Solidarity in time of war

I write the introduction to this issue of LiU Magazine with mixed feelings. Of course, I am pleased to see all the excellent, read-worthy content in the magazine. At the same time, I am horrified by the daily reports from Russia’s invasion of Ukraine. Who thought this could happen in 21st-century Europe, after everything our continent went through in the first and second world wars? Russia’s invasion is not only an attack on a democratic, friendly neighbour, it upends the stability that has distinguished our region for many years. It is important that as a university, we stand up for our fundamental values, for democracy and for academic freedom. At LiU we were quick to show our solidarity with Ukraine and have paused our collaborative agreements with Russia. Alongside other Swedish universities, we are offering assistance to fleeing academic colleagues, for instance through Scholars at Risk. It is also important to note that the conflict increases the vulnerability of Russian colleagues who study or work at Linköping University.

It is understandable that many of us are concerned about the future, and it is important that we make it possible for co-workers to express their anxiety. How can research help us understand, relate to, and perhaps act, in relation to current events? The open seminars, which have been held in Studenthuset every Wednesday for several weeks, attempt to address these questions. The seminar series has been very well attended, and there is reason for us to consider expanding it to other campuses and to other relevant topics where there is a need for critical social science perspectives.

We will no doubt return to this topic in subsequent issues, but here you can meet Johanna Dahlin, a researcher from LiU’s Department of Culture and Society. She discusses Russia in a historic perspective, in relation to the war in Ukraine. Also of interest is the research of one of our younger co-workers, in a field that many will find interesting. Read the interview with Moa Jederström, doctoral student at the Department of Health, Medicine and Caring Sciences and physician, who is studying abuse in sports. That is an important research field that can lead to greater understanding, and in the long term, help individuals in vulnerable situations.

Of course, there is much more to read in this issue that showcases the valuable contributions of many of our co-workers and students. Enjoy reading LiU Magazine!

JAN-INGVAR JÖNNSSON, VICE-CHANCELLOR
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A warning for the future
Writing a warning for 100,000 years in the future

From LiU to Stanford
LiU alumna at one of the world’s foremost universities

Vaccine scepticism and mistrust
Researchers examine cultures of rejection

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LiU students conduct field studies in Bangladesh

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Nothing beats the human eye – for now

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The war is unpredictable, but possible to understand

PhD student – and figure skater
She researches abuse in youth sports

Alumni
Electric cars in Africa and help to refugees
A good place in the world

IN THE MORNING when I drive to work, I leave my car in a car park at the north end of Campus Valla, even though my workplace is at the southern part of campus. The morning walk to my office is a way for me to get going, while also racking up more than a thousand steps on my pedometer. If the sun is shining, as it is today, it makes for an even better start to my workday.

AND OF COURSE, my job becomes even more interesting with duties such as being editor for LiU Magazine. Before I started at LiU, I spent many years as a journalist, and “making a newspaper” is one of my favourite jobs. The challenge is not just to produce a number of interesting articles, but also to find a good blend of topics, and to present it all in a compelling package. I’ll leave it to you readers to determine whether we’ve succeeded with this.

IT’S EARLY MAY AS I WRITE THIS, and just a few days ago, a large survey showed that Linköping University topped the list of the public authorities that Swedes wanted to work for. LiU ranked particularly high for its good reputation and the interesting work duties on offer. On the overall list of the country’s best workplaces, LiU placed tenth.

PERSONALLY, I’VE ALWAYS LOVED being at the university, both as a student in the late 80s and as employee for the past four years. It’s hard to find a better combination of ambition, knowledge, and a desire to contribute – in both large and small ways. Not to mention amiable, intelligent and dedicated colleagues, and a campus buzzing with student life.

IN THIS ISSUE, you can read about the latest AI research at Linköping University, an alumna who took the step across the Atlantic, and students doing fieldwork in Bangladesh. Plus much more. As always, the magazine’s second issue has been translated into English – so kudos to our translators, who worked hard to get everything finished in time.

Enjoy the magazine, and your summer!

MIKAEL SÖNNE, EDITOR-IN-CHIEF
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ETT INTERNATIONELT MAGASIN
Välkommen till det årliga internationella numret av LiU magasin, med texter på engelska. Vi berättar om forskning i världsklass och om studenter från olika delar av världen som läser eller har läst på Linköpings universitet.

LIU MAGAZINE

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A landmark with black spikes? A genetically modified blue forest? Or a document in an archive that somebody stumbles across? How can we warn humanity and other living organisms in 100,000 years of dangerous nuclear waste? These are questions that research colleagues Anna Storm and Thomas Keating at Linköping University are going to try and answer in their unique mission of writing warning texts for coming generations.

A fter a little more than 40 years of research and political negotiations, Sweden’s government decided in January to approve a final storage solution for spent nuclear fuel, the most radioactive waste from nuclear power plants. It will be put into copper capsules and then buried in bedrock and bentonite clay 500 metres underground in the Swedish village of Forsmark, in the province of Uppland. A part of this final storage solution is developing a warning text which must be guaranteed to be legible long into the future.

It is, to say the least, a challenging assignment, and one which has been given to Anna Storm, professor, and Thomas Keating, postdoc, at Technology and Social Change (TEMA T), at Linköping University. “This is not the easiest of tasks. Of course, we don’t even know if humans will be around in 100,000 years. And at the same time, we have to think in shorter perspectives, so that we also include people 100 and 500 years into the future”, says Anna Storm, who has overall responsibility for the project.

SHE HAS A BACKGROUND in the history of technology and industry, and has run several projects related to nuclear power. As a PhD student, she regularly visited the
Baltic countries, and her postdoc project was about the nuclear power plants in Barsebäck in Sweden and Ignalina in Lithuania.

“I discovered that nuclear power is very exciting to study from humanities and social sciences perspectives, and at that time the area wasn’t so well researched”, says Anna Storm.

THOMAS KEATING IS A CULTURAL GEOGRAPHER who looks at the problems that occur in the relationship between people and technology. He is now focusing on the question of how knowledge of the nuclear waste storage can be preserved. For this project, Thomas and Anna have interviewed several experts in Sweden and abroad, and they have arranged workshops with artists, professionals from the nuclear power industry, and young people.

“It is important to get young people involved and include their perspectives in such a question that is so crucial for the future”, says Thomas Keating.

THE SWEDISH NUCLEAR Fuel and Waste Management Company (SKB) initiated the task of creating a warning text – a project related to international discussions about plans for final storage of highly-radioactive spent nuclear fuel and how knowledge of it can be preserved. The nuclear power industry has engaged archaeologists, linguists and artists before, in order to shed light on the question of how we can warn coming generations about the waste – what it is, where it is, and why it is dangerous.

“Before, some people thought it would be best if the buried nuclear waste was simply forgotten about”, says Anna Storm. “As far as I know, there is nobody who advocates that today. Today, most people agree that the waste is the result of a choice that our generation has made, and we must take responsibility for making future generations aware of it.”

ANNA STORM AND THOMAS KEATING have lots of questions to consider. Are words and symbols the best way of reaching out with a warning? Or is there a risk that symbols lose their meaning? Which kind of material keeps best? And how should they word things in anticipation of potential paradoxes, such as the fact that when someone comes across something unknown, they want to “lift the lid” and take a look.

“A warning can easily give rise to curiosity. However, curiosity may be an important element in keeping the message alive. Another paradox lies in communicating a genuine danger at the same time as avoiding creating panic”, says Anna Storm.

THERE ARE ALSO SEVERAL OTHER RISKS, such as the fact that the large amount of copper used to contain the waste may, in the distant future, be regarded as a valuable metal resource.

Anna Storm and Thomas Keating are considering a wide array of techniques with different kinds of messages to warn people about the danger of nuclear waste. This includes, for example, an archive with written documentation.

“The technical nature and level of detail in this documentation may vary, and it may be stored in various locations. Another strategy involves visual messaging, such as landmarks – that is, various kinds of physical formation that show that a place is special.”
Anna Storm and Thomas Keating have examined some examples from other countries. For example, France has held a competition where artists have been invited to suggest ways of marking the storage area.

“One suggestion was to genetically manipulate a forest in order to make it blue. But then, what kind of message is communicated by a blue forest? Does it provoke warning, curiosity, or something else?” asks Anna Storm.

ANOTHER IDEA FROM THE USA was to form a landscape that deters people from coming closer – for example, with large, black spikes, or symbols communicating “danger”.

“But history shows that most attempts to dissuade people from entering places have failed,” says Thomas Keating. “One example is the Egyptian pyramids.”

The pyramids were the burial chambers for the Egyptian pharaohs. The Egyptians believed that if their bodies were destroyed, the world would end. Today, the pyramids are a big tourist magnet. And their warning is barely taken seriously.

The third method which Anna Storm and Thomas Keating are working with comprises social practices – that is, traditions, rituals and different types of activity to preserve knowledge of the nuclear waste.

SKB estimates that it will be at least 70 years before it is time to seal the storage facility. However, Anna Storm and Thomas Keating are to submit their proposal for the warning message, or “key information file” as it is called, next year. The document will be around forty pages long, and will be aimed at laypeople without expertise in areas such as nuclear physics.

“The key information file will communicate the most important data, and also indicate that more extensive information can be found in archives”, says Thomas Keating.

“We want to engage people to become interested in the place and its future. They will then ask themselves questions, such as what will happen next?” says Anna Storm.

In the Aspo Hard Rock Laboratory, the researchers study how bentonite clay and copper capsules interact with the rock under realistic conditions.

At the bottom of the tunnels, visitors can taste the groundwater that flows through the mountain. Photo: Annica Hesser

In many respects, the Aspo Laboratory resembles the future spent fuel repository with tunnels, emplacement holes, copper canisters, clay and machines. But the two facilities differ on one important point - there is of course no spent nuclear fuel at the laboratory.

“But history shows that most attempts to dissuade people from entering places have failed”
From LiU to top job at Stanford:  
“It’s an exciting environment”

Gunilla Jacobson’s career has taken her from studying chemistry at Linköping University (LiU) to a top job at Stanford University. Having lived there for a few years as a child, Stanford is a place that has followed her on her life journey. “The place has a positive spirit. There, it’s cool to be good at what you do”, she says.

EARLY WEDNESDAY MORNING in California. Gunilla Jacobson starts her day at home before making the short journey to Stanford University and the Clark Center lab. This large research centre is home to a variety of different disciplines such as biology, medicine, chemistry and technology.

“There are windows from floor to ceiling. Despite it being a lab, it resembles more an office. It feels almost like working in a doll’s house. You can see what other people are up to all the time, and can take a look at what’s happening with other projects. It’s fantastic”, says Gunilla Jacobson.

APART FROM A FEW YEARS in the early 2010s, when she moved home to Sweden and worked at the Karolinska Institute, Stanford has been her workplace since 2005. She has had several different jobs throughout her years at one of the world’s most prestigious universities, right in the heart of Silicon Valley.
Today, she is the head of translational medicine, and leads several projects. Translational medicine involves taking results from experimental research and translating them into patient benefits within healthcare.

“Often when you think about academic jobs, you think of somebody being a lecturer or professor. But here there are lots of jobs just like mine. Jobs where, just like in industry, you work with leading projects. Private universities such as Stanford have more freedom to employ people outside of traditional academic roles.”

“It is an exciting environment. There is a great openness and generosity. People want to help each other”, says Gunilla Jacobson. Her days are varied: no one day is like the other. She tries to get out to the lab as often as she can. But there are lots of meetings to be had and walks to be taken between Stanford’s various hospitals.

“Every day, the goal of everything we do is to help our patients. Ideally, we don’t want people to be at hospital – we want them to be free of disease. We are trying to find new ways to cure and prevent illness with the preventive work which we call precision health.”

Name: Gunilla Jacobson
Family: Husband Cory and two children, Tobias and Aiden
Lives: Menlo Park, California
Works as: Researcher, entrepreneur and head of translational medicine at Stanford University
Education: Chemistry degree from LiU, PhD student
Would spend a free day: Skiing by Lake Tahoe in northern California, or taking a trip to the ocean. It’s usually cold – but nice anyway!
In five years’ time: We’ve said that we won’t move again before our youngest son has graduated from high school. But I want to work with new, exciting projects and continue coming home to Sweden.
One of the projects she runs is working on developing a plaster with micro needles which people in the future can use to inject themselves with 50 times lower doses of mRNA vaccines. An innovation which can reduce side effects and lead to a lesser need for vaccines. And which means that the jab doesn’t need to be delivered by a nurse.

“Our research group is looking at this together with 17 other groups around the world. We hope that the result of this collaboration can be used in healthcare in the future.”

Gunilla Jacobson’s career began in the 1980s when she left the Swedish town of Finspång and moved just a few miles southwest to study chemistry in the university town of Linköping.

“It wasn’t such a long way from home, but I remember it feeling like a big step to move to Linköping. My mother studied and worked there, and both my brother and my sister have studied at LiU. And their children are now studying there, so it feels like the whole of our family consists of LiU!”

After two years on what was then the chemistry undergraduate programme, she chose to do the last year on exchange in Boulder, Colorado. When she was back in Sweden, there was a PhD position waiting for her in Uppsala, before it was time for her next trip across the Atlantic. This time for a postdoc at the University of Texas at Austin. There, she found opportunities for collaboration with a major research centre in Los Alamos, New Mexico, which became world famous when it was founded to construct the atom bomb in the 1940s.

“It was truly thrilling to be a researcher there”, says Gunilla Jacobson, who remained there as part of a research team for several years.

A lot happened during this period of her life. Gunilla filed a patent for a method of cleaning computer microchips. A Californian start-up snapped up the patent, and her bags were packed.

“But then came a phone call – they had been bought out by a company in Arizona. So Arizona it was! It was great fun and I learned a lot. But after three years, when they were bought out again, I felt like I was ending up too far away from medicine. I wanted to test something new.” This “something new” was Stanford University. And it was in fact in Stanford that Gunilla Jacobson lived between the ages of six and nine, when her mother Birgit Jacobson was a researcher there.

“It was actually a bit like coming home. I can remember the positive feeling from my time at school here. Here, it wasn’t cool to play truant. It was cool to be good at what you did. I’ve taken the attitudes that are fostered here – that you should dare to try new things, and that it’s okay to fail – with me throughout my life.”

Despite many years in the USA, her contacts with Östergötland and Linköping University are still strong. In the beginning of 2022, she was a keynote speaker during the Swedish Innovation Days, when LiU announced a project in precision healthcare, aimed at strengthening collaboration between Sweden and California.

“It was fantastic to be invited, and I will be welcoming a delegation from LiU in June”, says Gunilla Jacobson, emphasising that the student exchange with Stanford, begun on the initiative of professor Stig Hagström, is unique.

“I don’t believe that there is any other university in the world which sends two exchange students here every year!”

Gunilla Jacobson is a proud LiU alumnus – and a proud native of Östergötland.

“I can’t wait for the summer when we can travel home again and see all the yellow fields. Every time, it’s a must to meet the whole family in Finspång and Linköping. We love to see the Göta canal, and take a coffee by the Berg locks. My children speak fluent Swedish, and are probably more Swedish than many Swedes. In their eyes, Sweden is always better.”

FACTS ABOUT STANFORD.

Stanford University, founded in 1891, is a privately funded university located approximately 60 kilometres south of San Francisco in California.

Stanford is one of the world’s most renowned universities, and came in fourth place in the latest Times Higher Education ranking of the world’s foremost higher education institutions.

Around 17,000 students study at Stanford, and the university has almost 2500 employees.
January 2022. For two years, the world has been wrestling with the COVID-19 pandemic. In Stockholm and Gothenburg, thousands gather to demonstrate against restrictions, pandemic legislation and vaccine passports. They are the largest demonstrations of their kind thus far in Sweden. Several demonstrations have already been held in other European countries.

They vary in nature from country to country, but they have several common features, according to researchers who have studied COVID and vaccine critical movements in Croatia, Serbia, Germany, Austria and Sweden. The differences between the movements lie in their political and social composition. In some countries, such as Austria and parts of Germany, it is the organised right-wing populist parties that take the lead. In Sweden, it’s somewhat different.

“Here we can see that people with different backgrounds have come together.”

Right-wing populism and alternative media, conspiracy theories, racism and mistrust of science and politics. That there is widespread mistrust of society’s institutions is news to nobody – but it has been brought to a head during the COVID-19 pandemic. The big question is “Why?” – why are people increasingly mistrustful?

“Vaccine scepticism has grown out of a culture of mistrust”
together – all the way from the left to the extreme right, and with different conspiracy theories. It’s interesting that people with different backgrounds get behind one and the same message”, says Celina Ortega Soto. She is a PhD student at Linköping University, and has studied the Swedish demonstrations, both online and through fieldwork.

The demonstrators’ message is the same across all countries. Democracy and freedom are central concepts, as are person-centred politics and a mistrust of politicians, the media and science. Furthermore, all the demonstrations involve conspiracy theories and spiritualism.

**HOWEVER, IDEAS AND MOVEMENTS LIKE THIS** are nothing new. But they have manifested themselves in new ways, and become clearer than before. The pandemic has acted as a catalyst, researchers believe.

“You could say that the COVID demonstrators have sprung from an extant culture of mistrust and rejection”, says Stefan Jonsson, professor at the Institute for research on Migration, Ethnicity and Society (REMESO).

He leads the Swedish research group in which Celina Ortega Soto and Anders Neergaard participate. They are a part of a larger international project with universities from Croatia, Serbia, Sweden, Germany and Austria. The project is financed by the Volkswagen Foundation.

In all of these countries, the researchers are focussing on what has formed these cultures, which they call “cultures of rejection”. Questions of “why?” are central: Why is there a tendency for people to be increasingly unaccepting and to reject things? Why are right-wing populism and authoritarian groups thriving? Which political and social factors contribute to this development?

**BECAUSE THE CULTURE OF REJECTION** became even clearer during the COVID-19 pandemic, the project has largely focussed on movements related to COVID and vaccine scepticism. But to understand why these cultures have emerged, the researchers have also studied people’s daily lives and living conditions.

“We want to know what it is about our way of living, our way of working, our free time, our forms of living and interacting, that makes us people more and more liable to reject what we don’t like, what is different to us”, says Stefan Jonsson.

The researchers have interviewed people who worked in the trade or logistics sectors in each of the project’s five countries. And they have seen a pattern. This is a sector which has gone through big changes in the last few years. Digitalisation and the pandemic have involved changed working and employment conditions, which in turn have led to another kind of existence for many people.

“This is not as prominent in Sweden as in other countries, but even here we can see that people lead a more hectic and anxious existence. Many have more to do, at the same time as increasing numbers of people are in temporary employment. Older people feel that things were better before”, says Celina Ortega Soto.

In general, there is a feeling of powerlessness.

“Many of those we have talked to feel that they don’t have a say in anything. That they have lost control over their lives”, says Stefan Jonsson.

The pandemic has led to people’s feelings of loss of control becoming even stronger. The restrictions and isolation have had a direct effect on people’s lives. People feel that politics is more unpredictable, because experts are researchers have gained more political power. Many feel that social media has been censured and that free speech is under threat.

**PEOPLE HAVE A TENDENCY TO TRY** and find scapegoats when they feel powerless, previous research shows. Such scapegoats are often established social institutions, but also some ideologies such as feminism, or certain groups, such as migrants.

When Celina Ortega Soto has studied Facebook groups, she witnessed – prior to the intensification of pandemic-related discussions – a resistance to the Black Lives Matter movement, the Swedish government and the EU.

In January 2022, the largest COVID-19 demonstrations thus far were held in Sweden. In several other European countries, many demonstrations of this kind had already been held. The sign says “No to vaccine passports”. Photo: Sten-Ake Stenberg

**MOVEMENTS LIKE THESE DO NOT DIE OUT**, but instead often move on to other questions. They do this exactly because there is a culture of rejection in society, according to the researchers. And cultures take a long time to create and change. The question is what happens now. How will COVID-19 and vaccine sceptical movements develop? Will we see similar patterns in connection to the war in Ukraine?

“It is actually good that people are engaged politically. That’s exactly what democracy is built on, of course. But when political engagement is based on a culture of mistrust and rejection, the consequences are negative for democracy”, says Stefan Jonsson.
New light on organic solar cells

Efficient and environmentally friendly solar cells are required for a transition to a fossil-free energy supply. Researchers at Linköping University have mapped how energy flows in organic solar cells, something that previously had been unknown. The results, which can contribute to more efficient solar cells, are published in Nature Communications.

Organic solar cells based on organic semiconductors are increasingly emerging as a sustainable option. But until just a few years ago they could not stand comparison with traditional silicon-based solar cells for efficiency. This was due to energy loss in charge separation, which was thought to be unavoidable.

In 2016, a research team at Linköping University together with colleagues in Hong Kong were able to show that it was possible to avoid the energy loss using different donor-acceptor materials that help the electron to escape from its hole more easily. Energy loss then decreased and efficiency increased. The problem was that no one knew exactly how it happened. It was possible to see that it worked, but not why.

Some of the same research team at Linköping University have now solved the mystery that had led to disagreement in this field of research. In the new study published the researchers have identified what energy levels are required to minimise energy losses.

“To find out how the energy flows, we laid nanometre-thick organic semiconducting films in several layers one on top of the other, rather like a strawberry and cream cake. After that we measured the energy required to separate the electrons from their holes in each individual layer,” says Xian’è Li, PhD student and principal author of the scientific article.

Tailwind. Many of LiU’s subjects are higher up the ranking list than last time.

LiU subjects high up in international rankings

Linköping University has been named as one of the world’s 100 best higher education institutions in the care sciences. In three other subjects, LiU comes among the 200 best universities in the world. This is according to this year’s QS World University Rankings by Subject.

In the international comparison, Linköping University has been named one of the world’s foremost universities in 17 of a total of 51 subjects. In the 2022 ranking, just over 1500 institutions from 88 different countries were compared. Since the last rankings were compiled, a quarter of subjects at LiU have risen up the list. Alongside the care sciences, materials science, engineering - electrical & electronic and educational sciences are the three other subjects that have come highest up the lists. Materials science is in the 100–150 range, and the two other subjects in the 151–200 range.

The British QS ranking is counted as one of the three largest and major global ranking lists, alongside the British Times Higher Education list and the Chinese Shanghai list. The ranking is based on the universities’ status and citations in academic journals.

Master carpenter wins major teacher award

Being engaged, caring about his students and showing what’s possible. These things are what motivates Leif Burman, master carpenter and senior lecturer at Malmstens Linköping University, second recipient of Ingemars Lärarpris, an award for excellence in teaching.

“I know how many talented teachers there are and I’m incredibly grateful, proud and humbled to win this award”, he says about the award.

The award was founded at LiU by professor emeritus Ingemar Ingemarsson, to remind us that teachers are just as important to the university as researchers. The first recipient was mathematics teacher Daniel Carlsson. The award includes a sum of at least SEK 500,000.

“I already feeling a bit light on my feet; I’m walking on my toes, not on my heels. This will strengthen my self-confidence, and I can at least imagine that what I’m doing is a good way to teach things”, says Leif Burman when asked to comment on the award.

Leif Burman will receive Ingemars Lärarpris at the Academic Ceremony at Linköping University in November, 2022.
When Swedes were asked which public authority they would most like to work for, Linköping University (LiU) turned out to be the most popular answer. LiU also ranks tenth on a list of all of Sweden’s most attractive employers. This has been shown by the annual survey Randstad Employer Brand Research.

LiU on top of the list

The survey, which is carried out by the recruitment company Randstad, is the world’s largest independent employer branding survey. In this year’s survey, over 4600 Swedes have said what they think about Sweden’s 150 largest companies and public authorities.

Among the public authorities, LiU tops the list of where people most want to work. LiU also comes tenth in the total top list of Sweden’s most attractive employers.

LiU’s deputy vice-chancellor Karin Axelsson had this to say about the news: “I am proud and pleased of LiU’s great performance in the employer survey. I see this as a sign that our outreach and visibility work is achieving good result.”

“We want to be an open and inclusive university that both contributes to society and brings society into our work. Our research and our programmes have long had a good reputation, and it’s fantastic that we’re now also ranked as a very good employer.”

Celebration of 25th anniversary with jubilee concert and women’s choir festival

In 2022, the student women’s choir Linnea turns 25. This jubilee is to be celebrated throughout the year with the theme “the female voice”. The high point of the celebrations was the big jubilee concert and women’s choir festival in May.

Linnea was founded in 1997 and consists today of around 50 choristers with a wide repertoire of music, mainly for quartets. Merete Ellegaard has been the choir director since 2009.

Among the choir’s traditions are the Saint Lucy processions in December, and the charity concert “Ett knippe kvinnekamp”, which takes place on 8 March and raises money for women’s refuges.

The choir holds its own concerts every academic year, and sometimes performs during the Academic Ceremony and during new students’ first weeks in the autumn, together with their brother choir, the Linköping University Male Voice Choir.

This year’s jubilee concert took place at Ryttsargårdskyrkan in Linköping in May. It was a celebration of that which makes the choir the wonderful instrument that it is – the choristers and their voices. The concert was inspired by the choristers’ own stories, and was a tribute to prominent women and their musical works.

During Ascension weekend, Linköping was the host city for a large women’s choir festival, inviting women’s choirs from all over Sweden and Denmark. The festival rounded off with a marathon concert in which all the participating choirs sung parts. An evening of inspiration and tribute to women’s voices in choirs.

Education minister: Studenthuset is “magnificent”

Anna Ekström, minister of education, is impressed by the large building Studenthuset on Campus Valla. When she visited Linköping University in April she said that the building was “magnificent” and that “the drawings were cool, but seeing it in real life was much cooler.”

Anna Ekström was chair of the board of Linköping University from 2013 to September 2016. During that period, the decision was taken on the 16,000 square metre building, which was completed in 2019.

During the visit at Campus Valla she got the chance to see Studenthuset for the first time. “The building is beautiful; it looks much larger at a distance than what I thought it would. But when I walked around the interior, it seemed smaller. It has a cozy feel; I understand that the students like it”, she said.

Anna Ekström started her afternoon at Campus Valla with a visit to the Division of Education and Adult Learning at the Department of Behavioural Sciences and Learning (IBL). The minister of education concluded her visit to LiU by speaking with university management about topics including...
Aisha Rahman and Tilde Krusberg got to know each other at upper secondary school, when they both studied specialised in environmental studies. Their shared interest, and curiosity for interdisciplinary studies, led them to both apply to study environmental science at Linköping University’s (LiU) Norrköping campus.

“I was attracted by the interdisciplinary nature of the programme, where there is an explicit wish to combine perspectives from the natural sciences and the social sciences”, says Tilde Krusberg.

“It was above all the ecological and social perspectives that attracted me. Natural disasters have real effects on real people’s lives”, says Aisha Rahman.

This is something they experienced first hand during a two-month trip to Bangladesh in the spring of 2022, where they performed field studies with the support of the Minor Field Studies (MFS) scholarship. The scholarship was financed by Sida (the Swedish International Development Cooperation Agency), and can be applied for by students who are interested in global development questions and who want to collect material for their thesis in a low or middle-income country. The scholarship is available for field studies in any subject, and for both undergraduate and postgraduate studies.

Aisha and Tilde found out about the opportunity to apply for the MFS scholarship early on in their studies. They chose Bangladesh because Aisha had been there before.

“My parents come from Bangladesh, so I have family here. We stayed with my aunt in Dhaka.”

While there, they studied how mangrove forests work as protection against the effects of climate change on an island off the southern central coast.

“The island Char Kukri Mukri has a planted mangrove forest, where 90 percent of the trees are of the same species. Because the forest is basically a monoculture, it is now being destroyed, and the protection it provides may disappear. We investigated the possibility of restoring the mangrove forests by planting more species”, says Aisha.

Mangroves have a lot of important functions, such as providing protection from storms, cyclones, saltwater intrusion and flood waves, at the same time as filtering water and capturing carbon. Mangrove forests absorb four times as much carbon dioxide as rainforests. They are also an important living environment for several species, and provide food and sustenance for local communities. Therefore, developing a sustainable and long-term ecosystem for mangroves is very important.

During their field studies, Aisha and Tilde took advantage of the environmental science programme’s interdisciplinary nature.

“We aimed to understand both the ecological and social dimensions”, says Aisha. “For the former, we collected soil and water samples; for the latter, we performed interviews with the local population, and with experts from local public agencies, NGOs, the UNDP and climate researchers. This helped us discover the barriers to and opportunities in planting mangroves.”

Field studies led to deep dive in MANGROVE FOREST

With the Indian Ocean on one side, and mangrove forest on the other, they travelled by motorboat along the Bay of Bengal. A trip that’s resulted in several soil and water samples, rich interview material, and, not least of all, a deep dive on the topic of how valuable the forest is, and how it both protects against and is threatened by climate change.
THE INTERVIEWS WITH THE LOCAL POPULATION were facilitated by Aisha’s being able to speak Bengali. “My language skills have been put to the test, but they have been a big help from the very moment that we touched down in Bangladesh.” “They were invaluable. Without them, we wouldn’t have got so much out of the interviews. I don’t speak any Bengali, and the people we spoke with often didn’t understand English. But when I explained that we were researching ‘climate change’, everybody understood. It’s a lived reality, something in common that we could discuss”, says Tilde.

“The material that they gathered formed the basis of their bachelor’s thesis, which they finished writing while in Bangladesh. When they were in need of a break, they went up to the roof. “In Dhaka, it’s common to hang out your washing and interact with others on your roof. There are lots of buildings and people there”, says Aisha.

They also went out on the occasional walk, to discover more of the megacity and go shopping. Initially, they were always accompanied by one of Aisha’s relatives. But when they got more familiar with the city, they went on walks or took rickshaws unaccompanied. “We’re so used to being independent from having lived in Sweden. We’re not used to thinking of risks. People gave us a lot of warnings here, and that was a challenge. Because at the same time, we needed to test our own boundaries”, says Aisha.

“You could see the very richest and poorest on the streets. We’ve really deepened our understanding of and insight into people’s different living conditions”, says Aisha.

They are both planning to study at master’s level after graduating from the programme in environmental science. Anything could happen after that. “We’ve just been in Bangladesh. Anything is possible now”, says Tilde.

1. Aisha and Tilde on the boat just outside of Char Kukri Mukri, taking samples.
2. Here are Tilde and Aisha in front of a map of Bangladesh at the Bangladesh office of the UNDP.
3. View from the roof.
4. Walking around Char Kukri Mukri.
5. Masses of green space and teeming street life everywhere.
Expanded perspectives with co-workers from 16 COUNTRIES

The Division for Environmental Technology and Management employs 50 people – from 16 different countries. It’s a diverse blend that ensures a broad range of perspectives in research contexts – and fascinating discussions in the lunchroom.

THE DIVISION FOR Environmental Technology and Management, which belongs to the Department of Management and Engineering, was established 40 years ago. It is a fast-growing, internationally renowned research unit.

TODAY SOME 50 PEOPLE work at the department, from various scientific backgrounds, cultures and countries. A total of 16 nationalities are represented, which the department head Olof Hjelm considers a huge asset.

Marianna Kambanou, assistant professor with a background in the UK and Greece, agrees.

“Sometimes you have to be a little bit more understanding, a little more laid back, with so many co-workers from different backgrounds and cultures. But there’s also a lot more understanding than if there was only one person from another country.”

She came to LiU as a doctoral student seven years ago – and stayed on.

“My interest is sustainability and environmental challenges, a field that’s at the forefront here, which attracted me. It’s exciting that we have so many people from different countries; we see things from different perspectives and can apply our research results in different contexts.”

EMAN HEGAZY FROM EGYPT, and Abhijna Neramballi from India, are both doctoral students with a strong interest in sustainability. From day one, they have been supported in their research.

“There is always a co-worker nearby who you can ask, which makes for a good working climate. It’s really interesting being here; having co-workers from so many different cultures is teaching me a lot. It’s huge advantage, I think”, says Eman Hegazy.

Abhijna Neramballi decided at an early stage that when he was finished with his bachelor’s degree in India, he would head for Sweden. And after completing a master’s at Jönköping University, he ended up in Linköping.

“In conversation, Swedes are quite straightforward and open, which makes for a relaxed work environment. In many other countries, workplaces tend to be hierarchical; here the relationships between co-workers are more horizontal. It doesn’t seem as if my supervisor and my older co-workers are my bosses.

FACTS

The Division for Environmental Technology and Management is a research unit that has existed for 40 years. Its aim is to achieve a more resource efficient society where new environmental solutions become reality, by way of research, education and collaboration with society.

The division is divided into four units: Sustainable Development and Strategies, Industrial and Urban Symbiosis, Products Services and Innovation, and Sustainable Materials Management.

At the division there are co-workers from 16 countries: Brazil, China, Ecuador, Egypt, Germany, Ghana, Greece, India, Indonesia, Iran, Japan, Lithuania, the Philippines, Sweden, Turkey and the United Kingdom.
“There is always a co-worker nearby who you can ask, which makes for a good working climate.”

We have a very good and professional relationship where I quickly felt at ease”, says Abhijnā Neramballi.

When we arrive for our visit in the A Building on Campus Valla, there is a buzz around the table in the lunchroom. For Yang Li, associate professor from China, having co-workers from 15 other countries is not a big deal:

“At my previous job, at the University of Vaasa in Finland, there were people from 20 countries.” Yang Li’s move to Linköping meant a shift from IT and computer sciences to research in smart sustainable production.

When the people from the division are physically present at work, fika breaks are an important opportunity to talk about everything from work to hobbies and the global situation – something Yang Li wasn’t really used to.

“In Finland, at coffee breaks everyone sat by themselves, reading a newspaper. Here it’s completely different. It’s really nice when we meet outside the office, and when so many people are from almost the whole world, we have more to talk about. People have different perspectives. Things have different meanings in different cultures, and even the same joke can be interpreted differently, depending on where you come from”, he says.

“Sometimes it takes longer to do things, of course. And integrating new people and getting the communication to work might take a little extra time”, says Marianna Kambanou.

She laughs and thinks of one more thing:

“When Swedes give negative criticism, they often package a lot of different things together. If you don’t mentally peel away all the layers, it can be difficult to understand where the criticism actually is.”
Unique lab for knowledge-hungry young people

WADSTRÖMS EXPLORANATION LABORATORY in Norrköping, Sweden, is a new laboratory for young people who want straight facts, far from all the sensationalism and the noisy, opinionated comment fields in social media. The lab opened in April on the top floor of the Visualization Center C, and is part of Linköping University. LiU researchers in fields such as climate, environment and sociology joined forces with visualisation researchers, to create completely new opportunities to understand and explore the world around us.

The word Exploranation is a merger of explore and explanation, and this is what makes Wadströms Exploranation Laboratory unique. On active screens, a globe and a number of visualisation tables, visitors have access to enormous data volumes in areas related to sustainability, for instance climate, biodiversity, marine environments and not least, how we live, eat and exist. The funding for the lab comes from the Stig Wadström Foundation.

TEXT MONICA WESTMAN SVENSELIUS PHOTO THOR BALKHED
Unique lab for knowledge-hungry young people
Loneliness and social isolation among older people have been studied and discussed extensively. The starting point is often that many older people are lonely, that loneliness is harmful, and that a social lifestyle is necessary for good health and well-being.

But it is not that simple, research shows. “Social relationships are significant, and one of the strongest factors in terms of how long we live and how satisfied we are with our lives. But as our research clearly shows, this does not mean that solitude is always bad. Not everyone who lives a solitary life is unhappy”, says George Pavlidis, postdoctoral student in ageing and social change.

George Pavlidis and Andreas Motel-Klingebiel are part of the international Genpath project, which focuses on older people’s exclusion from social relations, and how it affects mental health and well-being.

George Pavlidis is part of a research group that has studied exclusion from social relationships in older age and its connection with mental health and well-being. The data comes from the 2011 and 2015 waves of the Survey of Health, Ageing and Retirement in Europe, where...
over 70,000 older people answered questions about their lives.

Some results of the study are in line with previous research: that being unhappily alone or unhappy with established social relationships are associated with poor quality of life and depressive symptoms.

**BUT WHAT IS INTERESTING** is that while a very small minority, four per cent, of older people are alone, four per cent, more than half are satisfied with their solitude. The quality of life among the “happy loners” is high – on a par with the people who have a social network and are satisfied with their relationships. In addition, both the “happy loners” and those who are happy with their social network have the least depressive symptoms, although “happy loners” report increased levels of loneliness.

“The message in research, in the media and from politicians has been that loneliness always has negative consequences. But this may be misleading”, says Andreas Motel-Klingebiel, professor of ageing and social change.

**THE RESEARCHERS SAY THAT WE NEED TO** re-think what older people’s exclusion from social relationships means. There are different types of exclusion, and they can have different consequences.

“Having no social network at all is a type of exclusion, and it’s not necessarily bad if you’re happy that way, except for the fact that you feel lonely sometimes. Having social relationships but not being happy with them is another type of exclusion, and that is associated with a poorer quality of life”, says George Pavlidis.

The types of exclusion, and their effect on health, differ between men and women. It seems that a functional social network or being satisfied with a solitary life is particularly important for women’s mental health.

“One explanation for this is that there have been different expectations for social relationships among men and women, as older generations have had different gender roles in society, and consequently different types of social networks”, says Andreas Motel-Klingebiel.

Gender and life patterns are at the core of the major project that the research group from Linköping University is part of. In the project, titled Genpath – A life course perspective on the gendered pathways of exclusion from social relations in later life, researchers from several European universities are studying different aspects of exclusion.

**GEORGE PAVLIDIS** says that this knowledge is important in several ways. In particular, it gives insight on how to support older people in the right way.

“We often believe that society must create social contacts for everyone who is alone – but is this really the right way to go now when we know that solitude and loneliness are not always harmful? The question is how social services can support older people who are challenged by different types of exclusion.”

He sees a need for more knowledge about what it is that makes some people unhappy with their social relationships or with their solitary states. There is also a need for a less stigmatising perspective on these issues.

“If we are to understand how health, well-being and quality of life are affected by social isolation and loneliness in older age, we should avoid homogenising these conditions. Yes, social isolation and loneliness can be bad for older people, as it can be for any age group. John Donne famously said; “No man is an island”, but we argue here that some people are fine with living alone on their island.”
Does the idea of harvesting ripe tomatoes give you a warm, fuzzy feeling? Do you want to grow different colour carrots, promote biodiversity, or exchange tips with other urban cultivators? If so, you’re in good company.

The increased interest in growing food in urban environments may reflect an increased interest in what we consume. It doesn’t get more local than when you’ve grown something from seed yourself. Today, many cities allocate parts of public land for urban agriculture. And allotments have existed in Sweden since the end of the 1800s. In recent years, interest in allotments has skyrocketed.

“Urban agriculture can be a way to relax, and it can provide us with food. But that doesn’t necessarily mean everything happening in a garden is positive. We currently know very little about how nutrients move in these urban agricultural environments”, says Geneviève Metson, associate professor at Linköping University, who leads a research project on urban agriculture.

Plants need nutrients such as phosphorus and nitrogen to grow and provide food. But if these substances end up in our waterways, they act as fertilisers for algae and cyanobacteria. The over-fertilisation of the Baltic Sea is an example of this. There, areas of the sea with little to no oxygen in the water, called dead zones, and algal bloom during the summer, have been caused by nutrient inputs from human activity on land including farming and wastewater. Given urban agriculture is a form of farming, there is a risk it contributes to excess nutrients ending up in the wrong place and worsening water quality. But to get to the root of the problem, researchers need to take a closer look.

“I think that the fact that we work closely together with urban cultivators is what makes our project interesting and unique. We visited shared cultivation spaces, allotments, and some commercial urban agriculture places in Linköping, and asked if people wanted to be a part of the study. They don’t need to change anything. We leave them to their own devices. We just want to take some measurements, ask a few questions, and then share our results with them”, says Geneviève Metson.

This approach can give a more realistic picture of what people actually do, which is an important contrast to when researchers do controlled experiments. The cultivators who participate have different methods for taking care of their crops. They are interviewed about their techniques, how much and which nutrients they use, how much they harvest, and their motivation for gardening and the benefits they get from it. The research team has also installed bottles underneath garden plots to collect water from the soil. The team retrieves the water from the bottles every week, and measures the phosphorus and nitrogen levels. They also take soil
sample once a year in order to measure nutrient levels.

“It isn’t just about how much we fertilise. Lots of different factors affect these nutrients. For example, which vegetables and crops you grow, how you water them, if you cover the soil during the winter and so on.”

Geneviève Metson has previously worked on Canadian and American studies which have shown that urban cultivators often fertilise with more nutrients than the plants they grow can use.

“On the one hand, urban cultivators often use such fertilisers as compost, manure and diluted human urine. We need to recycle nutrients, so it’s good that they use these sources. But if we add too many nutrients, then there’s a risk that they end up in our waterways. So we suspect that there might be a problem there. But we need to take measurements to know for sure.”

**THIS YEAR IS THE THIRD AND LAST YEAR** that the researchers are taking measurements. When the analyses are done, Geneviève Metson hopes that the results will bring them an improved understanding of what actually happens with nutrients in these parts of a city’s green infrastructure. Her and her team also want to get a picture of why people grow food in different ways, and how the environment is affected.

“Urban agriculture lies at the intersection of cities, sustainability and handling of nutrients. I really look forward to seeing how urban agriculture can be a catalyst for more sustainable food production and water stewardship.”

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**3 TIPS TO START GROWING FOOD**

1. **Avoid using too much fertiliser.** The soils which the researchers have tested during this project already have high amounts of nitrogen and phosphorus, which can support a good harvest. Why not try to use slightly less compost or other fertilisers, and see if you get a good yield anyway?

2. **If you can, do a soil test and check the nutrients in your soil, to know what is needed.** Then you can use recommended fertiliser amounts based on what plants and soil you have in your garden.

3. **Keep in mind that nutrients can still find their way out of your garden during the winter.** See if you can cover the soil and reduce the loss of nutrients. This is a way to save them for next year’s crops, at the same time as protecting the quality of nearby water.
Human vision

Achieving diversity in human vision is one of the major challenges for AI research. In the vast majority of cases, we are better than machines at understanding the world around us. But machines are catching up – slowly but surely.

Michael Felsberg is professor at Linköping University and one of Sweden’s foremost researchers in computer vision and artificial intelligence (AI).

“Within a single day we humans can go from driving a car to free diving, and continue to reading the newspaper and navigating a dense forest – all without a great deal of effort. For a robot, doing the same things would currently be impossible”, he says.

That we humans can do all this, and much more, is largely due to vision. Estimates say that some 80 percent of our impressions reach us by way of our vision. It is the single most important sense for perceiving what happens around us. Michael Felsberg’s research focusses mainly on what is called the artificial visual system, where the aim is to get computers to see as well as humans do.

“Biological systems simply work. Humans are remarkably skilled in general perception and analysis, skills we want to emulate in computers. Today we can build technical systems that are good at doing a particular task, such as self-driving vehicles. But if in the future we want to be able to collaborate with robots, they must be able to see and understand exactly what we see”, says Michael Felsberg.

Imitating human vision might seem easy at first glance. When AI research began, the feeling was that computer vision would be
solved with a simple camera – maybe a project for the summer break. Now, almost 60 years later, general computer vision has developed into one of the most salient challenges in AI research.

MICHAEL FELSBERG AND HIS CO-WORKERS test many of the solutions they develop in the Visionen laboratory on Campus Valla in Linköping. For instance, between the huge glass walls, autonomous drones and small self-driving cars equipped with advanced sensors and cameras are test-driven. But the actual brain in the computer vision is behind the lens.

“The camera is just a light sensor; it can’t do anything else. The actual work is done by the code and the software behind the camera. It’s the same with people: the eye registers the light and the brain does the work”, says Michael Felsberg.

There have been many attempts to emulate the human brain – with varying results. Today, a method of machine learning called deep learning is usually used. Put simply, it means that the computer learns its models organised in neural networks from large amounts of data. The algorithms are fed with huge amounts of data, which are analysed on several levels. This might sound complicated, and it is. The truth is that no one can say exactly what happens in every activation in a deep network.

Michael Felsberg draws parallels to the human brain:

“On a brain scan you can see which parts of the brain are active during different stimuli. But we still don’t know what actually happens and how a thought is formed in the brain. Deep learning works in a somewhat similar way. We see that it works, but not how it works in detail”, he says.

BUT WHY IS IT SO DIFFICULT for a computer to see what we see? The answer lies in our ability to rapidly adapt to different situations, and the feedback loop between our perception of our surroundings and our constantly active cognitive ability.

Looking out through a dirty window pane is an everyday example of a situation where computers struggle but we humans manage swimmingly. We see immediately what’s going on outside the window, despite our slightly obstructed vision. On the other hand, a computer will first auto-focus on the dirt on the pane. But once it has found the right focus – on the scene outside – it still won’t fully understand what is happening, because some of the view is blocked by the dirt.

Still, there are areas where computers already see better than humans – in particular when it comes to exact calculations and assessments of distances, temperatures and patterns. In these cases, computer vision can complement our own vision, rather than draw its own conclusions and act on them.

“A technical system works well as long as everything is as expected. But faced with something unexpected, it will have problems. We must work to make the systems more robust”, says Michael Felsberg.

BUT DEVELOPING SOFTWARE that can surpass the flexibility of human vision takes time. And according to Michael Felsberg, research must take time if it is to be robust. Science is a process, and every new research article adds another little piece to a massive puzzle. Breakthroughs that give research a huge leap forward are very rare.

“General situational awareness in a computer could possibly exist in our lifetime. But creating the link between cognition and general situational awareness in a computer is probably very far off in the future”, says Michael Felsberg.

Once general computer vision exists, he believes there will be many different applications, e.g. social robots, safer autonomous vehicles and more efficient production. But AI is not uncontroversial. Many fields of use risk encroaching on individual privacy when large volumes of personal data are processed.

For this reason, Michael Felsberg and his research team are focussing on how AI can give better insight into how we can prevent additional climate change:

“Climate change is one of humanity’s greatest threats. Using advanced computer vision, we will be able to rapidly analyse large tracts of land, and their importance for the climate. What would take humans several years to map out manually could potentially be finished in a few weeks with the help of AI.”

Autonomous vehicles and drones are some current areas of application for the research conducted by Michael Felsberg and his group.
LiU researchers spread international biogas expertise

TEXT JOHN MARTHINSON

A wide-ranging report from IEA Bioenergy has highlighted different perspectives on how biogas can be used in the transport sector. “The research shows that well-designed biogas solutions are technically, economically and sustainably competitive”, says Jonas Ammenberg, associate professor at the Division of Environmental Technology and Management (MILJÖ).
At the International Energy Agency (IEA), there are several working groups, of which IEA Bioenergy Task 37, which consists of representatives from different countries, focusses on biogas solutions. In connection with his role as research leader at the Biogas Research Center, Jonas Ammenberg has been appointed by the Swedish Energy Agency as Sweden’s representative.

Task 37’s main job is to increase knowledge about biogas solutions. They do this mainly through technical reports, summary brochures, webinars and conference presentations around the world.

“Working with Task 37 is very rewarding. I get to learn about how things are developing in other countries, and get to make new contacts. Many people are interested in developments in Sweden. Internationally speaking, it’s somewhat unusual to use biogas – or, put more accurately, biomethane – in the transport sector”, says Jonas Ammenberg.

“But we have come a long way with it in Sweden. So it’s natural that we’ve been given a leading role. We have fuel production, vehicle production, relatively expansive infrastructure, as well as several decades' experience of using biomethane in various transport applications.”

By “we”, Jonas means the researchers at the Biogas Research Center, the national expertise centre for which LiU is the host. After a decade of research into biogas solutions, with a relatively strong focus on the transport sector, a great bank of knowledge has been built up. So Task 37 was not lacking in published research. Instead, the challenge was to summarise it all into content that the public could understand, without leaving out essential elements. The result was a wide-ranging, 90-page report.

“We at the BRC have long said that we want to summarise what we have learnt. To be able to understand and evaluate biogas solutions, we need a broad, system-wide perspective and interdisciplinary approach. The report builds on many years of work by many people, both at the BRC and from other organisations in Sweden and around the world.”

“A lot of the communication and decisions around energy system systems and transportation in other context are based on far too narrow perspectives of the different systems involved. We hope that the report will lead to wider understanding of biogas solutions, as well as the alternatives or complements that exist. Biogas solutions are multifunctional. They don’t just bring us environmentally friendly fuel – they can also improve agriculture and society’s food handling, waste handling, energy security etc.”

The report emphasises that meeting sustainability challenges involves solving more than one bit of the puzzle. We need a whole pallet of solutions, taking account of the fact that biomethane is a technically mature and competitive alternative in the transport sector and energy systems.

“Unfortunately, we see a lot of examples of tunnel vision, and a too narrow focus on individual technologies or parts of products' lifecycles (e.g. exhaust emissions). We face lots of different kinds of sustainability challenges for which, for example, electrification may be a good partial solution. But, it’s just that – a part of the solution.”

“We don’t have time to wait for a better solution to eventually come along. We ought to focus on expanding smart biogas solutions, which are likely to play an important role in a future economy that is more bio-based and circular.”

The report ends with a summarised message to decision makers. It says that the fact that biogas solutions often involve several sectors and are multifunctional can be beneficial for society. But biogas solutions also require expertise, as well as tools and policy instruments that are well adapted. There’s a lot left to do. For example, it’s often hard for those who work with biogas to receive remuneration for the value that it brings to society.
Honorary doctors boost LiU’s research

Seven international researchers who have each contributed to research at Linköping University have become honorary doctors. The ceremony where they were promoted took place on 21 May, during the spring’s Academic Ceremony.

The selected researchers were awarded honorary doctorates in the spring of 2020, but, due to the coronavirus pandemic, it is only now that they have been able to come to Sweden for the promotion.

Two of the honorary doctors – Professor Brian Byrne and Professor Richard Olson – have worked with Professor Stefan Samuelsson from LiU, leading a major international twin study for 20 years. Professor Karen O’Brien has been awarded an honorary doctorate for being a pioneer in cross-disciplinary research into the societal effects of climate change.

Professor Jeannette M. Wing has been awarded an honorary doctorate, with special focus on her work in computational thinking, formal methods and artificial intelligence. Professor George Malliaras, also an honorary doctor, is a pioneer within organic electronics.

Professor Cynthia H. McCollough has been awarded an honorary doctorate for her initiatives in the borderland between medicine and technology.

Professor Derek McKay, a well-established researcher within the physiology and pathophysiology of the gastro-intestinal tract, in particular during inflammatory disease, has also been awarded an honorary doctorate.

Things are heating up for superconductors

Researchers at LiU have, by way of a number of theoretical calculations, shown that magnesium diboride becomes superconductive at a higher temperature when it is stretched. The discovery is a big step toward finding superconductive materials that are useful in real-world situations.

“Magnesium diboride or MgB2 is an interesting material. It’s a hard material that is used for instance in aircraft production and normally it becomes superconductive at a relatively high temperature, 39 K, or -234 °C”, says Erik Johansson, who recently completed his doctorate at the Division of Theoretical Physics.

Erik Johansson is also principal author of an article published in the Journal of Applied Physics that have attracted broad attention. The results have been identified by the editor as particularly important for the future.

“Magnesium diboride has an uncomplicated structure which means that the calculations on the supercomputers here at the National Supercomputer Centre in Linköping can focus on complex phenomena like superconductivity”, he says.

Access to renewable energy is fundamental for a sustainable world, but even renewable energy disappears in the form of losses during transmission in the electrical networks. For this reason, scientists worldwide are trying to find materials that are superconductive, that is, that conduct electricity with no losses at all.

From fossil to fact

KNOWLEDGE IS NOT ONLY CREATED BY researchers at universities or in labs, but in collaboration with many different actors, over time. Science and the communication of science cannot be separated. This has been very clear in the discovery of the so-called Denisova human.

In his doctoral thesis Mattis Karlsson, now doctor of culture and society, studies the discovery of the Denisova human in Siberia 2008. He analyses the network around the discovery, and the actors and places that have collaborated to create knowledge about the previously unknown type of human.

He does this by analysing texts about the Denisova human published on various platforms between 2010 and 2021, such as scientific articles, journalistic texts or Wikipedia texts.

The first scientific article was published in 2010 in the highly regarded journal Nature when the story becomes public. From this point, things moved quickly. Within a few hours a Wikipedia page was created and news sites spread the information around the world.

“Historically, science has been considered and studied as a distinct part of society – separate from other social and cultural spheres. But science exists and is made in many places, because the communication of science is also the creation of science,” says Mattis Karlsson.

Fossil found in the Denisova cave.
Network for “textile muscles” receives EU grant

A doctoral network has been granted almost SEK 29 million from the EU-funded programme Horizon Europe. Using an interdisciplinary approach, the PhD students are learning how to develop materials that can work as “textile muscles”.

“This is going to be a really exciting project, one in which we’ll develop lots of new materials and technologies focussed on ‘wearables’. The fact that the project also has an interdisciplinary dimension makes the project interesting both as a whole and as a part of the PhD students’ education”, says Edwin Jager from the Department of Physics, Chemistry and Biology (IFM), who is the coordinator for the project.

Linköping University is the host for the network, which consists of a total of twelve PhD students at ten partner universities across the whole of Europe. Two of these will be employed in Edwin Jager’s research group, and will work with both textile muscles and new manufacturing methods. Five universities from France, Japan and Australia are also participating as partners, as are seven European companies.

Horizon Europe is a research and innovation programme funded by the European Union. There is also additional funding from Switzerland, which is not part of the Horizon Europe programme.

Big donation boost for timely history research

Understanding our own history is of vital importance when Europe is once again at war. The subject of history at Linköping University (LiU) is now to receive a substantial boost through two new professorships in modern and local history respectively.

A newly started foundation for research and culture in Linköping municipality has received a seed capital of 100 million to support research within the humanities, social sciences and medicine. The foundation’s board decided, based on a direct request from the founder, on a first step of financing two professorships in modern and local history respectively.

“This is a fantastic opportunity for LiU – one which strengthens and vitalises the whole subject of history here. This donation gives us the opportunity to recruit leading experts who can help us develop lively and timely history research”, says Josefina Syssner, head of department at the Department of Culture and Society.

The donation has come from business leader Michael Cocozza and his wife Catharina Högbom.

“To understand what is happening in the world right now, we need to understand how society has changed over time, and what these changes depend on. The view we have of history is important. For example, the twisted view of history that Vladimir Putin has is affecting us all right now”, says Michael Cocozza.

How to make smart technology even smarter

The Swedish Foundation for Strategic Research (Stiftelsen för strategisk forskning, SSF) has given SEK 30 million in a grant to a research project at Linköping University. The research is to come up with new methods for developing software for “smart” technology used, for example, in the vehicle industry.

Christoph Kessler, professor of computer science, is the one behind the grant application. Since 2015, he has been head of division for Software and Systems (SAS).

“I’m naturally thrilled. The competition for these grants is intense, and it means a lot for me and for my group here at IDA to have got one”, he says.

The project comes in the trail of the accelerating digital transformation of Swedish industry and society. It is about coming up with methods for developing, organising and adapting the complex software that governs “smart” technology. The software is intended to realise computation that is energy-effective and data-intensive, at the same time as meeting the requirements often placed on security and real-time technological solutions.

The researchers also aim to demonstrate the potential of the technology in four areas of strategic importance for Swedish industry and software-intensive products: computer networks and their uses, smart electricity grids, smart aviation and smart cars.
The cruelties against civilians are difficult to understand, and actually impede Russia’s chances of winning the war. “I can’t explain it in any other way than that people do horrible things in war”, says Johanna Dahlin.

**OHHANNA DAHLIN** – Russia scholar and assistant professor at LiU – reacted just like most other people when Russia began its war of aggression against Ukraine on 24 February: with shock. Yes, there was a longstanding conflict between the countries. Yes, Russia felt threatened and cornered by NATO. And yes, since 2014 a low-intensity war had been ongoing in the eastern region of Donbas. But full-scale war? No, that was completely unexpected. “I never thought it would happen. I was shocked, and so were most Russians. There was sabre-rattling at the border, but no indications that there would be full-scale war”, she says.

Many have described the war as “Putin’s war”, but Johanna Dahlin feels this description is too simplistic. Rather, it is “the Russian leadership’s war”, with wide support from the Russian population. Putin has long been popular with Russians, because after the fall of communism and the chaotic 1990s, he has brought two things: stability and welfare.

If the initial reaction to the outbreak of war was surprise, public opinion in Russia has since grown polarised. In late April, when this article was written, surveys showed that two-thirds of the Russian people support the war. “Of course, one must take care with those surveys. They are conducted by state-run opinion-polling institutes, and many respondents say what they are expected to say. But in any case, there is certainly public support”, says Johanna Dahlin.

People looking for historical explanations for the war can begin in the ninth century, when the first Russian kingdom – the precursor to modern-day Russia, Belarus and Ukraine – was founded by Scandinavian vikings in Kyiv. This kingdom is the reason why many Russians view both Ukraine and Belarus as part of their own country, or at least as closely linked sister countries.

In modern times, Ukraine was liberated from the Soviet Union in 1991, and was
accepted as in independent state as long
as it did more or less what Russia wanted.
The Orange Revolution in 2004 and the
Maidan Revolution in 2014 (named after
Independence Square in Kyiv) changed
this. Ukraine shifted focus to the West,
and began to talk openly about both EU
and NATO membership.

**THE RUSSIA-FRIENDLY PRESIDENT** Yanukovych
won the election in 2010, but was
removed in the revolution four years later.
Russia responded by annexing Crimea
and, until the current war, more or less
openly supported rebels in the eastern
provinces of Luhansk and Donetsk.

“Ukraine is extremely important to
Russia and has special significance,
together with Belarus. For this reason,
I don’t think Russia would continue and
attack Poland, for instance, if they won
the war. Ukraine is special”, says
Johanna Dahlin.

Apart from the historical ties, the war
is also about Russia’s sphere of interest.
That is, Russia believes it has the right to
push its neighbouring countries in a
Russia-friendly direction.

“The Russian leadership thinks in the
same way as it did during the Cold War,
and is worried by NATO’s expansion,
especially if Ukraine were to become
a member. They feel cornered by the
West, while retaining their superpower
dreams from the Soviet era. A large part
of the population also thinks this way.”

**HOW WILL THE WAR END?**

Russia has said that the aim is that
Ukraine will be neutral, that Crimea is
incorporated into Russia and that the
republics of Donetsk and Luhansk are
recognised. Right now it is very difficult
to see that Ukraine would agree to this. It
feels like the war could continue for a
very long time.”

**WHAT MAY INCREASE OPPOSITION** inside Russia,
and in the long term help bring peace,
are protests from the families of dead
Russian soldiers. Ukraine claims to have
killed more than 20,000 Russian
soldiers, and even if this figure is exag-
gerated, the war has doubtlessly been
very costly in terms of human life. It is
sometimes said that Putin listens to
soldiers’ mothers, and after the war in
Afghanistan there was extensive criti-
cism from relatives of fallen soldiers.
These protests led to change, especially
thanks to glasnost.

“On the other hand, there have been
other wars where this didn’t happen,
such as the Second World War and the
war in Chechnya. The decisive factor will
be if a movement is formed and the fami-
lies mourn not only as individuals”, says
Johanna Dahlin, who in her own research
has studied how dead Russian soldiers
from the Second World War are viewed.

Of course, the ongoing war has hit
Ukraine the worst, but Russia is also
affected. The country is isolated from
the rest of the world, censorship is being
tightened and domestic oppression
is increasing.

“I’m also very worried about Russia.
The war will affect our view of the coun-
try for a long time”, says Johanna Dahlin.
Moa Jederström prepares for training young people in figure skating. In her PhD studies, violence and abuse in youth sports is her focus, and her goal is a research-based prevention programme.
Figure skating has been a safe place for PhD student Moa Jederström ever since she was six years old. She now does research on physical and psychological abuse in Swedish youth sports.

We need more knowledge about this. And I want to contribute to that. There is a lot of research about football, athletics injuries and young people in sport. But there are blind spots. For example, it took a long time before people realised that lots of female football players get knee injuries. Today, there is a research-based intervention programme for preventing such injuries. But there isn’t anything of the same scale for preventing violence against young athletes”， says Moa Jederström.

She emphasises that sport is a positive thing for children – it gives them long-term health benefits.

“Exercising or doing a sport is, in short, good. It reduces the risk of a range of different illnesses such as depression, cancer, diabetes and cardiovascular disease”, says Moa Jederström.

SHE RECENTLY GRADUATED from the medical programme at Linköping University, and has now begun her PhD studies, which she planned all the way back during her master’s thesis. Moa Jederström has also worked clinically at the Department of Child and Adolescent Psychiatry at Linköping University Hospital.

“I hadn’t really given much thought to doing more research about figure skating. I wanted to do my master’s thesis on the subject and thereby give something back to the sport which has been a safe place for me since I was a child. At the same time, I know that it isn’t like this for all children. So I contacted a physician at the Swedish Figure Skating Association to get help designing a study about figure skaters’ health.”

Young people’s sports can lead to several problematic situations affecting sleep, eating habits and physical/mental health.

“Many coaches are not educated to deal with this, and sports clubs are not prepared for it.”

MOA JEDERSTRÖM ALSO EMPHASISES that violence against children and adolescents is not limited to physical violence, and that it can occur between young people too. There are very few studies about young figure skaters.

“That’s why these studies are needed. We know too little about young figure skaters, both in terms of physical and mental health. We are going to expand the studies later on. We believe that it is possible to find similarities with other sports.”

Moa Jederström says that there are reports about a culture within figure skating where young skaters are, for example, pressured into training or losing weight. She is working together with Professor Laura Korhonen at Barnafrid, a national centre for expertise on violence against children. Professor Korhonen is one of her PhD supervisors.

“We are going to study young figure skaters’ well-being and the culture in figure skating, and we are going to map young skaters’ exposure to psychological violence and other forms of abuse.”

Thus far, Moa Jederström has published one article: a cross-sectional study of determinants of sports injuries among young figure skaters. Another study – about anxiety, well-being and body image perception, as well as factors associated with these things – is currently going through a peer review process before publication.

Moa Jederström has conducted a study based partially on the Swedish Public Health Agency’s survey of school-age...
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WE HAVE ADDED SEVERAL QUESTIONS specifically about figure skating. About their training habits, which jumps they can execute, at which level they practice etc. It was a very broad survey, intended more as a basic kind of screening.

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General risk factors

Some of the general risk factors for violence within youth sports, identified by the International Olympic Committee (IOC), include the relationship to the coach, the intensity of the training, media interest for the athlete, and the fact that athletes are being bought and sold between clubs, or that a certain athlete might move between different clubs, and train at different locations and different times. These athletes might then come further away from a stable context, which can lead to them being more easily exploited.

There is also a risk associated with training far away from your parents, for example at a sport-oriented college.

“WE HAVE ADDED SEVERAL QUESTIONS specifically about figure skating. About their training habits, which jumps they can execute, at which level they practice etc. It was a very broad survey, intended more as a basic kind of screening.”

Source: Based on interview with Moa Jederström

“WE HAVE ADDED SEVERAL QUESTIONS specifically about figure skating. About their training habits, which jumps they can execute, at which level they practice etc. It was a very broad survey, intended more as a basic kind of screening.”

“We have observed that young figure skaters get less sleep than recommended for their age group. We have also observed that skipping main meals and being older were both associated with either having had a serious sports injury in the past year or having an ongoing sports injury when answering the survey. Skipping meals is, generally speaking, not good for your health. But we can’t tell from this survey why figure skaters do it – we only know that it happens. So we have to conduct more studies, and more interviews.”

SHE HAS A PASSION for young people in sports: “Local sports clubs are where most children and adolescents participate in sport. Unfortunately, research often focusses on elite sports. But I want all young people to feel to be able to feel safe in the sporting world.”
Vehicle maker on Time’s list of most influential companies

**FOUNDED BY LIU STUDENTS**, Roam Motors produces electric vehicles in Kenya. *Time* magazine recently included Roam in its ranking of the 100 most influential companies in the world.

The company, which until April 2022 was called Opibus, has electrified safari vehicles, produced an electric motorcycle and launched an electric bus. The vehicles were developed in collaboration with Kenyan engineers, and produced at the company’s facility in Nairobi.

“This could give rise to a completely new, innovative industry, based on engineering. And this is what *Time* magazine recognised – that no one else has seen the potential here. Especially considering that Kenya has so much renewable energy production”, said Albin Wilson, Opibus’ chief strategy and marketing officer, to the Swedish tech/engineering magazine *Ny Teknik*.

*Time*’s list also includes Swedish tech companies Spotify and Klarna, and major international carmakers Tesla, Volkswagen and GM.

Language app for Ukraine

**THE WORLDISH LANGUAGE TOOL** created by LiU students and headquartered at Linköping’s Mjärdevi district, is now being used to facilitate Ukrainian refugees’ arrival in Sweden.

The tool, which is normally used to bridge language barriers in healthcare, includes a long list of languages and more than 15 different healthcare areas.

And now there is a special application – Helen for Ukraine – with information in Ukrainian about Swedish society, for instance rules for asylum applications, as well as accommodation, education and financial assistance. There is also a section on opportunities for learning Swedish.

Worldish was started by Naveen Sasidharan and Abhishek Jacob Chathicatt, master’s students from India, and has won Swedbank’s Rivstart entrepreneur’s award. In addition to the founders, Worldish currently employs some ten people.

LiU Alumni

**JOHAN BERHINS** a designer and founder of the company BERHIN Studios. He has a Master of Science in Mechanical Engineering and graduated from Linköping University in 1998.

**ANIISA BIHI** works as a software developer at Capgemini Sweden. She has a Master of Science in Media Technology and Engineering, and graduated in 2020.

**ANDERS BÄRLUND** s Chief Strategy Officer at ICA Gruppen. He has a Master of Science in Industrial Engineering and Management from 2004.

**KALLE ERIKSSON** works as a logistics developer at Scania. He has a BA in Social Logistics and graduated from LiU in 2021.

**PÅR JOSEFFSON** works as a Research and Development Manager at Elitfönster. He has a Master of Science in Mechanical Engineering and graduated in 2010.

**ANNA KARLSSON-BENGTSSON** is a professor and vice president of education and lifelong learning at Chalmers University of Technology. She has a BA in Chemistry from LiU and graduated in 1991.

**CARINA MÅRLIND** works as Group Head of Travel at Stena Line. She is an engineer, and graduated in 2007 from the programme in mechanical engineering.

**LILIANE NIYUBAHWE** is key account manager at the Swedish section of Save the Children International. She attended the master’s programme in Child Studies at LiU, and graduated in 2017.

**MICHELLE SANDBERG** is an environmental and public health inspector at Finspång municipality. She has a BA in environmental sciences and graduated from LiU in 2021.

**SVEN SKÖLD** is the head of cyber and IT security at Postnord. He graduated from LiU in 1992 with a Master of Science in Applied Physics and Electrical Engineering.
LIU NEWS

The English language newsletter from Linköping University.

With LiU News, you get a summary of what’s going on with research and teaching at Linköping University. The newsletter comes out once every four weeks.