because the top 1% earn wages that are twice as high as the average wage among the top 2-3%, according to Marc Keuschnigg, associate professor at The Institute of Analytical Sociology at Linköping University and professor of sociology at Leipzig University.

Recent years have seen much academic and public discussion of rising inequality. In debates about interventions against large wage discrepancies, a common defense of top earners is that their unique talents motivate the huge amounts of money they earn. However, along an important dimension of merit—cognitive ability—the study finds no evidence that those with top jobs that pay extraordinary wages are more deserving than those who earn only half those wages.

PHOTO: THOR BALKHED



The new Tage Danielsson professor is a researcher, poet and artist

Keti Chukhrov is the new holder of Linköping University's Tage Danielsson visiting professorship.

Keti Chukhrov is an art and cultural theorist, with an interest in philosophy, politics, media theory and art. The three main areas of her current research are linked, and focus on the philosophy of performativity, the impact of non-libidinal (non-capitalist) political economics in socialist epistemology, and art as the institute of global contemporaneity.

In the spirit of Tage Danielsson, she is also an artist, with an eye for the written as well as the spoken word. She is a writer, poet, film maker and dramatist, and has written books and plays.

Her art, and maybe above all her poetry, portrays the changing society and the turbulence following the demise of the Soviet empire. Her research is intrinsically linked to her artistry. It is based on

her own dramatical writing and on close collaboration with other artists.

At Linköping University, she will be based in the Department of Culture and Society, in the Language and Culture research environment, where language and literary studies are united in an interest in the interplay between language and culture in various contexts.

Keti Chukhrov has long been with the School of Philosophy and Cultural Studies at the Higher School of Economics in Moscow, Russia. In the autumn of 2022, she was with the Karlsruhe University of Arts and Design in Germany.

"Many academics, intellectuals and artists find themselves in a difficult situation due to Russia's war in Ukraine. This makes it particularly important to invite Keti Chukhrov to the Tage Danielsson visiting professorship," says Jesper Olsson, deputy head of research in the Department of Culture and Society and



PHOTO: CHARLOTTE PERHAMMAR

chairman of the drafting committee.

As a visiting professor, Keti Chukhrov will focus on her ongoing research, organise workshops and lectures, and take part in seminars. She is also hoping to learn more about Tage Danielsson.



The best liquids to maximise antioxidant content in spinach smoothies

Different market products give very different results when it comes to liberating the antioxidant lutein from spinach in smoothies. Researchers at LiU have examined 14 common dairy and plant-based products and found that only four of these increased lutein liberation. Compared to water, some drinks had a negative effect on the lutein content in spinach smoothies.

Most people know that spinach is good for your health. One substance found in, for instance, spinach and kale is lutein. Several experimental studies have shown that lutein can suppress processes linked to inflammation, and there is now ample research indicating that chronic low-grade inflammation is an important risk factor in cardiovascular disease.

As our bodies cannot produce lutein, the researchers behind the study were interested to find out how to optimise lutein intake from foods. The research group previously showed that preparation methods where the spinach is heated break down some of the lutein, whereas mixing it into a smoothie makes more lutein available for absorption.

The type of liquid used in the

smoothie can also affect lutein content. As lutein dissolves in fat but not in water, it needs gastric juice and/or other food components to be liberated from the plant material and absorbed by our intestines. The researchers suspected that some components in our food, such as fat, carbohydrates, proteins and fibres, can affect the amount of lutein available for absorption.

The researchers have examined the effects of various products available from food shops on the amount of lutein liberated in smoothies. Both dairy and plant-based liquids were tested.

"We could see that only 4 of the 14 examined products increased the liberation of lutein from spinach compared to water," says Rosanna Chung, assistant professor in the Department of Health, Medicine and Caring Sciences at Linköping University.



PHOTO: PRIVATE

Bengt Normann, Olle Stendahl
and Christer Tagesson in
Linköping Cathedral in 1973.

The first jubilee doctors share their life journeys:

"A fantastic time"

In 1969, Bengt Normann, Olle Stendahl and Christer Tagesson came to a new university college in a city they barely knew. Now, 50 years later, the three of them still live there, are still in touch, and among Linköping University's first jubilee doctors.

TEXT **MARCUS NYENGER**

Look at the black and white photo. It was taken in Linköping Cathedral one day in early summer 1973, towards the end of the very first promotion ceremony of the city's new university college. Bengt Normann, Olle Stendahl and Christer Tagesson, wearing their doctor's hats, smile proudly at the camera.

"I remember how solemn it was. I was elated at having done something good, and then it was of course a really big thing that Astrid Lindgren was promoted to honorary doctor at the Faculty of Arts and Sciences on the same occasion," says Christer Tagesson.

Bengt Normann recalls similar memories when we gather in his house 50 years later. Olle Stendahl takes a moment to think. He spins his hat, which is in pristine condition, in his hands.

"I remember my old granny being very thrilled that I was going to be a doctor.



PHOTO: LINKÖPING UNIVERSITY

She bought me the hat."

Bengt got his hat from his mother. Christer does not quite remember how his hat was financed.

"But I'm sure I paid for it!"

They all laugh. They have had many good laughs together over the years.

The first time Christer and Olle met was when they began studying medicine in Lund in 1966.

Having completed his studies at Uppsala, Bengt Normann moved to Lund a few years later to get his medical

degree and study for a PhD with Docent Lars Edebo. He quickly found out that Edebo was soon to get a professorship in medical microbiology at the new university college in Linköping, and was set on joining him there. But more people were needed to get things going in the new place. Olle Stendahl and Christer Tagesson, who had begun with small microbiology research projects in Lund, were asked to come along to Linköping and work as assistants in parallel with their doctoral studies.

Olle Stendahl fondly recalls his years as a young researcher:

“In those days, when you told people you were doing research, they found it really exciting. Deservedly or not, you actually got quite an elevated position, especially in a small city like Linköping.”

The trio found the subsequent four years to be intense and eventful. As the Medical Microbiology Department, just like much of the new university college (which became Linköping University in 1975), had to be built from scratch.

“We all probably thought we’d be doing something else ten years later, but we remained close to the university, and we’ve all enjoyed it very much,” says Bengt Normann.

“My first thought was: Linköping? Where the heck is that? Then I quickly understood what a fantastic opportunity it was, and if I didn’t like it, I could always go back to Lund. But that didn’t happen,” says Christer Tagesson.

When the medical programme started and the first medical students came to Linköping in the autumn of 1969, the trio had moved to Östergötland.

“I recall that the lab hadn’t been finished and we had to climb over scaffolding to get to the rooms where we were going to teach. There was a true pioneering spirit about it, which appealed to the students, and we established a very good rapport with them.”

Bengt was ready to defend his doctoral thesis in the spring of 1973. Only a couple of months before the Academic Ceremony, it was still not evident that he would be joined by Olle and Christer. But all three of them finished their theses and became doctors—a huge achievement that became a springboard to their successful careers in and around LiU.

BENGT NORMANN became an infectious disease doctor and later also an infection control doctor. He continued teaching at the Faculty of Medicine throughout his career.

CHRISTER TAGESSON had a career in research, became a doctor of clinical chemistry and later a professor of occupational and environmental medicine.

OLLE STENDAHL stayed in microbiology, soon became a docent and was chosen to take over the professorship in Linköping in the 1980s. His subsequent employment history includes becoming a dean when the Health University opened in 1986, and he has held various appointments at LiU up until 2022.

“Yes, I’m probably the one with the longest employment record at LiU. I never had a reason to look elsewhere. Linköping was a small city before the university existed, and it’s more fun to be in a place that keeps developing and not just trying to keep what’s already there.”

Alongside their professional careers, the three of them have always been in touch over the years, and meet at crayfish parties and other events. Christer and Olle exercise together at least once a week, preferably by taking long walks.

“We tend to discuss important things, like the development of academia,” says Christer Tagesson.

Fifty years of developments in academia provides plenty of food for thought and discussion. This was probably evident during the Academic Celebration in May, when the three of them were promoted to jubilee doctors, together with five others. The very first jubilee doctors promoted at Linköping University.

“A lot has happened in Linköping over these years. The university has always been innovative and has been a pioneer in many ways, in terms of pedagogics as well as choice of subjects. I’m honoured to have been part of this journey,” says Christer Tagesson. ■

Jubilee doctors

A jubilee doctor is a title awarded a person who was promoted to doctor fifty years earlier.

At the Academic Celebration on 27 May Linköping University, for the first time, honoured jubilee doctors.

Promoted from the Faculty of Medicine and Health Sciences were: Olle Stendahl, Bengt Normann, Christer Tagesson, Rolf Andersson, Arne Tärnvik and Hans Arnqvist.

From the Faculty of Arts and Sciences: Martin Ribe and Gunnar Åberg.



Christer Tagesson, Bengt Normann and Olle Stendahl are three of Linköping University’s very first jubilee doctors.

PHOTO: CISSI SAFSTRÖM

The Mamirauá Sustainable Development Reserve:

Located: State of Amazonas

Founded: 1996

Size: 11,000 square kilometers

Population: Around 6,000



The quest for sustainable livelihoods in the Amazon

The journey on the grey and brown river from Tefé to the Mamirauá Sustainable Development Reserve normally takes around three hours. But things are not normal. The extreme drought, which has caused the water levels to drop to a record low, forces the boat to take detours. Instead, it takes eight hours to reach the destination deep in the heart of the Amazon.

TEXT JONAS ROSLUND

It is autumn 2022. The effects of climate change are evident in Mamirauá, yet the group of scientists stepping ashore are filled with positive anticipation.

Along for the trip are two students from the master's programme in Science for sustainable development at Linköping University. Alejandra Leon Lavandera comes from Peru but has never been to Brazil before. Roksana Rotter from Germany has travelled in South America, but this part of the Amazon is a new experience, and she has suddenly realized how big Brazil is.

"First we flew to Rio, then took another flight to near São Paulo, then another to Manaus and then to Tefé and from there we went by boat up the river," she says.

In total, the group consists of ten researchers from Sweden, Brazil and the UK, mainly natural scientists but also social scientists. The project leader is



Water levels have dropped to a record low.

PHOTO: PRIVATE

Professor Alex Enrich Prast from the Department of Thematic Studies—Environmental Change at Linköping University. In his professional life, he has been involved in research from the Antarctica to the deep sea but has now decided to devote himself entirely to the Amazon and to biogas research.

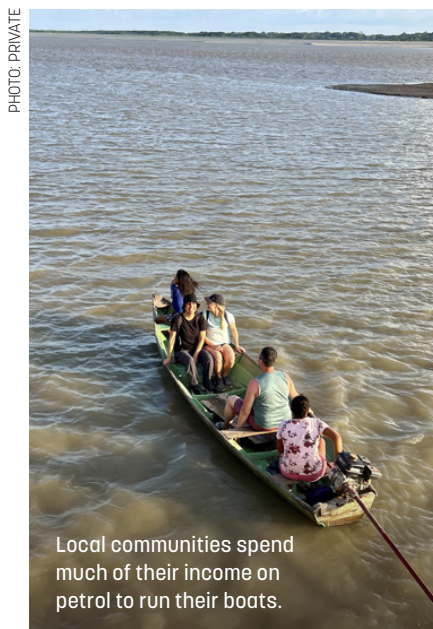
"There was a moment when I said, ok, I've published—I don't know—80 papers. I decided that I would rather have less papers and do something that directly benefits society and has more tangible impact."

The drought affects the schools

The Mamirauá Sustainable Development Reserve is in northwestern Brazil. Local communities make a living from fishing, agriculture, and forestry, but that has become an increasing challenge. The naturally recurring dry periods have become more intense in recent decades. This autumn, some schools have been forced to cut back on teaching because the low water levels made it difficult to transport school meals.

The scientists from Linköping have come to start a project on sustainable

forestry together with the state-owned Mamirauá Institute for Sustainable Development, the University of Rio de Janeiro, and Lancaster University. The Mamirauá Institute has collaborated with the residents in the area for 25 years in developing sustainable management of natural resources. ►



Local communities spend much of their income on petrol to run their boats.

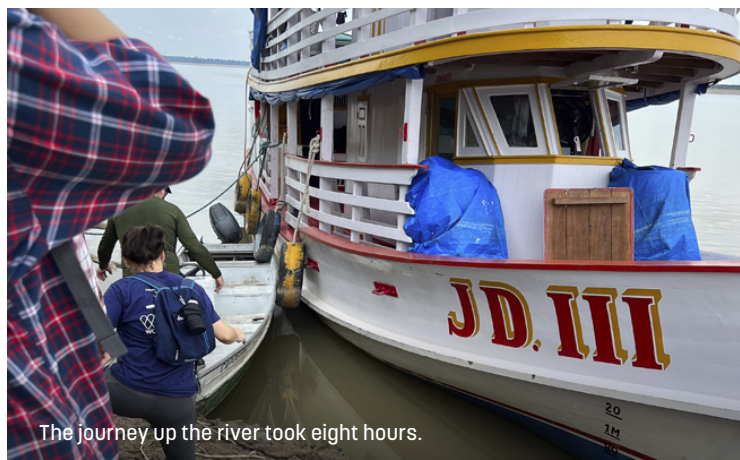
PHOTO: PRIVATE



The forest both binds and emits greenhouse gases.

PHOTO: PRIVATE

PHOTO: PRIVATE



The journey up the river took eight hours.

PHOTO: PRIVATE



Roksana Rotter, Alex Enrich Prast, Veronica Brodén Gyberg and Alejandra Leon Lavandera.

The Amazon is larger than Western Europe. Biodiversity is priceless and the ability of vegetation to absorb greenhouse gases is crucial for the earth's climate. But forestry is also an important means of livelihood for the riverine communities, so a key question is how to combine sustainable social and economic development with reduced climate impact. Perhaps the researchers from Linköping can contribute an important piece of the puzzle.

Forest waste can become biogas

The purpose is to deepen the understanding of the greenhouse gas fluxes from Amazon trees. The forest both binds and emits greenhouse gases, such as methane, but different trees have different properties. In the project, three tree species and their role in the cycle will be studied. Through measurements of gas flows, the researchers hope to determine which species have the most climate benefits and should therefore ideally be spared.

Logging also gives rise to forest waste, which then causes emissions of greenhouse gases when it breaks down. Therefore, Alex Prast wants to investigate whether the waste can be used to make biogas and environmentally friendly fertiliser. This would provide some of the tangible benefits for society he seeks in his research.

"Local communities spend around 30-40 percent of their income on petrol to run their boats. If they could somehow generate their own biogas that would go down to zero," he says.

Interdisciplinary collaboration

The social scientists' part of the project is to establish a rapport with community leaders and get permission to participate in activities and do interviews. As the project goes on, they will examine how people view their lives and the future, what their needs are, and consequently what actions are realistic to take.

The work is led by Associate Professor Veronica Brodén Gyberg from the Department of Thematic Studies—Environmental Change.

"The communities' needs have to be met, so it's possible that one conclusion will be that it's not realistic to stop using tree A, but maybe tree B. Together the results can help minimise climate impact and also improve livelihoods. Hopefully this will make the scientific recommendations useful more quickly."

During their weeks in Mamirauá, the members of the research group live together on the boat and have time to share experiences and learn a lot from

each other. For some of the scientists, the interdisciplinary approach is completely new, but interest is high.

Memories that linger

Now it is spring 2023. Alejandra Leon Lavandera and Roksana Rotter are back in Sweden, struggling with their master's theses but the memory of their weeks in the Amazon lingers.

"What struck me was the relationship that the communities have with the Mamirauá Institute, how they are included and empowered, that's something that I really liked," Alejandra says.

And Roksana adds:

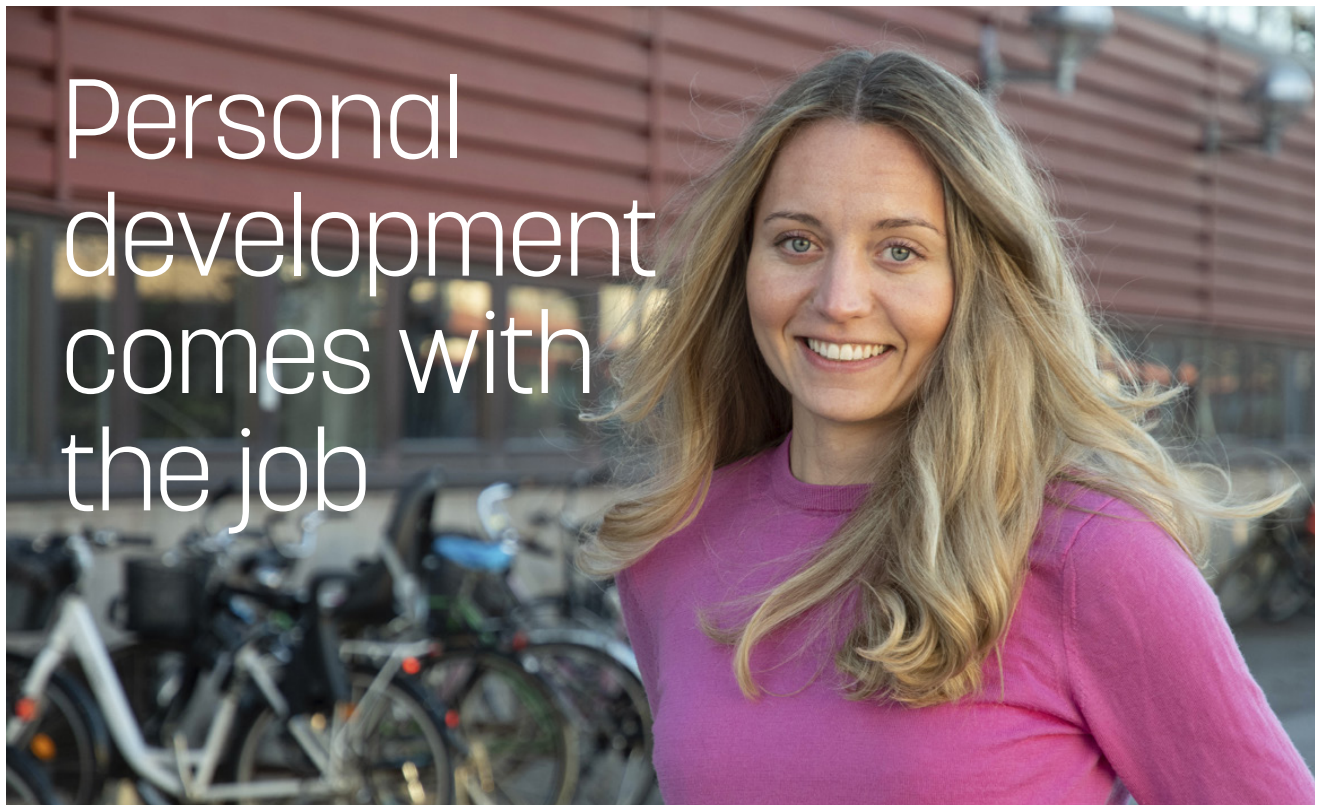
"What also impressed me is how welcoming the people are, both in talking about their livelihoods but also in general. They invited us to play football and said 'you should come more often'. So that was very nice to hear."

In September, the team will return to Mamirauá for the project. ■



The members of the research group lived together on the boat.

PHOTO: PRIVATE



"It's fun and challenging to be a doctorate student. I enjoy doing research, and now I know it's something I want to keep doing," says Lisa Lundin at the Division of Industrial Management. Her time at LiU has included research into digital customer journeys.

TEXT & PHOTO **KARIN MIDNER**



Lisa Lundin would recommend anyone looking for stimulating work to apply for a doctoral student position at LiU.

"Your work here can change society, and also who you are as a person. There's also ample opportunity to travel and see many places, which I really enjoy!"

She is originally from Lund, and has a master's degree in sociotechnical systems engineering from Uppsala. Her interest in doing research began when she was working on her dissertation, and shortly after graduating she realised her dream of studying for a PhD.

"In my view, I get to take more responsibility here than in a normal job, which is a positive thing, as it makes me want to develop even more. I feel fortified when I've finished a difficult task."

"It's a luxury to be working in an area you're passionate about"

She recently published a paper on digital business-to-business customer journeys.

"It's a luxury to be working in an area you're passionate about. I'm doing this for my own development, and I'm driven by my interest. These two years have given

me the ability to analyse, reason and reflect over things in a whole new way. Personal development is a fantastic thing, and here it comes with the job."

All these new opportunities that open up with digitalisation, and how digital technology can be used to influence touchpoints, actors' roles and ultimately the whole process, is what is exciting to Lisa Lundin.

"It's fascinating how a supplier can work with the customers and that it's possible to change and influence the way they interact. It's possible to follow the customer from when they start thinking of buying something, through the various stages of the purchase process, to the actual usage of the product or service."

The best time of her life

Lisa Lundin is two years into her five-year doctoral student position at LiU. Although the work is quite challenging, she really enjoys her job and her colleagues.

"Before I became a doctorate student, many people told me that this would be the best time of my life, and I tend to agree with that." ■

IF I'D STAYED, THEY WOULD HAVE KILLED ME

As the Taliban took over town after town in Afghanistan in the summer of 2021, Mohammad Sajjad Afsharzada finally realised that he had to flee for his life. Now he is in Sweden, where Linköping University has accepted him through the international network Scholars at Risk. But the future for Sajjad and his wife is uncertain.

Mohammad Sajjad Afsharzada

From: Herat in Afghanistan where he was Assistant Professor at the university.

Education: Master in Psychology at the University of Isfahan. Currently writing his doctoral thesis.

Age: 33

Family: Married to Wahideh Talebian

TEXT JONAS ROSLUND PHOTO ANNA NILSEN

From his temporary office in the Division of Social Work, Sajjad has a beautiful view of Norrköping and the Motala Ström river. It's a long way from

Afghanistan, but his mind is constantly wandering between the old life and the new.

"We have a lot of different emotions. Sometimes we are sad, sometimes happy," he observes.

Since February, he has held a one-year post at Linköping University through Scholars at Risk (SAR), an international network of universities committed to supporting academic freedom worldwide, including by giving sanctuary to researchers who are at risk of being imprisoned or killed in their home country.

LiU is a new member and Sajjad is the first such scholar to come to the university. He and his wife Wahideh have got a flat in Norrköping. She is trained in family law but is currently at home waiting to receive a personal identity number.

A turbulent time

In less than two years, their lives have been completely turned upside down. Before they came to Sweden, Sajjad taught at the University of Herat in northwestern Afghanistan. The capital city of Kabul is two hours away by plane. He worked in research, educational projects at schools and held couples therapy at a clinic. It was a good life, he says.

But in 2021, the Taliban returned to power after the US-led troops left the country, and the new rulers do not accept psychology as a science. This had consequences for Sajjad and his colleagues.

"They accused us of spreading useless and harmful knowledge and of corrupting people's minds. As I was teaching couple and family therapy, they warned me several times to stop. When I refused, they threatened me with death. Finally, my family convinced me to escape to Iran."

There he and his wife stayed for a year and a half until the opportunity to go to Sweden arose. Many other members of his family have also fled and are scattered around the world. Two brothers are in the Netherlands, an uncle is in Germany and two siblings are in Iran. Only his mother, father, a sister and a brother remain in Afghanistan.

Loss, sadness and gratitude

He comes from a somewhat unusual Afghan family. His parents are not university-educated, but they have always been open-minded and given their children freedom, he says. All his siblings have been able to choose their own path in life: one is a surgeon, some have chosen artistic professions, another is a psychologist just like Sajjad.

He talks to his family every day on the phone. Naturally, his parents are very sad. They have told him that the Taliban have been at their house looking for him. But, amid the sadness and sense of loss, he is grateful for the support he has received in Sweden.

He has two mentors at the university who will help him settle in and integrate into society. One of them is Axel Ågren at the Division of Social Work at the Department of Culture and Society.

"We've arranged some evening activities and then there are also some practical things. I helped him with his electricity subscription, for example.

He is also in the final stages of his thesis so everything around him has to work, you must feel comfortable and get support from colleagues."

Prepared to move on

A new country, a foreign culture, and a foreign language. There is a lot to contend with, including the uncertainty surrounding what will happen in a year when his position at Linköping University ends and his doctoral thesis that needs to be written.

Meanwhile, Sajjad thinks that he and his wife are adjusting well. In their spare time, they can go into town, go to the swimming pool or out into the countryside. Despite the problems, he does not forget to smile and enjoy the arrival of spring. He hopes that one day Afghanistan will be free and that he will be able to return. Until then, he has some hope of being allowed to stay in Sweden, but is fully prepared that he and his wife may have to move on.

As a trained psychologist, he is used to examining both his own behavior and that of others. This knowledge has changed him for the better, he says.

"I love psychology because it tries to help people. I love to talk to the students and to make them think. I speak about what is good behaviour in society."

And he gives a basic definition of what that is:

"Don't kill another human being."



FACTS: Scholars at Risk (SAR)

Scholars at Risk is an international network founded at the University of Chicago in 1999. In 2003, the network headquarters relocated to New York University. Since then, more than 650 higher education institutions in over 40 countries have joined. The aim is to support and defend the principles of academic freedom and human rights around the world. LiU became a member in 2021.

The reception of scholars at Linköping University will be co-financed by the hosting department and funds granted to SAR-Sweden by financiers such as Riksbankens Jubileumsfond, SIDA and Formas.

From LiU to Google

“Digital marketing and business. Those things you can learn. But the soft values ... quickly understanding the culture of the team, the country, and the specific market. SMIO at Linköping University provided this”, says Elena Sabrova.

TEXT **ULRIK SVEDIN** PHOTO **CHARLOTTE PERHAMMAR**

For the past ten years, she has been working in global IT giant Google’s European office in Dublin. She is one of the alumni who returned to Linköping for the SMIO programme’s 15th anniversary jubilee in Studenthuset on 3-4 March 2023, together with some 80 alumni from across the globe.

“It was so much fun seeing everyone again. We still have some contact with our fellow students from SMIO. But this is a very nice opportunity! I’m also happy that the programme wants our input and suggestions for future improvements. I’d like to give something back,” she says.

ELENA SHABROVA comes from a small town in central Russia. She moved to the big city for a bachelor’s degree at the country’s oldest and largest technical university. But she wanted to study and work abroad.

“I looked at different places. I wanted a master’s degree and I wanted to study in English for two years. An ideal programme for me would have a strong international focus. There were some alternatives in Europe, but I picked SMIO in Linköping. I also received a Visby scholarship from the Swedish Institute,” she says.

SMIO is an acronym for the master’s programme Strategy and Management in International Organisations. It was launched in 2007 as part of LiU’s initiative involving international exchange studies via ERASMUS. The programme

educates future managers, strategists and organisational developers. Most of the students are from other countries, and international organisations is a common thread throughout the programme.

“This was perfect for me. And completely different. Some 20 nationalities were represented on the programme. In my home country, I was used to studying alone and doing all the assignments by myself, such as examinations, essays, projects and degree projects. When I came to Linköping it was a huge change for me to commit so much to teamwork and getting tasks done together with my fellow students. I think this prepared me for working in teams at Google, particularly in an international environment.”

FOLLOWING HER MASTER’S DEGREE, she worked for a year on a research project at LiU, on handling acquisitions of companies in transition economies. This was presented at the International Management Conference in Estonia in April 2013.

Elena also took a one-year intensive Swedish course and passed the Tisus test.

She then received an offer she could not say no to:

“Google offered me a place in their customer sales team at their European head office in Dublin. That’s why I moved to Ireland. Studying at LiU gave me the opportunity to work for a fantastic international company and travel the world. This was a big step in my professional

development and in my personal life.”

Elena has worked with Google’s advertisers, traditional media agencies, independent agencies and advertising technology partners in Russia. She also had a brief spell at their Stockholm office as a YouTube specialist. In 2022, she moved to a team supporting the MENA (Middle East and North Africa) region. She is now a strategic agency manager, building long-term partnerships with advertising agencies to help them become successful.

“The MENA team consists of some 50 people. My teammates are from different countries in the Middle East and all over the world. It’s a fantastic mix of cultures and very international. I think that what I learned at SMIO helped me adapt faster to a new business environment and new cultures, and to be open to learning more about the MENA region.”

What is it like working at Google?

“It’s a fantastic place to be! I like being part of a team of very professional and fun people. They’re all very ambitious and have a passion for their roles and for helping customers. That said, technology is a very challenging and fast-moving environment. You have to be prepared for changes and be able to learn something new every day. If I go on holiday, I feel that I’ve missed something when I come back. But it’s never boring!”

What does the term “Googleyness” mean?

“There’s no definition, and it may mean different things. It’s a quality we look for in people when we hire or interact within the company. To me, having *Googleyness*’ refers to someone who can work efficiently in a team, is aware of the company’s values but also takes risks and always puts the customer’s/user’s best first. To me, a googley’ person is someone who cares about the team but is not afraid to speak up when needed.”

About 5,500 people work at Google’s office in Dublin. The sales teams play an important role in supporting more than 100 markets.

“If you’re looking for case studies and examples of how to work in a specific market, or if you need advice, there’s always someone who knows the subject and is ready to share their experiences.”

What does a typical Google fika look like?

“We have nothing like Swedish fika. In my team, we try to get together at around 4 p.m. every day to process the day. We also try to schedule regular one-to-one coffee chats with colleagues from different functional areas to network or share experiences.”

Instead of fika, there is an after-work event, every week, for the entire (!) office:

“After the pandemic this was moved to Thursdays, as we can now work from home on Fridays. It’s called TGIT, a ‘Thank God it’s Thursday’ event where our entire office gathers for some snacks

and drinks. It’s a very good opportunity for meeting people from different parts of the company.”

What is your dream, your next step in life?

“I have many ideas, not always realistic ones. But lately I’ve been reflecting a lot on my education. I came to Moscow from a very small town of 30,000 people. My university studies have developed me academically and professionally and have given me new opportunities in life. I’d really like to contribute to education initiatives for underprivileged groups, especially girls, around the world. It would be fantastic to see how more of

them could have the opportunity to study and have a career, create their independence, and reach new heights in their lives.”

What memories do you have from Linköping?

“I have so many good memories! Ryd, where I used to live. And Gamla Linköping, my favourite place in town. I also have fond memories of the SMIO teachers, who guided us through the programme: Marie Bengtsson and Jörgen Ljung. I am so grateful to them and I wouldn’t be where I am today if it wasn’t for them,” says Elena Shabrova. ■



On April 15 LiThe Blås–LiU's well-renowned and spectacular student orchestra–celebrated their 50th anniversary. Two sold-out concerts during the day and in the evening a "sittning" for old and new members. LiThe Blås dates back to 1973 and was formed as the first student orchestra at Linköping University (then Linköping Tekniska Högskola).

PHOTOS: MAGNUS JOHANSSON





LiU alumna releases crime novel

Kerstin Bergman is a crime novel writer, general crime fiction expert and docent in literary studies. Between 1992 and 1995 she studied Art and Visual Culture and Comparative Literature at Linköping University.

"I mostly remember the many excellent teachers we had", Kerstin says.

Kerstin's passion for literature took over and she left LiU with a bachelor's degree majoring in Comparative Literature. The degree from LiU got her into a PhD program at Lund University.

How did you enjoy your time as a student at LiU?

"At LiU, I studied half time courses run in the evenings and had an flat in central Linköping, so I never really took part in any student activities at the university, except for some concerts at Kårallen and



PHOTO: ANDREAS GRUVHAMMAR

the occasional visit to Flamman and Herrgård. However, Linköping was an exciting city with a vibrant art and music scene in the early to mid-nineties, so I had a great time being a student!"

When did you develop an interest in crime fiction and writing?

"I have always read a lot, and early on I developed a passion for suspenseful crime and detective stories. I ended up working with literature and crime fiction, as a scholar, critic, editor, and general crime fiction expert."

For many years she researched and wrote about other authors' crime novels, and in 2011 she was included in the Swedish Academy of Crime Fiction. In an international context, Kerstin is one of the foremost experts on Swedish crime fiction. In 2020, Kerstin released her first crime novel and earlier this spring her third crime novel "Ekarvet" was released.

"Ekarvet is set in and around Linköping. It is a mixture of a peculiar class reunion and a manor house mystery. This is a novel about how we were shaped by our peers in school, peers we thought we knew everything about, but who might not be who we thought they were."

LiU Alumnus new CEO of Byggmax

KARL SANDLUND has been appointed as the new president and CEO of Byggmax Group. Karl comes most recently from a position as COO for AcadeMedia. He has previously held several senior positions at SAS, most recently as Chief Commercial Officer and acting President and CEO. He began his career at McKinsey & Company in Stockholm after he graduated from Linköping University in 2001 with a Master of Science in Industrial Engineering and Management.

LiU Alumni

JONAS ARNELL-SZURKOS is Herald at the Chancery of the Royal Orders of Knighthood. He has a Bachelor of Education from LiU and graduated in 1994.

KARIN KARLTORP is Group Manager Software at HMS Networks. She has a Master of Science in Applied Physics and Electrical Engineering and graduated from LiU in 1996.

OSCAR ÅNG is Strategy Manager at Swish. He has a Master of Science in Industrial Engineering and Management and graduated from LiU in 2017.

JENNIFER SEVALLIUS is Product Owner at Vinnova. At LiU, she studied the bachelor's programme in Information Systems Analysis, graduating in 2014.

EMMA LUNDMAN is Senior Engineer at Oslo University Hospital. She has a Master of Science in Chemical and Biomolecular Engineering and graduated in 2007.

PETTER JAKOBSSON is Program Manager at Trafikförvaltningen, Region Stockholm. He has a Master of Science in Mechanical Engineering and graduated from LiU in 2015.

ANN LINDSKOG is Project Manager at ISS Sweden. She has a Master of Science in Industrial Engineering from LiU and graduated in 1992.

KENNET ALEXANDERSSON is Senior Security Analyst at Saab. At LiU he studied for a Master of Science in Political Science and Economics, graduating in 1999.

MARGARETA BASK is QA Manager at Advanced Integration Technology. She graduated from LiU in 2004 with a Master of Science in Mechanical Engineering.

EMIRA RAMIC is Content Director at Tale Content Creators. She studied culture, society, and media production at LiU and graduated with a master's degree in 2010.

Reach out

ALUMNI ARE A VALUABLE RESOURCE FOR LIU.

We would be grateful for your feedback on your education, this magazine, or any other experience you have with LiU.

A key factor for Linköping University is collaboration with the society around us. You might be the bridge that strengthens the relevance of our programmes or research and helps your organisation and LiU to benefit society and nurture positive social development. Please contact me with any ideas and feedback.



FREDRIK ANDERSSON
013-28 25 29
alumni@liu.se
LiU Alumni,
Linköpings University
581 83 Linköping

Spring Mingle

ALUMNI CURIOUS ABOUT AI, ChatGPT and how new technology affects future learning met on Wednesday afternoon, April 26, at Visualiseringscenter in Norrköping, where LiU Alumni organised Spring Mingle.

In lectures and dialogue between Anders Ynnerman, professor of scientific visualisation and Linnéa Stenliden, senior associate professor of educational sciences, the alumni were able to take part in world-leading research presented from two perspectives.

Linnéa Stenliden's and Anders Ynnerman's research interests overlap and both work to develop the pedagogy of tomorrow. Linnéa with a focus on knowledge-driven development of AI in education and Anders who is passionate about making scientific information available to both young and old.

"It is fun to be able to show our alumni the latest research from LiU and we are happy that so many have shown interest in coming here", says Fredrik Andersson, alumni manager at Linköping University.



CHANGE IS INEVITABLE

We have the courage to think freely and innovate. We believe in forging our own path, by putting innovation above tradition, results above prestige. We break boundaries and explore new ground. This is what we have always done, and this is what we will always do. Innovation is our only tradition.

We have the power of 40,000 minds: Our hope for the future, ambitious and thriving students, joined with researchers, teachers and co-workers. That power will change everything.

Are you brave enough to create the future with us?