World-leaders in sustainability

The International Student Barometer, ISB, was presented in April. This is an annual global survey in which students from nearly 200 universities in 17 countries participate. For the most part, Linköping University (LiU) gets high marks. It is particularly gratifying to be able to report that it is our fantastic alumni all round the world who play a crucial role when students abroad choose to study at LiU.

THE INTERNATIONAL STUDENTS rank LiU first in Sweden and second in the world in the category “eco-friendly attitude”. This is because LiU leads the field when it comes to research in the environment, energy and sustainability. All faculties at the university carry out research in these fields – across the boundaries of scientific fields – and this has, of course, a positive influence on the education we provide.

A comprehensive view and a systematic approach are two key elements when it comes to environmental and energy research at LiU. The significance of this is now to be further developed in China, in Guangzhou in southern China to be precise, which has been a twin town of Linköping since 1997. The academic sphere, the public sector and the business world have all collaborated in this long relationship. This edition of LiU Magazine describes three extremely exciting pilot projects in biogas processes, environment and energy systems analysis, and societal conditions. These are taking place within a research center, which Linköping University and Guangzhou University have started. I would like to point out that Tekniska verken in Linköping, one of LiU’s strategic partners, also plays an important role in the projects.

AROUND 20 RESEARCHERS will participate in these pilot projects, many of them based within LiU Sustainable, which brings together approximately 300 researchers from every faculty of the university. LiU Sustainable has also been an important contact pathway for the construction companies responsible for the new residential district Vallastaden – next-door neighbour to LiU – when looking for researchers to work with in the project, which is full of innovation, knowledge and visions. Some of the results of this collaboration will be on show in the major housing and society exhibition to be held in September this year.

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A LiU alumnus spreading floorball and democracy in Ukraine.
Courage amidst the misery

Bombs fall on Syria, societies are destroyed and millions of people are forced to flee. Many sink into despair and apathy. A group of Syrians in Sweden, however, is showing courage in this misery: they are looking to the future and the period after the war, when the country will need to be rebuilt.

We have met Haqqi Bahram, Syrian refugee and master’s student at Linköping University, who is a member of a network attempting to find constructive solutions for Syria’s future. “It’s human nature to hope”, he says.

In Ukraine LiU alumnus Tamuz Hidir is making his contribution to finding hope. He studied political science at Linköping University, and is now using the sport of floorball as a way to spread democracy in the homeland of his mother.

Two examples of LiU students who want to make a difference.

THE WHOLE WORLD CAN BE FOUND at Linköping University, in the form of students and researchers with roots in other parts of our common planet. Some are here to stay, others on short visits. This gives rise to meetings that arouse curiosity about how others think.

The results of a large survey in which international students evaluated their institutions of higher education were published this spring. Linköping University took high marks in several fields, not least the quality of the education and the range of social activities on offer. International students were particularly impressed by the eco-friendly attitude that they met at Linköping University.

More details about the survey are presented in an article in the magazine, while in another article British master’s student Sarah Childs gives useful advice for people who are considering studying at Linköping University. And don’t miss the article describing the Nordic Culture course, which attracts many international students.

WITHIN RESEARCH, an international dimension is taken for granted. This edition of LiU Magazine contains an article about a research group at Linköping University with researchers from all corners of the Earth using smart communication to shrink the world.

Another article describes how Swedish and Chinese researchers are working together with the growing threat of drug-resistant bacteria, while another gives details of a new anthology of texts discussing issues of gender and how we use medicines.

In short, this edition is a classic Swedish smörgåsbord. We hope you enjoy the magazine!

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ETCH INTERNATIONAL MAGAZIN
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 lärer eller har last på Linköpings universitet.

LIU MAGAZINE

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Sarah Child
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ECO-FRIENDLY PROFILE IMPRESSES

Linköping University offers good education, plenty of social activities and an impressive environmental approach. That’s according to the latest International Student Barometer, an annual global survey of international students.

STORY LENNART FALKLÖF PHOTO ANNA NILSEN & CHARLOTTE PERHAMMAR
According to the study, international students choose Linköping University primarily for its strength in research and its interesting educational programmes. Sweden is perceived as a peaceful, stable country to live in. When choosing a university, students are influenced most of all by the information on the university’s website, and by friends and alumni.

“We are delighted that once again, our international students have rated Linköping University very highly. Many people, including LiU’s staff and student union representatives, have helped ensure these good results. We can be very proud that 90 per cent of the students recommend LiU,” says Deputy Vice-Chancellor Karin Fälth-Magnusson.

The most common way of getting about as a student is by bike.

What is the International Student Barometer?

ISB is an online benchmark survey, conducted by the British company I-Graduate. It is one of the world’s largest surveys, containing questions regarding learning, living, support and arrival.

Each participating institution is informed of their benchmark position. Participants do not receive any information regarding other institutions. Students across all levels and all years of study complete the survey.
Internationals experience NORDIC CULTURE

Nordic Culture is one of the most popular courses amongst LiU’s international students, with more than 800 participants over the years. The course is based on experiential learning, outdoor education and the important of place. Cooking a Swedish Easter buffet is one example.

STORY ELISABET WAHRBY PHOTO CHARLOTTE PERHAMMAR

The Cooking Lab in the Key Building at Campus Valla is crowded, hot and full of cooking fumes, as some 25 students from 15 countries prepare an Easter buffet. The menu features Swedish specialities – pickled herring, Jansson’s Temptation, meatballs and gravlax. The head chef tonight is course coordinator Bo Hinnerson, who started Nordic Culture 17 years ago.

“Sure, you can read about food. But there’s no point if you don’t get to cook and taste it. The same goes for all culture – you have to experience it.”

Nordic Culture is intended for exchange students, and is part-time for one term. The group meets every Wednesday evening. For some students it’s part of their agreement, but many take it as an elective. Many of the students are European, while others come from Australia, North America and increasingly, Asia. Marketing isn’t necessary; the course sells itself and there’s always a waiting list.

“In our teaching we use methods inspired by experiential learning and outdoor education. In addition to more traditional study forms, there’s a lot of hands-on content; we experience things and have fun together. To make this happen, we travel on live-in seminars for a few days, experiencing both urban and rural settings.”

THIS YEAR’S GROUP HAS already travelled to the Swedish mountains, where many of the students saw snow and mountains for the first time. They snowshoed over the
Åreskutan mountain, experienced Sami culture and visited the Jamtli open-air museum. On route they stopped in Nusnäs to see how Dalecarlian horses are made. Soon they’re off to a nearby archipelago – after spending a day on a local walking trail.

The programme varies depending on season. Some classes visit Stockholm, to sample some culture in the city centre as well as the suburbs.

“The countryside is an aha experience, as the students aren’t used to being out in nature, and they have no idea of the Swedish Right of Public Access and our relation to nature. We make an effort not to be tourists, but to get below the surface, so we can understand the culture. On our trip to the archipelago we head out with professional fishermen, and everyone helps out with letting out and taking in the nets, and with cleaning, smoking and eating the fish. Not many Swedes get to experience that.”

“Nordic art, literature, architecture, film, folk and contemporary music, as well as traditions and festivities are all on the curriculum. As is immaterial culture such as folklore and folk religion. And the ’fika’ is a strong tradition that every visitor to Sweden comes across, and many want to take home with them,” according to Bo Hinnerson.

**IN THE COOKING LAB** the Easter buffet is almost ready. Alena Stvanova and Maria Gutiérrez are standing at a table, making meatballs.

“I wanted to meet students from other countries and learn more about Sweden. I love nature, and Sweden has lots of nature,” says Alena Stvanova from Prague, who is studying human resources and adult education.

“I get the impression that in Sweden people care more about their history and culture. We have snow and mountains in the Czech Republic as well, but seeing other people get excited about it actually makes me appreciate it more than I used to. And I like the social idea of the Swedish fika.”

Her classmate Maria Gutiérrez also likes fika – coffee or tea and a snack. Maria comes from Navarra, Spain, where she studies teaching for special needs. In Linköping she is doing her work experience.

“Sweden is so different, I wanted to discover the country and meet people from other countries. The teaching is different too, I wanted to learn more about the methods.”

“One thing that surprised me is that even though it is very cold here, you Swedes still get out into the countryside very much.”

“A sizeable portion of the course is about identity. It’s an eye-opener, and it gives lots of people a new perspective on their own culture and identity,” says Bo Hinnerson.

*Do you think about the fact that you have quite a large impact on the image of Sweden that gets spread abroad?*

“Yes, I actually do think about that. More than 800 students worldwide have taken the course. Some come back to do their master’s. One did their graduation project on the small-scale professional fishermen, a profession that will probably disappear. One former student now works in the EU parliament with nature and environmental issues, which is obviously a topic we discuss in the course. Plus, the world isn’t that big, we learn from one another. When the world meets here in Linköping we discover that we actually have quite a lot in common,” concludes Bo Hinnerson.
A year as an exchange student in Linköping has given Sarah Child the taste for a research career. Here, she shares some useful advice for other exchange students.

OPTIMIST OR PESSIMIST?
Sarah Child is studying chicken personalities.
Sarah Child is taking a Bachelor of Science in Zoology at the University of Manchester. The third year is spent on a placement with a partner organisation in the UK or overseas. The university distributed information about the various possibilities.

“I learned that at Linköping University, I could look at chickens and their behaviour. It’s one of the areas that interests me most,” she says.

So, Sarah Child arrived in Linköping and Campus Valla on a sunny day in September last year.

“The campus here was very different to Manchester, where the university buildings are spread through the city. I wasn’t used to having everything together, but it’s nice.”

She had to get used to cycling everywhere, the weird overalls that students wear on special occasions, and the Swedish tradition of “fika”. It wasn’t long, however, before she found her feet. The greatest problem was finding somewhere to live. Before arriving in Sweden, she heard from a previous exchange student that it might be difficult, and this certainly turned out to be true.

“When I first arrived I didn’t have anywhere permanent to live. I stayed with different people. Now I share a flat in Ryd.”

Another aspect that took some getting used to was a tendency of people to speak Swedish to her.

“People assumed I knew Swedish. I guess I look Swedish. But it wasn’t really a problem once I explained, everyone speaks English.”

Maybe it’s a bit too easy to get by in English – she admits that she hasn’t learnt much Swedish in the six months or so she’s been here. She has got to know some Swedes, and many exchange students from various parts of the world.

“I definitely recommend joining international societies and participating in their activities. I just came back from the Erasmus Student Network Sea Battle cruise to Riga and in March I went on a trip to Lapland with the International Student Association. We were very lucky with the Northern Lights!” she says happily.

**SARAH CHILD’S EXPERIENCE** as exchange student differs from that of many other people in that she is not taking any courses but is working as research assistant in the AVIAN Behavioural Genomics and Physiology group. She studies the personality of chickens.

“One test that I’ve been using is the cognitive judgement bias test. It determines whether the chicken has an optimistic or pessimistic bias, similar to asking a human if the glass is half empty or half full.”

In this test, the researchers train chickens to react to black and white cues. If the chickens approach the white ones, they receive a reward, while approaching black ones doesn’t lead to a reward. Subsequently, their reactions to different shades of grey are studied. Chickens who approach darker shades are assessed as being more optimistic: I judge that this is sufficiently close to white for it to be worth a chance.

Sarah Child will return to the UK at the end of June in preparation for her final year. But after that, she’s not sure.

“Maybe I’ll do a PhD in animal behaviour. This year has definitely inspired me and given me real experience of how to work in a research lab.”

So what about the overalls, that she found so strange in the beginning? Now she is the proud owner of an Erasmus overall with patches from all the parties and other activities she has participated in during the year. A nice memory from LiU.

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**Sarah Child’s advice to other exchange students:**

- Look into accommodation early.
- Get an International Student Identity Card as this gives discounts for trains and flights, as well as many other things.
- Bring warm shoes or boots and a waterproof coat.
- Buy a bike.
- Get a Swedish SIM card.
- Join international student associations like IBA, International Student Association, and ESN, Erasmus Student Network.
- Join Facebook pages where students sell things, such as the ESN flea market.
Honorary doctorate for Nobel laureate

Japanese Nobel laureate Hiroshi Amano was one of four to receive honorary doctorates at this year’s Commencement Ceremony on 20 May, the others being Marie Rådbo, Sara Mohammad and Graham Hendry.

Professor Hiroshi Amano was awarded the Nobel Prize in physics in 2014 for the development of blue light-emitting diodes. These have made it possible to develop intense but efficient white LED light sources. These are now widely used to replace tungsten filament lamps and other light sources in, for example, computers and mobile phones.

Behind the work to produce a practical blue light-emitting diode lies extensive work with the development of a semiconductor, gallium nitride, during the 1980s and 1990s. Hiroshi Amano worked on this together with his supervisor at the time, Professor Isamu Akasaki, with whom he shared the Nobel Prize in 2014. Professor Akasaki has also been awarded an honorary doctorate by Linköping University, in 2001. The development of this material involved a close and intense research collaboration with physicists at Linköping University, which resulted in more than 100 joint publications in scientific journals.

Sara Mohammad is celebrated for her fearless commitment for the rights of girls and young women, and for her work to prevent honour-related violence and female genital mutilation.

Astronomer Marie Rådbo has written many books designed to bring science to the general public. In recent years, she has also been active at Visualization Center C in Norrköping, where she collaborates with researchers from Linköping University.

Graham Hendry at the University of Sydney has been an important collaborator and source of inspiration for the Faculty of Medicine and Health Sciences in their work with problem-based learning (PBL) and the application of information and communication technology (ICT) in education.

High in global ranking

Linköping University is number 21 in a global ranking of universities less than 50 years old.

The universities have been evaluated by the QS World University Rankings. The top six places are held by Asian universities, led by Nanyang Technological University of Singapore.

It has been a rapid ascent for LiU, which entered the top 50 just four years ago.

Of the young universities in Europe, LiU is now ranked seventh.

The QS ranking is based on indicators such as academic reputation, staff/student ratio and internationalisation.

The QS World University Rankings – which disregards the university’s age – is topped by American and British universities. Here Linköping University is number 282.

All in all there are roughly 20,000 universities in the world today, of which about 16,000 are younger than 50 years old.
Fredrik Löfgren, robot developer and student of applied physics at Linköping University, is one of the recipients of a large scholarship for research in the natural sciences.

“It’s brilliant. SEK 150,000 is a huge amount, but I don’t actually care about the money. It’s nice to be selected for a scholarship in the natural sciences, for me that’s more important and a greater honour than the money.”

In addition to developing robots and studying, Fredrik Löfgren captains the Swedish national robot football team, teaches maths, runs his own company, and in his spare time is building a humanoid robot. He thinks the money will be useful for many aspects of his work.

“It can be used to buy robot parts for our research at LiU. Also, I organise robot workshops for children, which I can now do for free. The money will benefit our outreach activities, where I head out to meet children and businesses, and I can use it in my robot development work.”

In addition to his studies, Fredrik Löfgren has been involved in developing a lab for humanoid robots at Linköping University. Today he is director of the lab, and in charge of the robots.

And when you finished your studies?
“I’m an entrepreneur. I’m driven by a desire to engage with society, and make sure that our knowledge gets out into the real world, and is made use of. I want to continue with this combination, so in ten years I think I’ll have one foot in academia and one in business.”

Fredrik Löfgren, robot developer and student of applied physics at Linköping University, is one of the recipients of a large scholarship for research in the natural sciences.

Chinese football, Spanish music and a walking, talking Pokémon. It was all part of LiU’s annual IDAY.

The tradition where international students get together on a particular day to share their cultures is now in its twelfth year. This year there were students from 13 countries, including India, China, Spain, Latvia and Germany.

“Everyone puts their heart and soul into this event, which is the ISA’s largest,” says Pranav Morey, president of the International Students Association (ISA) at Linköping University.

Each country that participated had its own stand, with traditional costumes, food and music. The aim was to learn from each other.

“People who don’t know what’s going on here seem a bit surprised when they first arrive, but in the end, everyone learns something from the other cultures.”
LiU researcher Björn Berglund collaborates with Chinese scientists to investigate how bacteria resist certain antibiotics.

ANTIBIOTIC RESISTANCE

- A GROWING GLOBAL THREAT

When bacteria develop resistance to several of our most common antibiotics, there are some relatively well-established methods to test. Swedish and Chinese researchers are now working together to investigate resistance against the last remaining treatment alternative.

STORY KARIN SÖDERLUND LEIFLER PHOTO THOR BALKHED & LENNART E NILSSON
Antibiotics have been available for use by humans for less than 100 years, but during this period we in the western world have become accustomed to the fact that bacterial infections can be treated. This is now, however, no longer obvious. Increasing antibiotic resistance has become such a serious problem that WHO is calling it one of the biggest threats to human health.

“If we end up in a situation in which antibiotic-resistant bacteria are present everywhere, we would face a major threat to modern medical care. We depend on effective antibiotics to treat, for example, cancer patients with impaired immune systems, in the care for premature infants, and when carrying out advanced surgical procedures such as transplantation,” says Björn Berglund, postdoc at the Department of Clinical and Experimental Medicine.

This is because it’s not simply a case of being able to cure people who have an infection: it’s also about the possibility of preventing infections during medicine treatments that would otherwise be too risky.

“If we reach a point at which we can no longer treat bacterial infections, we will be facing a paradigm shift within the healthcare system.”

It is only when a person becomes sick and treatment is started to kill the bacteria that it becomes clear that the bacteria are resistant. The problem with resistance, however, is not limited to the healthcare system.

“Most studies have been done in a clinical context, and people have tended to concentrate too much on where the problem appears. But it has become clear in recent decades that resistance arises in other places than solely hospitals. Many people believe that the widespread use of antibiotics within veterinary medicine has caused antibiotic resistance, which has subsequently spread to human medicine, but this has not been confirmed,” says Björn Berglund.

He has recently returned from a visit to China, where he met collaborators working on a project in antibiotic resistance. The project is part of a large international collaboration, IMPACT, in which government agencies and universities in Sweden and China are participating. It aims to increase knowledge about how antibiotic resistance overlaps between human health, animal health and the environment. Both bacteria and antibiotics from people and animals end up in the environment, via waste-water treatment and manure management.

During IMPACT’s first years, researchers have collected samples in the Chinese countryside. These are taken from healthy volunteers and from people who have sought medical care for bacterial infections. Other samples are taken from animals and the environment, such as the wells from which inhabitants fetch water. Björn Berglund and his colleagues are planning to collect further samples during the coming summer. They investigate the ability of the bacteria to resist two antibiotics in particular, carbapenem and colistin. These are used against infections caused by bacteria that form an enzyme known as ESBL, which breaks down the most common types of antibiotic.

“Carbapenems are often the last resort when treating infections caused by bacteria that produce ESBL. And now it has become clear that resistance to carbapenems has started to increase all over the world,” says Björn Berglund.

Carbapenem resistance has become so prevalent that the medical care system has started to use a previously used antibiotic, colistin. This has been used only for animals in China, but has recently been approved also for the treatment of humans.

“In 2015, however, a research group in China discovered colistin resistance that was spread by a mechanism involving plasmids. This makes it much easier for the resistance to spread to other bacteria. The discovery aroused a fear that treatment would rapidly be impaired,” says Björn Berglund.

Since the first discovery, it has become clear that plasmid-mediated resistance is present essentially everywhere in the world. Bacteria with plasmid-mediated colistin resistance were discovered in Sweden in 2016. Björn Berglund points out that increasing resistance against different antibiotics is an ecological and international problem.

“Antibiotic resistance is a huge problem. More international collaboration and co-ordination at a higher political level is needed to solve it.”

Researchers are investigating the interaction between humans and the environment. What is the significance, for example, of the widespread use of antibiotics in animal husbandry?
Smart communication making the world smaller

LiU researchers are involved when 5G is developed at record speed. The research group has members from many countries, including Italy, Iran and Vietnam.

STORY MONICA WESTMAN SVENSELIUS PHOTO THOR BALKHED

The PhD students working in the 5GWireless programme come from all corners of the world. They are attracted by the opportunity of contributing to a generation change in the mobile traffic network from 4G to 5G, with thousands of times more traffic at speeds of hundreds of Mbits per second.

It has been predicted that in 2020 there will be 50 billion wireless devices communicating with each other, video streaming available in our cars, and untold numbers of sensors in our surroundings detecting both indoor and outdoor conditions. Fifth generation mobile technology is to connect all corners of the world, with transmission capacity of hundreds of Mbits per second. It will reach nearly everywhere and offer response times of a few milliseconds.

“Working with 5G is exciting because there’s so much happening. Our PhD students are here for 4–5 years and they can see the complete process, from the development of theory to commercially available technology,” says Emil Björnson, docent and senior lecturer at the Division of Communication Systems.

Together with Professor Erik G Larsson, he is in charge of the Swedish part of the Horizon 2020 programme 5GWireless, which is part of the Marie Sklodowska-Curie Innovative Training Networks.

The project has several goals, in addition to the actual research results. These include increasing the mobility of young academics (the PhD students must work in another country than their own), and giving the European telecommunications industry a lift.

Fifteen PhD students and their supervisors from five European universities are involved in the project, together with five companies, one of which is Ericsson.

“This is a unique project, since the PhD students have supervisors from several programme partners. They are also participating in a graduate school with courses in, for example, presentation techniques and how to protect ideas and apply for patents. They were recently in Dresden, and will travel to Paris during the spring. They’ll be at LiU this autumn,” says Erik G Larsson.
THE RESEARCH AT LIU is centred around antenna technology known as “massive MIMO”, where Erik G Larsson and his research group lead the field.

MIMO is an acronym for “Multiple Input, Multiple Output”, and the technology is based on replacing the large currently used antennas – grey units weighing around 50 kg with a power of around 40 W – with hundreds of small antennas, each with a power of around 10 mW.

Each of the small antennas transmits a few tens of signals at the same time in different directions, and intelligent signal processing ensures that a strong signal is received by the intended receivers, giving just a slight disturbance at all the others. This gives a combination of low output power, high energy efficiency and superior capacity.

“Our research has a high industrial relevance, with a strong theoretical edge. The core of our work is clearly patentable,” says Erik G Larsson.

One of the three LiU doctoral students working on the project, Giovanni Interdonato, is from Italy. He is employed by the industrial partner Ericsson, and has already contributed to two patents. His research deals with what happens if you spread the many hundreds of small antennas over distances of around a kilometre, instead of collecting them in one place.

“I carry out mathematical analyses and simulations to determine whether a distributed antenna deployment works as well as a co-located one. It’s true that there is a higher probability that a user is close to an antenna if they are distributed, and this thus increases the coverage and efficiency. On the other hand, it also probably leads to greater variations in signal strength,” he says.

Amin Ghazanfari, a PhD student from Iran, is working to improve communication between the devices in a massive MIMO network.

“If we can talk more quietly to the devices close by and more loudly to the base station that is to transmit the signal onwards, we can improve the efficiency. And energy consumption is lower, if we whisper to each other when we are close together.”

Trinh Van Chien from Vietnam is the third LiU PhD student working on the project. He works with load balancing, which is the technique used to ensure that several base stations in the system can collaborate to determine which one is to transmit signals to which recipients to achieve as high an efficiency as possible.

“There are strong commercial pressures to make 5G technology available. As soon as the next generation is on the horizon, investment in the current generation falls. The telecommunications industry in Europe is becalmed at the moment,” says Emil Björnson.

Ever since the first mobile network, NMT, was launched in 1981, a new version has been launched every 10 years. The next generation, number five, is expected to be on the market in 2020.

Will 5G really be out in 2020?
“We’ll have to wait and see. But whatever is ready to be launched then will be called ‘5G’ – this is what has happened in previous generational shifts,” laughs Emil Björnson.

Read more on 5GWireless
www.h2020-msca-etn-5gwireless.eu/
Just a tablet?

Before swallowing a tablet, we seldom see anything other than a small round pill. But medicines affect us in many ways - not all of them physical. Behind the tablets and vaccines we take lie expectations and, not least, marketing. Our medicines are pieces in a game that deals with feminine and masculine, and what the state and drug companies really consider these terms to mean.

Imagine a little pink Viagra tablet instead of the blue one. How masculine would that be? Would it strengthen the potency of the man who took it? The colour of the little blue tablet is one example of how medicines reinforce our ideas of masculine and feminine.

Most of us have expectations about how our bodies will behave, and what they should or should not do. The male body, for example, is expected to be virile: when it isn’t, we treat it. So prescribing a medicine may achieve more than simply curing a disease. Medicines are loaded with ideas about how healthy people should be, how they should behave, feel and look.

In a recently published book Gendering Drugs, editor and LiU senior lecturer Ericka Johnson investigates how drugs reinforce various notions about gender. Together with her colleagues, she has investigated what is considered to be a healthy feminine or masculine body, and the role that marketing plays in creating these ideals.

“We wanted to investigate this question since whether or not to take a particular medicine is often seen as an individual decision. But behind this decision, there are always structures and social standards. In this book, we wanted to shift the focus from the individual, and examine more closely the structures in different countries,” says Ericka Johnson.

Targeted marketing of prescription drugs to the general public is forbidden in Sweden. People in Sweden can see advertisements for analgesics, anticongestant sprays and cough medicine, but not drugs for enlarged prostate, as in the US and the UK. The advertising that Ericka Johnson and her colleagues have studied has included the HPV vaccine against cervical cancer, hormone treatments to delay puberty, and treatment for benign prostate enlargement.

“We see clearly that the advertising plays on different identities, such as masculine and feminine. It also plays on identities related to relationships. It is not seldom that a grandma or partner is present in the advert, with the message: ‘Do you want to spend quality time with your grandchildren or partner? If so, you should take our medicine.’”

By using relationships in advertising, pharmaceuticals companies can ensure that more people see it. The medicines are not just a prescription for a healthy life for the person taking them, they also create healthy relationships.

“The advertising says that drugs affect more than the person taking them. It is also the duty of a responsible loved one to make sure that they are taken,” says Ericka Johnson.

One example of this is the human papillomavirus (HPV) vaccine. HPV is a very common virus spread by sexual intercourse. It can give rise to, among other things, condyloma (genital infection). Some types of HPV can cause cell changes and lead to cancer, mainly in the genitals of women, but also in men.

Commercial advertising in Sweden for HPV vaccine has principally targeted mothers, who are encouraged to take responsibility for the future health of their daughters and help them avoid cervical cancer. It was clear that the intended takers of the HPV vaccine were to be young girls. But this is not the case everywhere.

By studying vaccination campaigns for the HPV vaccine in Colombia, the UK, Sweden and Austria, the researchers
could see how one medicine has completely different significances, depending on where it is marketed.

“In Austria, the HPV vaccine does not have the same association with gender as it has in Sweden. Instead, all children, both boys and girls, are vaccinated as part of the school-based vaccination programme.”

IN A WORLD IN WHICH WE ARE LIVING LONGER, taking medicines has become a more natural part of our everyday life, and small niggles, symptoms and even normal physical development can be treated. But if you have to take a medicine every day, can you call yourself “healthy”? Or should we change our ideas of what our bodies are capable of – as long as we are not fatally ill – and accept that they may not manage everything we demand of them, throughout the whole of life? Ericka Johnson suggests that this is a decision for each individual.

“I am a social scientist and I can’t express an opinion about effects on individuals or particular medical effects. But no matter whether you take that tablet or not, you should think about the norms you have adopted without thinking about them, and who profits.”
New online drugs to be detected

New drugs appear for sale on the internet all the time, and techniques to identify new substances on the market must develop equally rapidly. Researchers at LiU are participating in a research project that can contribute to the fight against narcotics by helping forensic laboratories detect traces (metabolites) of new online drugs in urine specimens.

“Many people believe that these substances are not dangerous, since they are not classified as narcotics and are sold openly on the internet. The truth is, of course, quite the opposite. Often, those who are selling drugs online have no idea of their effects, even less what is a non-lethal dose,” says Peter Konradsson, professor in the Department of Physics, Chemistry and Biology.

One example is acrylfentanyl, which is several hundred times stronger than morphine, and caused several deaths in Sweden in 2016.

The researchers at LiU have previously worked extensively on Spice, a herbal mixture onto which synthetic cannabinoids have been sprayed. They have manufactured metabolites and determined which ones are important. The result of this work is that the metabolites can now be used routinely in forensic analysis of urine. The researchers have also worked with fentanyl (drugs related to morphine and heroin) and cathinones (whose effects are similar to those of amphetamine).

Athletes’ symptom anxiety linked to risk of injury

The anxiety experienced by elite athletes over illness symptoms is linked to the risk of being injured during competition and should be taken seriously, according to a study. The way in which the symptoms progress and the nature of the sporting activity also influence the risk of injury.

“Elite athletes know their own bodies extremely well. If an athlete becomes anxious about injury or illness, this is a reliable indicator of the degree of seriousness. We have seen this also in previous studies. An athlete cannot lie to himself or herself,” says professor Toomas Timpka of the Athletic Research Center at Linköping University, one of the researchers who conducted the study.

The study was published in the British Journal of Sports Medicine.

Whiplash relief by exercise

Recent research results from Linköping University have shown that a specific form of exercise effectively alleviates problems following whiplash injury. The research group is now to start a further study, looking at the possibility of using an internet-based programme for much of the exercise.

As many as half of the 30,000 people in Sweden who are affected each year by whiplash injury, usually caused by a road traffic accident, experience long-term effects. Until now, effective treatment for people with such effects has not been available. The research group led by Anneli Peolsson, professor in physiotherapy, recently showed that a particular form of neck exercise helps a great deal to alleviate such problems. Some participants became completely free of their problems, despite having had them for many years. This was the largest study of its type in the world, and the results have aroused considerable international attention.

A new study is just about to start in which all participants will carry out the specific exercises. This can take place either at a physiotherapist clinic or using an internet-based programme supplemented by a small number of visits to a physiotherapist.
Research on patents

Professor Eva Hemmungs Wirtén has been awarded a European Research Council Advanced Grant, one of the most prestigious grants awarded by this body. She receives EUR 2.3 million spread over five years for research into patents and their role in the scientific infrastructure.

Eva Hemmungs Wirtén is the first woman in Sweden working in the humanities and social sciences to receive an Advanced Grant. She is professor of mediated culture at Linköping University in the Department of Thematic Studies – Culture and Society.

Her research throughout her career has focused on intellectual property rights, including copyright law, patents and trademarks. The project for which the grant has been awarded is entitled “Patents as Scientific Information 1895-2010 (PASSIM)”.

“Quite simply, we want to understand more about the position of patents in the scientific infrastructure, both historically and now. We do not examine patents from the traditional perspective as indicators of economic activity, but as texts and documents that circulate together with other texts and documents,” says Eva Hemmungs Wirtén.

Roosters are nicer to their relatives

Male domestic fowl are less aggressive towards related males than to unrelated males when competing for copulations, according to a new study. This finding suggests that domestic fowl can recognise their kin among individuals in a group, and that their behaviour is different towards kin and non-kin.

“The finding demonstrates how complex evolutionary processes and finely tuned individual behaviour can be. Animals in a group behave differently towards other individuals depending on who they are related to,” says Hanne Løvlie, associate professor in ethology.

It is however still not clear how the birds can recognise their kin. One possibility is that they use olfactory cues.

Roosters are nicer to their relatives than to other males.
A war is raging in Syria, forcing millions to flee. But what will happen when it comes to rebuilding the country? This is the question that master’s student Haqqi Bahram from Syria is trying to get to grips with in an online network.

STORY EVA BERGSTEDT PHOTO STAFFAN GUSTAFSSON & KHALED KHATIB
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“We cannot keep watching: we must do something for our country.”

Haqqi Bahram, master’s student at Linköping University, is a member of a network attempting to find constructive solutions for Syria’s future.

He has a background in language studies. Before the war started he had graduated in English and British Literature, taught English, and started a master’s course in linguistics. He never managed to finish this, because the war came.

Haqqi Bahram instead began to work in Syria with humanitarian issues, including working as a translator for the Doctors without Borders organisation. He was eventually forced to flee from Syria, and arrived as refugee in Sweden in 2015.

He is now taking the master’s programme Ethnic & Migration Studies, an interest which has grown from his own experiences in recent years.

“Migration is a burning issue globally at the moment. There are students on the course from all over the world – Syria, Sweden, Ghana, the Congo, China, Germany, Italy, Finland, Iceland, Denmark, Ireland, Canada and Russia. You can just imagine how interesting our discussions are, and how participating expands one’s horizons.”

THROUGH HIS STUDIES AND AN ACTIVE, inquisitive lifestyle in Sweden, Haqqi Bahram has become a member of a network concerned about the future for Syria. Around 40 Syrian students and researchers in Sweden are members. What will Syria look like in 2040? This is the fundamental question for the network. The group hopes that by systematically drawing up various futures for Syria after the war, they will be able to use their academic knowledge to reconstruct the country.

“We are not politicians or decision-makers with power. We don’t have all the tools available. But as students and researchers we want to do what we can to ensure a sustainable future for our country,” says Haqqi Bahram.

The network started to grow during the autumn of 2016 and is supported by several Swedish government bodies and institutions, including Lund University, the Swedish Foundation for Strategic Environmental Research (MISTRA), and the Swedish Institute.

“So far, we have held three workshops where we have drawn up various scenarios for how Syria may develop after the war. We asked ‘What if...’ and used this prefix in front of many possible events. One example was: ‘What if the people who have fled do not want to return to Syria?’ We also asked the inverse question: ‘What if everyone wants to return?’ Another fundamental question was ‘How is reconciliation to be possible?’ And for all of the scenarios we drew up, we wanted to know how we best could prepare for them. What roles can we play? What concrete actions can we take?’

The participants in the network hope that analysing the various scenarios now will prepare them in a manner that has a positive influence on the future.

“There are some things we can be sure about. The school system in Syria is just not functioning, and this will be an enormous problem. A complete generation has missed out on school. We need to come up with creative ideas and solutions. The same is true of the infrastructure, which has been largely destroyed. One task facing the network is to pose questions about what we can do about it, and be ready to take immediate action as soon as the war ends.”

HAQQI BAHRAM POINTS OUT that raising questions about the future of Syria requires huge courage and a firm belief in the future – two properties that are scarce in today’s desperate situation with a deeply traumatised population. Twelve million people have fled from the war and are today refugees.

“At the same time, it’s important for us who have reached safety to consider our own role, here and now. We must not fall into despair and inaction in front of the TV; we must try to find what our place will be in a future for Syria.”

Haqqi Bahram hopes that the network will spread outside of Sweden, and that the scenarios developed that communicate hope for the future and a constructive reconstruction of Syria will gain a foothold.

“It’s part of human nature to hope. The more people who are involved, the more hope and trust we can spread all over the world,” concludes Haqqi Bahram.

To contact the network, send email to Haqqi Bahram, haqba671@student.liu.se, or Tareq Emotairah, tareq.emotairah@iiiee.lu.se, coordinator for the network at Lund University.
LiU exports urban sustainable development

Linköping University and Guangzhou University have opened the Urban Sustainable Development Research Center in Guangzhou, China. Three pilot projects with around 20 committed LiU researchers are already underway as part of the collaboration.

Guangzhou is a fast-growing city with around 15 million inhabitants in a part of southern China undergoing rapid expansion. It has been a twin city of Linköping since 1997. Guangzhou University and several other universities can be found there, on an island in the Pearl River. The campus on the island is planned to eventually have around 350,000 students, and this enormous campus will, of course, produce huge amounts of food waste – food waste than can produce vehicle fuel or electricity.

Jonas Ammenberg, senior lecturer at the Division for Environmental Technology and Management, is leading one of the pilot projects with 17 researchers, 10 of them from LiU.

“It’s really exciting and great fun. We’re going to have to regard the first year as a learning period during which we transfer knowledge, establish collaboration, and lay down ideas about how we can go on from here,” says Jonas Ammenberg.

China has some biogas facilities and some universities possess expertise in the field, but this is a new area for Guangzhou University, both in research and education.

“We will have to contribute knowledge, and start gradually,” he says.

The biogas project has three arms, directed towards biogas processes, the analysis of environmental and energy systems, and societal conditions.

“For the biogas processes, the researchers at Guangzhou want to establish a full laboratory setting in which to study them. They currently have a laboratory with some equipment, but what is needed more than anything else is transfer of knowledge,” says Jonas Ammenberg.

The second arm concerns putting the planned system into perspective, and for this the researchers will make a rough estimate of the
amounts of food waste involved, the amounts of gas and electricity that can be generated, and the extent to which biogas solutions can contribute to reducing greenhouse gas emissions. Finally, the project’s third arm will attempt to identify and interview central stakeholders, in order to investigate the prevalent conditions against which biogas solutions can be developed.

The city of Guangzhou is also expanding its waste incineration, and this is the topic of a second pilot project with Joakim Krook and Stefan Anderberg, both researchers at the Division for Environmental Technology and Management. They will supervise a degree project that will map the flows of waste in this immense city. Most waste currently ends up in landfills.

“In order to build up an efficient system of waste management, we need to know how waste travels within the city, and the quantities and qualities of waste involved,” says Joakim Krook.

The degree project will involve collecting data in collaboration with Chinese researchers and students. It is intended to be the basis of guidelines for how to design the system to be as efficient as possible, and where to invest most resources.

The third pilot project deals with urban planning, where the metro system in Guangzhou is an interesting system: what are its social, environmental and economic effects on the city? We want to find out what the city planners look at, how great their freedom is relative to the central five-year plans, and how inhabitants view urban planning,” says Kristina Trygg, researcher at the Department of Thematic Studies – Technology and Social Change.

“One of the challenges is establishing a productive dialogue with the Chinese researchers. But we’re sure that the study will give interesting results, provided we can achieve what we’re hoping for,” she says.

**THE THREE PILOT PROJECTS** are already well under way, but the intention is that long-term collaboration will develop between Linköping University and the Guangzhou University Research Center on Urban Sustainable Development.

“Both parties agreed at an early stage that the drive and interest in collaboration must come from the researchers themselves,” remembers Per Larsson, who was previously head of faculty administration at the Faculty of Science and Engineering.

Per Larsson is a member of the working group at LiU tasked, together with Chinese colleagues, with ensuring that the collaboration functions well. Other members of the group are Per Gyberg, head of department at the Department of Thematic Studies, Stefan Anderberg, professor at the Division for Environmental Technology and Management, and coordinator Jack Zhe Yang.

“This is a unique collaboration in which the funding is provided by China. It is hoped that the centre will in the long run become self-financing,” says Per Larsson.
Alumni world

RADISTINA ANDREEVA is project manager at Proxiad Bulgaria. At Linköping University she studied for a master’s in business administration, and graduated in 2015.

BENNO ARNOLD is general manager for controlling and accounting at Bosch Corporation Japan. He studied for a master’s in manufacturing management, and graduated in 2008.

ONUR BEKAROGLU is operations planning analyst at Mey Içki, Turkey. He studied for a master’s in management of innovation and product development, and graduated in 2012.

KIM DUNG DANG in operations planning analyst at Bao Viet Investment JSC in Vietnam. He studied a master’s in Scandinavian history, and graduated in 2013.

ALYSSA GUTHRIE is health facilities analyst at Alberta Health in Canada. She studied for a master’s in health and society, and graduated in 2011.

HENOK HAILE is analyst at Verified AB in Sweden. He studied for a master’s in science for sustainable development, and graduated in 2015.

NIKETH JAGADEESH is CEO and founder of Carbon Custom Engineering in India. He studied for a master’s in mechanical engineering, and graduated in 2015.

AMBARISH KARANANITHI is senior research associate at the Centre for Policy Research in New Delhi, India. He studied for a master’s in energy and environmental engineering, and graduated in 2014.

GABRIEL LIMAVERDE FALCAO is education specialist at Instituto Alana in São Paulo, Brazil. He studied for a master’s in applied ethics, and graduated in 2010.

ANGELIKI PSYCHOGYIOU is Erasmus and international credit mobility officer at Université Patis 8 Vincennes – Saint Denis in France. She studied a master’s in international and European relations, and graduated in 2015.

LIUIS SOLAZ PICHER is external consultant at aeio Luz – Evolución energética in Valencia, Spain. He studied for a master’s in international and European relations, and graduated in 2016.

International alumni get-togethers

From a business school in Oslo to an Australian restaurant in the trendy part of Taipei. International alumni get-togethers have taken place in different corners of the world during the last twelve months.

Linköping University arranges or participates in several international alumni get-togethers every year. Sometimes as the only organiser, sometimes in collaboration with partners such as the Swedish Institute, the Swedish Embassy or other universities.

Around 30 Swedish and Taiwanese LIU alumni met at a restaurant in Taipei in March for lunch and networking. Swedish students on exchange studies to Taipei were also invited. A representative of the Swedish Chamber of Commerce in Taipei held a speech celebrating the long-term relationship between Sweden and Taiwan and the alumni were invited to participate in the network “Young Professionals”.

In Oslo, alumni from universities in Sweden, Finland, Denmark, Iceland and Norway were invited to a joint Nordic alumni event in April. Amir Sasson, professor at BI Norwegian Business School, spoke on revitalising the western economies and how technology will change the way we do business.

International alumni get-togethers were also arranged in Guangzhou, Shanghai, London and Seoul during the autumn of 2016.

Do you want to know more?

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The Panama Papers continue to arouse strong reactions all over the world. A demonstration at a Paris bank in April.

LiU alumni helped secure Pulitzer

STORY LENNART FALKLÖF PHOTO FRANCOIS GUILLOT & MATTIAS LUNDBLAD

The revelations contained in the Panama Papers yielded a 2017 Pulitzer Prize, perhaps the world’s most prestigious journalism award. Two LiU alumni played a key role in making sense of the networks of advanced tax avoidance schemes.

This spring the International Consortium of Investigative Journalists, ICIJ, was awarded the Pulitzer Prize in the category Explanatory Reporting, together with the publisher McClatchy and the Miami Herald, for their work with the Panama Papers.

It would hardly have been possible without the assistance of the Swedish database company Neo Technology, with roots at Linköping University. Their contribution was a technical solution for surveying 11.5 million leaked documents. With their technical solution the information could be organised in a way that made it possible to follow the money.

“It’s a question of understanding things that aren’t obvious. We do this by finding connections. In this case, it may be that a head of state is not directly linked to a shady company, but they could be through people associated to them, if you take two, five or ten steps back,” Neo Technology CEO Emil Eifrem explained when the documents were first revealed.

Neo Technology did not itself have access to the sensitive information; it constructed a database that the ICIJ reporters could make use of to find connections and report further.

University Board 2005-09 and was awarded an honorary doctorate in 2005.

The company has its origins at Linköping University. Both founders, Emil Eifrem and Johan Svensson, are LiU alumni who studied the master’s programmes in engineering for computer technology and computer and electric engineering, respectively.

For two years they were located at the LEAD business incubator in Linköping, where they got help with things like raising venture capital. In 2011 they opened an office in California’s Silicon Valley, where they now are headquartered.
n the centre of the Ukrainian capital of Kiev is Maidan, or Independence Square, where three years ago a revolution started. A group of students gathered there to protest against corruption in the country. The police violently removed them, but the students returned. Increasing numbers joined the protest. A few months later the Ukrainian president had fled the country, Russia had invaded Crimea and a war was underway in eastern Ukraine.

At a café just off the square, Tamuz Hidir orders a coffee and croissant. He speaks Russian and the waitress answers in Ukrainian. They understand each other perfectly. Kiev is a bilingual city.

Tamuz Hidir's mother comes from Ukraine, so he has the language from home. He grew up in Jönköping, not far from Linköping, and did a bachelor's in political science at Linköping University. He now lives in Kiev and was recently selected as the chairperson of the Ukraine Floorball Federation. His objectives are to get more people playing floorball, to build up the federation and to deal with the Ukrainian bureaucracy.

We sit down at a table and Tamuz tells us about his work.

“Our clubs around the country are growing like crazy. Now we have a chance to introduce floorball to every school in the country,” he says enthusiastically.
FOR MANY SWEDES, floorball, along with things like ‘snus’ (a tobacco product) and midsummer celebrations, are quintessentially Swedish. But who plays floorball in Ukraine? Tamuz Hidir explains that many floorball clubs here have their origins in evangelical church organisations. They used the sport on their missions.

“They stressed soft values and worked with children from less well-off families. Floorball isn’t just a sport, it’s a social activity. That’s what has driven me. You can’t build an organisation if you only think about results. You need other values to hold it together.”

For many of the Ukrainian players, floorball is the first sport they have played – they didn’t feel welcome anywhere else. In the former Soviet states, sports were elitist.

“A trainer in Russia told me that when the floorball season starts, 45 twelve-year-olds will turn up to play. From the group he immediately removes 15, who he feels aren’t up to scratch. A week he later weeds out 15 more. Now he has the 15 best to work with. Most sports in Ukraine work this way. But in our federation, not one club does that. Everyone is welcome, and this is quite unique.”

The Ukraine Floorball Federation consists of various local clubs. Tamuz Hidir has introduced the system of democratic meeting procedures from Sweden.

“Just like in Sweden we have annual meetings, board meetings, elections and so forth. This is new here.”

“It’s a new approach, compared to what is customary in Ukraine. The Soviet tradition is more centralised and closed.

“Sports are rarely seen as a way of promoting democracy. But in my opinion, collaboration in sports can have a huge influence on a country’s politics. The older generation here often have difficulty with an annual meeting where everyone gets to vote. They wonder, ‘Who actually decides here?’ But our system works. People see that the results are good.”

Tamuz Hidir explains that all parts of Ukrainian society are undergoing major changes. In the wake of the Maidan Revolution, Ukraine is becoming a more democratic society. The bureaucracy can still be incredibly frustrating, but things are improving. Tamuz is hopeful about the future.

Ukraine is at war, and this affects floorball as well. Players from Crimea and eastern Ukraine have fled to other parts of the country.

“At the Maidan there are often demonstrations and photo exhibits about the war. And in the news they talk a lot about it. But apart from that, it’s almost frightening how little impact the war has on everyday life.”

Tamuz Hidir was at the Maidan during the 2014 demonstrations.

“For two days I helped a Swedish journalist. The previous day, around 100 people had been shot and killed. It was terrible, and a bit strange. At their funeral they lay in open coffins, while just a few streets away people were going about their lives as usual.”

THERE’S NO LEAGUE MATCH IN KIEV TODAY, so to see something of what’s going on, we visit a school in the suburbs. On the way we pass the arena where the Eurovision Song Contest was held.

We meet a team of 12-year-old boys – the Kiev Vikings. Every now and again the trainer, Jurij, blows his whistle, and explains how something can be done better.

While we watch, Tamuz Hidir tells us that the Ukrainian Floorball Federation is putting a lot of effort into encouraging girls to play.

“We use affirmative action to help girls. We have a great deal where we can send 25 girls to Sports Camp in Norrköping every summer. Of course many of the boys also want to go, but it’s only for girls.”

You studied political science in Linköping. Has this helped you in your job?

“At the moment I’m benefitting from political theory, and being able to explain democratic processes. Knowledge of public management has also been useful. It’s extremely interesting to see how bureaucracy works here in Ukraine,” says Tamuz Hidir.
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