LiU magazine

LINKÖPING UNIVERSITY NR 2 2010

No reason to rush home

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Getting the competitive edge

AS I WRITE, the international elite of the computer graphics and visualisation world are gathered together on our campus here in Norrköping, which is hosting the Eurographics 2010 conference. In a little over 10 years, professor Anders Ynnerman and his colleagues have managed to establish an absolutely top-class international operation. Even the big digital studios from the American west coast have discovered the talent that our master's students have. At the end of May, Sweden's king will inaugurate our new Visualization Centre C, providing Norrköping with yet another exciting public attraction and thereby giving us the opportunity to show off some of our exciting research to a wider audience.

Our efforts to develop the links between research and industry, and to support entrepreneurship, have also been noticed more and more internationally. Please have a look at what an enthusiastic Dylan Jones-Evans from Wales writes at www.walesonline.co.uk "Swedes show the way".

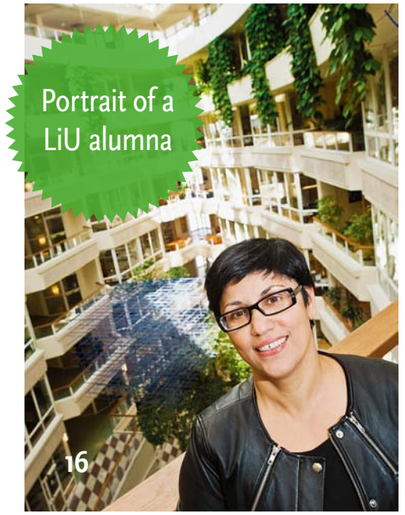
RESEARCH AT LINKÖPING UNIVERSITY has always had a significant international profile, as expressed by the level of cooperation shown as well as the choice of research topics. But we are now seeing the growth of ever more institutionalised collaborations.

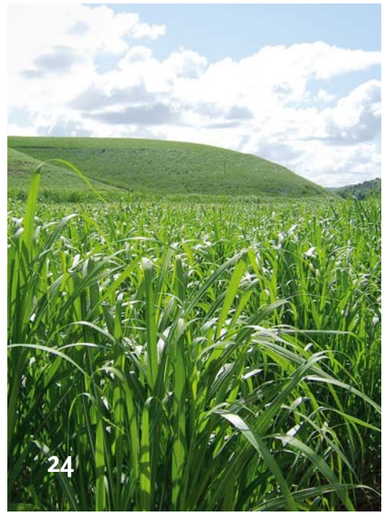
This past spring, for example, I had the pleasure of signing two very exciting agreements with universities in Singapore. One of these involves an absolutely international top-class lab for biomimetic sensing – a joint initiative with the Nanyang Technological University (NTU) and the Austrian Institute of Technology (AIT). You can read more about it in this issue of *LiU Magazine*.

The other agreement in Singapore is with the Institute of Manufacturing Technology, and involves industry-related applications; in particular, the advantages of a "greener" production.

AN INCREASING INTERNATIONALISATION is also evident on our campus. We have seen a rapid increase in the number of international master's students, and we have received a lot of praise for our efforts to develop the exchange programme. It is a natural next step to now establish an international alumni programme. Contact with former students is extremely valuable for receiving feedback on our work, and we hope, of course, that they can also act as ambassadors, providing potential students with a full and honest picture of what it is like to be a student at Linköping University.

Mille Millnert, rektor • mille.millnert@liu.se





FAR AWAY YET REMARKABLY CLOSE

I WAS AMONGST THOSE who got stranded when a huge cloud of ash from the Icelandic Eyjafjallajökull volcano forced European air traffic to come to a standstill in the middle of April. My family and I were on our way home from Australia, where we had been visiting a son who is busy doing his degree project at the University of Sydney. After two very enjoyable weeks of holiday, we were ready to return home to once again tackle everyday life.

But at the stopover in Malaysia, our journey came to a halt. The volcanic ash had caused airports all over Europe to close one after the other. During the days that followed, we were able to follow the movements of the ash cloud on TV and computer screens and listen to speculations around various future scenarios. It could take weeks before we were able to get out ...

We were quick to get in contact with friends and colleagues back in Sweden by email, SMS, Facebook and other means.

Just how we managed to get home is another story for another time, but the experience in Malaysia taught us a few lessons: It showed how vulnerable global communication is, but, at the same time, how modern information technology has revolutionised our ability to get in contact with people from anywhere in the world.

We were certainly a long way away – yet remarkably close.

SOMETIMES THINGS can be completely the opposite. Despite being right amongst other people, we feel like outsiders. We are close, yet infinitely far from one another.

Most of us probably recognise that scenario. But if you also have a hearing impediment, following conversations becomes even more demanding: at work meetings, around a dinner table or at parties. We have met hearing researchers who are intensely occupied in studying cognitive aspects of communication in everyday situations.

IN THIS ISSUE we also tell you about an Indian Master's student whose studies at Linköping inspired him to use biogas as fuel for busses. He is now on his way to turn his ideas into reality in the huge city of Chennai (formerly Madras). For Siva, and all other international alumni, it will now become easier to keep in touch with Linköping University itself as well as former classmates from time spent here. A network for international alumni is in the process of being set up. Welcome!

Finally, I would like to wish you all happy reading!

Lennart Falklöf, redaktör • lennart.falklof@liu.se

LiU magasin

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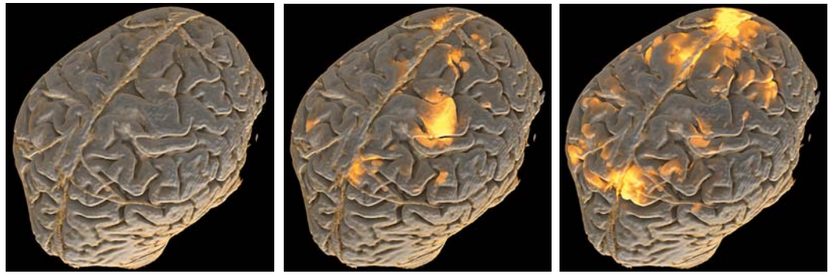
Ett internationellt magasin

Välkommen till det årliga internationella numret av *LiU magasin*, med texter på engelska. Här berättar vi bl.a. om spännande forskning, internationella studenter och om alumner som har världen som sin arbetsplats.



The brain in depth: new volume visualisation techniques give researchers and surgeons a far better picture of where the action is. Images: Nguyen Tan Khoa.

INSTANT BRAINWATCHING

It is all about having things under control – cars, unmanned aircraft and minds. The MOVIII Strategic Research Centre at Linköping University is now coming to its end, but the exciting research carried out there will continue.

MOVIII strategic research centre

text **ÅKE HJELM**
photo **GÖRAN BILLESON**

IN HER BOOK *Hon älskade ("She Loved")*, Swedish author Helena Henschen writes about a German scientist who smuggled out a third of Lenin's brain after his death. He wanted to know if there was anything special about a brain that could think great things.

These days he could have just put Lenin into a magnetic scanner, preferably whilst still alive so that there would be some thoughts to study.

In other words, it is sufficient to think of something new in order for that thought to be registered by the scanner and displayed on a computer screen. The active areas of the brain are coloured in blue, green, yellow and red.

But that is already old news. Development of that technology took a great leap forward when it was successfully used to show a brain's activity in real time; whilst its owner is still lying in the scanner, he can receive direct feedback. This opens up fascinating possibilities – for the first time in history, it is possible to see your own brain.

Mats Andersson

Hans Knutsson

"A person lying in the scanner can observe their own brain activity and control things by thought alone", says Hans Knutsson, professor of medical informatics at Linköping University.

THE TECHNOLOGY with the abbreviation fMRI (functional Magnetic Resonance Imaging) took its first steps in the early 1990s. A problem that needed to be overcome was how to develop useable images from the extremely weak signals picked up from nerve cell activity. Together with his colleagues, Hans Knutsson solved that problem by using CCA, a mathematical analysis. Now, the team is in the middle of the next big challenge.

"In classic fMRI, the person being scanned must continuously follow set instructions, like moving a hand or solving a math problem. But with real-time fMRI, the situation can be changed interactively all the time", Hans Knutsson explains.

Mats Andersson, himself a principal research engineer, is an experienced test subject. He calculates that he has spent at least 20 hours inside the machine, where he is exposed to a very powerful magnetic field – 1.5 tesla, or 50,000 times stronger than that of the earth.

"But I'm fine!" he says. "Magnetic fields are completely safe, as long as you don't have any metal in there with you."

As he lies in the tube that will lead him into the scanner, he puts on a head coil – an antenna that catches signals from the cerebral cortex – and a pair of 3D goggles. He is now connected to a loop, where his brain can work together with a computer to solve a problem.

Closing the loop: At the same time as the subject's brain is displayed to the operators outside, he can see it for himself in his 3D-goggles, and receive instant feedback from his moves and thoughts.

Right now, Mats Andersson will use the loop to communicate in writing with another person at a computer terminal outside the scanner room. His goggles show him a virtual keyboard and a pointer that can be controlled from letter to letter by means of slight movements of the hand or foot. The system has been gradually refined so that, now, the mere thought of moving is enough for the pointer to obey.

A reply to the question "favourite food" emerges, letter by letter. P, A, N, C... pancake. A little shaky, but it works.

A POSSIBLE APPLICATION of this technique is to give patients who are totally paralysed a chance to communicate with the outside world. But, mainly, the real-time technology provides new opportunities for understanding how the brain works. It can also be used during brain surgery, thanks largely to LiU researchers developing a new way of visualising information.

"We first scan the brain for five minutes", explains Anders Ynnerman, professor of scientific visualisation. "New algorithms help ▶

Mats Andersson installed in the scanner, with the head coil that catches the weak signals from the cerebral cortex.

Hjärnkoll i labbet

Idag är det möjligt för en person som ligger i en magnetkamera att iaktta sin egen hjärnaktivitet och styra saker och ting enbart med sina tankar. Det berättar Hans Knutsson, professor i medicinsk informatik vid Linköpings universitet.

Han ingår i excellenscentrumet MOVIII, där den gemensamma nämnaren är att hantera komplex information och komplexa system. Det handlar om att ha saker under kontroll – bilar, obemannade flygplan och hjärnor.

▶ us to get better pictures with a greater depth than before. We then use the fMRI signal as a kind of lamp that lights up areas of activity. The light spreads out and casts shadows. We can also peel the brain apart, layer by layer, to see what is happening deeper inside."

The result provides much better guidance for a surgeon than the traditional flat pictures, which show only the activity on the surface of the brain.

"Everyone gets excited over the new images, from radiologists to neuroscientists", Ynnerman says. "All we need to do now is package the technology into user-friendly software."

Volume visualisation is viable in many areas apart from medical applications. It can be used for simulating airflow around aeroplane wings, for finding defects in industrial materials, in archaeology and so on. It is basically the same method used in creating special effects in films, such as smoke and fire. ■

Breaking down barriers and changing ideas

To manage complex information and systems – that is the common denominator for MOVIII, the strategic research centre at Linköping University.

Lennart Ljung is a professor in automatic control engineering and the leader of no less than four large research centres at the university. He explains: "There are two big challenges involved in any kind of signal processing. Being able to separate relevant information from the background noise and to be able to present the results in an effective way – where methods such as visualisation, virtual reality and haptics are becoming ever more important."

MOVIII spans a broad scientific field. Lennart Ljung's goal is to break down the barriers between departments and create a joint research platform where ideas are exchanged instead of everyone jealously guarding their territory.

"Let's imagine they want to build an aeroplane at SAAB. Specialists form collaborative project groups to solve problems. That is not how we normally work in academia".

He is trying to create something of that spirit within the centre, but he is careful not to go in issuing commands.

"I try to work intuitively, as an inspirer", explains Lennart Ljung.

PETER MODIN

Lennart Ljung

MOVIII IS NOW ENTERING its final phase. The centre was established in 2005 with funding from the Swedish Foundation for Strategic Research, and, in October, it is time for the closing party at the new Visualization Centre C in Norrköping. But none of the researchers plan on closing down.

"Our plan is to make ourselves so attractive that no investor can resist us. We are currently building up an infrastructure as a basis for seeking new project funding."

That strategy has worked well so far. The research team behind MOVIII received a Linnaeus Centre – CADICS – with funding until 2017.

A developed visualisation laboratory, new unmanned aircraft and a hybrid engine lab are now on the agenda. These projects represent expanded research in the areas focused on at MOVIII:

- Mapping brain activity
- Navigation for unmanned aircraft
- Vehicle warning systems
- Control of drive systems.

LENNART LJUNG HAS BEEN successful in bringing strategic research centres home to Linköping University, but, actually, he is a little sceptical about that kind of research funding. He applauds academic freedom and asserts that research is fundamentally an individual operation.

"There has been a trend towards concentrating on large centres with clear objectives. But the pendulum will likely swing back."

FOOTNOTE: MOVIII stands for Modelling, Visualisation and Information Integration. Researchers at the centre work on automatic control engineering, sensor informatics, vehicle systems, artificial intelligence and scientific visualisation.

Fika is great!

We asked three international students about life in Sweden. Fika is their favourite tradition!

text & photo **THERESE WINDER**

1. What is your favourite memory of Sweden?
2. What if any tradition will you continue in your home country?
3. Is there anything you would love to be able to take home with you?

SUSANA GÓMEZ MUNOS, EXCHANGE STUDENT FROM MADRID, SPAIN

1. It's impossible for me to just choose one! I will always remember the friendliness of Swedish people. They helped us out a lot in the beginning and it was always with a smile. The frequent smiles are definitely something I noticed. Also I love the stress-free life here. In Madrid it's impossible to cycle, here I cycle to university and arrive calm and smiling.

Another thing I think is great is the way your grades are based on participation in the course too, not just on an exam; it feels like your day-to-day work is valued.

There is a lot more, I have been very happy here. And I love the barbecue obsession!

2. Fika! Everybody respects fika. I really like how in Sweden free time is respected, you start work early but you leave on time. Family life is valued and respected. In Spain there is a culture of long hours, with no personal time. Even teachers here take the time to have a break and a fika.

3. I'm going to take my LiU store merchandise home with me! No seriously, I'd like to be able to take the Swedish lifestyle home with me. It feels freer and more relaxed. And my time as an exchange student has been so inclusive, there have been so many natural meetings and you meet so many new people all the time. You mostly meet new people in the student-corridors, where many people from very different cultures live together and then they bring their friends, from other nationalities too. This means you can meet new people even in your own home; it's awesome and has never happened to me before.

And finally, I have to say something about the candles obsession! I love it. When I arrived in Linköping, I went to IKEA and bought a big pack of candles, copying the Swedish style. In every restaurant, in every home there is candle light and this makes the atmosphere so nice and relaxed.

EYLER NGOH NDUMEYA, MASTER'S STUDENT FROM DOUALA, CAMEROON

1. The first PhD thesis defence I went to, it was my friend's disputation. It was so different to what happens in Cameroon; it seemed like such a serious event. There were traditional songs and the professors attended. I enjoyed both the actual session and the party afterwards. The session where my friend defended his thesis was great, I liked they way it was run, with questions posed in an organised way. It was not just about challenging the student to try and catch him out but about the opponent wanting to see how well you know your research.

2. Fika! It is an opportunity to see and talk to your colleagues, a moment of socialisation. It also gives you extra energy to go back to work. I think it is really good for your work.

3. Glögg. It's fantastic. My friends from Cameroon and I now refer to any alcoholic drink as Glögg.

VICTORIA WRIGHT, MASTER'S STUDENT FROM KENTUCKY, USA

1. My favourite memory of my time in Sweden took place on our class field trip to Åre. We had been cross-country skiing one morning and stopped to have lunch around a snow-covered fire ring. As we began clearing places to sit, a snow fight began among some classmates. As people arrived on their skis, it turned into a war. Snow was flying everywhere and we were throwing each other into the snow.

When we finally settled down to eat, still smiling and laughing, I looked around and realised that I was sharing such friendship and warmth with people from all over the world. I will never forget how it felt to sit in that group and feel so comfortable with people I had never met before the beginning of the school year.

2. I have enjoyed learning many Swedish traditions, so this is a tough question. I suppose the tradition that has been such a big part of my life here has been taking fika. This regular pause for coffee, tea, and a snack is such a relaxing tradition. I have come to realise that I depend on having this break every day. It is especially nice to take fika during class because many of us end up sharing something that we have brought. So, I think this is the tradition that I hope to continue when I get back home. But again, there are so many to choose from!

3. Ah, yes, there are many things I would like to be able to take home with me. I would like to take the practice of riding a bicycle everywhere, no matter what the weather or time of day. I would also like to take home all of the wonderful people I have met here, not only from Sweden, but from all over the world. It will be terribly difficult to leave my corridor-mates, classmates, and friends. I wish all of them could come home with me so we can continue to learn about and from each other, sharing our cultures and enjoying each other's company.

I have learned so much in my programme, but I have learned the most from the people I have gotten to know while living here, and I will miss them all.

Traffic jam in the city of Chennai in India. This is where the master's student Sivaraman Pandian has initiated a project to convert thousands of buses to run on biogas.

Biogas for Indian buses

MASTER'S STUDENT FROM LIU INITIATES HUGE TRANSFORMATION

Sivaraman Pandian had never heard of Linköping when he was looking for a course in environmental engineering. Once here, he became inspired by the Swedish experiences in using biogas as automotive fuel. His project today: To convert all of the thousands of buses in the huge city of Chennai (formerly Madras) to run on biogas.

text **ANIKA AGEBJÖRN**
photo **BABU/REUTERS**

IT IS A CLASSIC win-win situation. The city of Chennai, with its population of over ten million, produces several thousand tonnes of solid waste every day, which, for the time being, is mostly just dumped. The city's more than 3,000 buses run on diesel, a fossil fuel that causes serious air pollution.

If the waste could be used in the production of biogas, both of these problems would be reduced. In addition, carbon dioxide emissions would be cut drastically and fuel costs would go down by 25 percent.

It works in Linköping, where the city's buses have been running on locally-produced biogas for more than ten years, so why not Chennai?

A COUPLE OF YEARS AGO, Sivaraman Pandian – or Siva, as he is known – came to Linköping University. He is a qualified electrical engineer and wanted to expand his training to include the environmental field. He did an online search and found the masters course in Energy and Environmental Engineering, which was then relatively new at Linköping University.

"I had never heard of Linköping", he laughs, "but I thought it was worth a try."

Education in energy and environmental engineering at Linköping University is characterised by a systems and holistic approach, whereby the waste from one process can become a beneficial raw material in another. Environmental problems are turned into business opportunities. Östergötland, the province in which the city of Linköping is situated, is also at the forefront of the production of alternative fuels – biodiesel and ethanol in addition to biogas.

"If Linköping can run its 68 buses on biogas, imagine the potential in a place like Chennai, with its more than 3000 buses", says Siva.

He chose Chennai because there is a good foundation to build upon there. Biogas is already produced at the city's five treatment plants, but, instead of being used for automotive fuel, it is used only in generating electricity for the treatment plants themselves. There is a lot of potential here, says Siva.

"The quality of the biogas needs to be improved so that it meets the requirements for vehicle fuel."

IT IS PRECISELY this process that he has learned and would now like to introduce in Chennai. He has chosen one of the five treatment plants – Koyembedu – that is situated near the largest bus station in Asia. This station is frequented by 2,000 buses and 200,000 passengers daily. His choice minimises the problem of transporting the biogas.

Siva has been devoting a lot of time in establishing contacts in India. And he has been successful.

January of this year saw the signing of a Memorandum of Understanding between TEDA (Tamil Nadu Energy Development Agency) and Svenska Gasföreningen (The Swedish Gas Association) for a pilot project to be done. Siva is now looking for funding. He has contacts with several Swedish companies in the industry and has also started his own business, Ren Gas Private Limited.

"It doesn't all stop with Chennai', he says. 'India is a huge market; there is so much to do."

BACK AT LINKÖPING UNIVERSITY, Professor Mats Eklund, Siva's instructor, is clearly happy about how things are developing. The two-year Energy and Environmental Engineering Master's programme is now being offered for the third year running. The course is highly sought after and students come from all over the world, outside the EU.


Sivaraman Pandian

"We have applicants from Iran, China, India, Pakistan and Latin America but none from Europe. We would like to have more from there", says Mats Eklund.

For students coming from outside the EU to study at a university in Sweden, a fee will be introduced from the autumn of 2011. That is obviously a concern, but Mats Eklund hopes to be able to get sponsor money from businesses to help those students who are not able to finance their studies themselves. As he points out, this course is also a perfect way of exporting Swedish know-how and technology and create business opportunities for Swedish companies. ■

Biogas till indiska bussar

I den indiska mångmiljonstaden Chennai (tidigare Madras) har masterstudenten Sivaraman Pandian tagit initiativ till ett projekt att ställa om tusentals bussar till biogasdrift.

LiU news

Four honorary doctors at LiU

At the end of May, Marie Westrin, head of Ericsson's Development Unit Radio, received an honorary doctorate at Linköping University along with Professors Michel Gevers, Richard P Ellen, and Uno Svedin.


Marie Westrin

Marie Westrin has played a key role in the development of new mobile networks. She is responsible for the whole development span of Ericsson's radio network. She studied for her MSc in Physics and Electrical Engineering at Linköping University.

The Belgian Professor Michel Gevers is an internationally renowned researcher in the field of automatic control and systems engineering and has, for example, led high-profile projects to develop models for the regulation of industrial processes. Professor Richard P Ellen, University of Toronto, Canada, is doing research in dentistry and has over the years had many contacts with the Faculty of Health Sciences. Professor Uno Svedin has actively participated in many interdisciplinary research collaborations and has for over three decades had close contacts with the Faculty of Arts and Sciences.

Linköping University grows

Research and education grew significantly in 2009, shows Linköping University's annual report.

The number of students increased by 1300 to now stand at 26,500. The number of graduates from undergraduate programmes was at a record high of 3,659, while 176 new doctoral graduates put this number slightly lower than last year's peak.

The number of employees increased by nearly 100 and in December 2009 LiU had 3,564 employees. Virtually the entire increase is found in the university's core business, i.e. teachers and researchers.

The sharp increase in external research funding, totalling 74 million Euros (+16.5 million Euros), in combination with increased funding for both research and education, resulted in a total revenue of 300 million Euros and a financial surplus of 14 million Euros.

"I can talk to the dean, I can talk to the rector. I think it's a really nice environment for a researcher to be in."

MAY GRIFFITH, NEW PROFESSOR IN REGENERATIVE MEDICINE IN A VIDEO FILM AT WWW.LIU.SE

Tuition fees from next autumn

Sweden will introduce tuition fees for students coming from outside Europe from autumn 2011. Efforts are now underway to increase LiU's international profile.

Earlier this year the government published its bill "Competing on the basis of quality –tuition fees for foreign students". According to the proposal, fees for foreign students will be introduced from the autumn semester 2011. Charges will apply to students outside the EU / EEA area, who are not taking part in an exchange. Individual universities will themselves set the level of the fee, based on a principle of full cost recovery.

In connection with the new charges the government proposes to introduce two new scholarship schemes. One is aimed at students in the 12 countries with which Sweden has established long-term development cooperation and the other is aimed at particularly qualified students. These will be administered by the Swedish Institute for the former and the universities for the latter.

SWEDISH UNIVERSITIES now have little time prepare for the new system.

"With close ties to strong research environments and with Linköping University's reputation of providing high quality in education we are confident that LiU will continue to attract talented students", says LiU's Director of Communication Lars Holberg.

LiU will in this respect always be more of a talent destination than a volume recruiter.

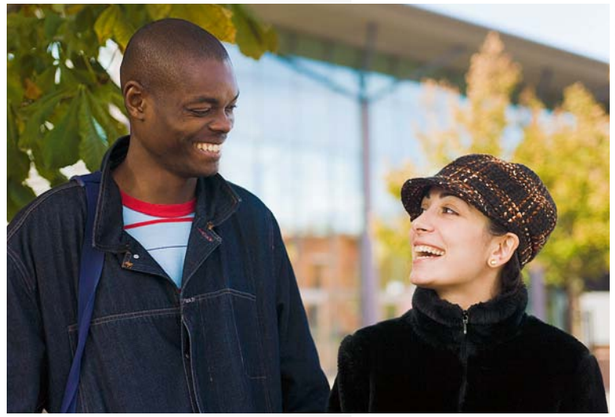
"We are not in this for the money, international recruitment for us is a question of enhancing the quality for all students. The international students are a very valuable asset for us."

There are a lot of new administrative processes that will have to be put in place regarding admission process, scholarships, reception and service and many people are working hard for an extended marketing effort to be released in the autumn.

When Denmark introduced tuition fees for foreign students in 2006 it led to a significant reduction of its overseas students. There will now, at a national level, be a joint marketing effort of Swedish education under the tagline "Challenge yourself" in an attempt to minimize the dip in recruitment.

THE COURSE FEES that are now proposed to be introduced in Sweden do not apply to students from universities that Swedish education institutions have exchange agreements with.

Those students who have already started their education in Sweden will not be charged tuitions fees.


PETER KARLSSON

A growing number of international students have vitalised the campus environment during the last decade. Linköping University hopes to attract talented students even after the introduction of tuition fees for students coming from outside Europe from autumn 2011.

COLUMN FROM LONDON, ENGLAND

World University

WHEN I FIRST ARRIVED at the University of East London, UEL, I wondered if I had accidentally wound up in another part of the world. Could this really be Europe? Or had I taken the wrong flight from Sweden and landed in Africa or Asia? The reason for my confusion was that I, as a white person, was no longer in the majority. That is not something that I am used to – at least, not when I visit universities in Sweden.

But, at UEL, things are different. 75 percent of the students are non-white, and the people working there also display a great range of ethnic variety. The university is situated, as its name suggests, in East London and next to some of the city's – and England's – most vulnerable areas, with a large variety of ethnic minorities living there.

THE UNIVERSITY HAS BEEN WORKING to diversify its recruitment for some time, especially towards those living close by. These efforts have been successful: almost half of the 23,000 students come from neighbouring areas. The university also attracts a great many international students as well as external students.

The education is similar to that taught at any other university, with the same exam requirements as anywhere else. What makes this university so different from many others are the enormous efforts that it goes to in order to help absolutely everyone – regardless of ethnicity, financial situation, disabilities or social status – to be able to complete their studies.

Many universities today are trying to make it easier for students with varied backgrounds to study, but it is said that there are few academic institutions that are a match for UEL when it comes to well thought out ideas that are not just written down neatly in a document but actually realised.

To name but one of many examples, the university has a modern library that is open 24 hours a day during terms. This means that everyone can access the library, with all its computers and literature, at any time – including those who, for example, are not able to sit at home and study, or those who work at certain hours.

NATURALLY, there are also many challenges for UEL. Anything else would be inconceivable bearing in mind that there are so many people from such diverse cultures and religions, and with such varying social and economic situations.


ÅSA WESTERLUND

None of the people I talk to, though – neither amongst the students nor the staff – say that there is a big problem with racism or ethnic and religious intolerance. Instead, the problems are more to do with difficulties in communication, that there are so many students and workers that do not have English as their mother tongue that misunderstandings can easily arise.

But it seems that the vast majority here agree that having a mixture of all the peoples of the world is a positive thing in itself and is rewarding from both a private and professional point of view. Quite simply, UEL is a reflection of the world we live in, and many are proud to argue that – from a knowledge perspective – there is no better environment to be in.

FOR THE INDIVIDUAL, as well as for society, each and every graduation at UEL represents a victory. There are many students who come from a disadvantaged background but, after university, go out into society full of self-confidence and a new critical and democratic way of looking at things, together with good job prospects.

Today, out of necessity, there is much talk about achieving an ecologically sustainable society. But we should not allow ourselves to forget that we also need a socially sustainable society. Ecologically sustainable is not enough; the social aspect, where we strive for good living standards for one and all, is just as important – for the individual and for society as a whole.

EVA BERGSTEDT

LIU JOURNALIST ON A STAFF EXCHANGE PROGRAMME

Come home, dad ...

Gender researcher Roger Klinth has studied campaigns in Sweden trying to encourage fathers to take their parental leave entitlement as provided by law.

text **GUNILLA PRAVITZ**
photo **VIBEKE MATHIESEN**

EVEN THE MANLIEST of all men can be at home with the kids.

Being a father on paternity leave is character-building – fathers somehow become better people afterwards, even better career men.

And give up that old myth about the "man's role"! What will men regret on their deathbed: missed overtime or missed relationships with their children?

But the most important thing is equal parenting, a sharing of responsibilities.

That has been the argument put forward in campaigns driven by the Swedish Government Offices, national authorities, trade unions and others since the 1970s – trying to encourage fathers to take their parental leave entitlement as provided by law.

There have been many campaigns through the years. Gender and equality researcher Roger Klinth has studied 13 national campaigns and some 20 regional ones from a social-historical perspective. His research has led to the release of a new book, entitled (in Swedish) *Svenska fäder mellan politiska visioner och levd verklighet* ("Swedish fathers caught between political visions and real life").

Roger Klinth has studied paternal leave before. His dissertation, *Göra pappa med barn* ("Making Daddy Pregnant"), published in 2002, focused on the Swedish political history of paternal leave, and how something that for many years had been politicly impossible became a reality in 1974.

Swedish fathers were given the statutory right for paid parental leave.

"It was a controversial decision that received a lot of attention, not least of which in the European press", says Roger Klinth.

But in Sweden there were few political opponents when the decision was finally made. The problem was rather how to get fathers to stay at home.

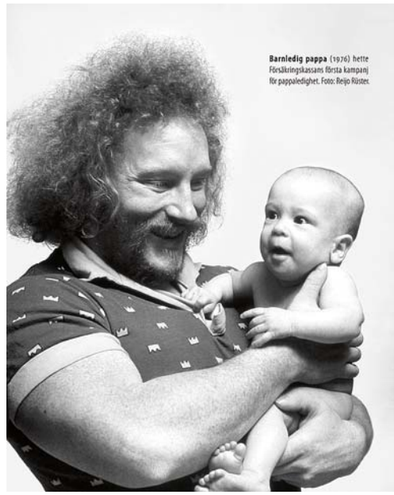
THAT IS WHERE the campaigns come in.

Roger Klinth explains: "In the middle of the 1970s, a lively discussion was under way about goals, methods and state control. Nobody wanted to go so far as to force men to take the same amount of leave as women."

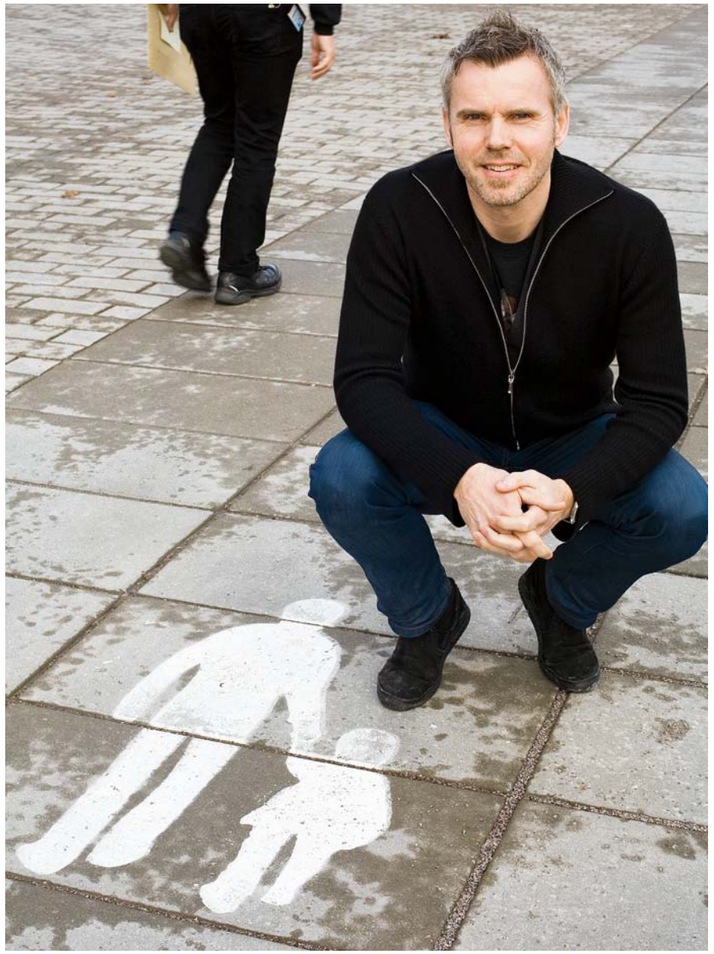
The alternative was to influence public opinion and bring about a change of attitudes. The campaigns were a phenomenon unique to Sweden; in Norway, which also introduced paternal leave towards the end of the 1970s, no equivalent was to be found; nor was there anything similar in Denmark, which followed suit in the mid 1980s.

"The Swedish campaigns were never evaluated, so we know little about whether or not they had any practical results. They do, however, say something about the notions of society."

In 1976, the first campaign put masculinity in the spotlight. The posters of the time show heavyweight lifter Lennart "Hoa-Hoa" Dahlgren posing with bulging muscles and a baby on his arm. Other pictures show impressive-looking sport prams, or the creative engineering solutions of a stay-at-home dad in the kitchen.



Since paternal leave for men was introduced in the 1970s, there have been lots of campaigns to get fathers to stay home from work (pictures from Roger Klinths new book).



In our society, it is possible to combine a succesful career with having children, says Roger Klinth.

ANOTHER ANGLE TAKEN by the campaigns can be referred to as "project dad" – being home with the child became a kind of personal training.

"Parental leave for men is seen as an asset in their working life – it is justified from a management point of view, whilst the same time off for women is more of a burden ..."

An additional thought that comes out in the campaigns is the idea of male self-deception; the duty of supporting the family as a man trap.

"The approach used is existential questions about what really matters in life: working 80 hours a week, or close relationships?"

Lying behind these arguments was the criticism at the time that was aimed at the traditional male role. The campaigns posed straight questions, such as: "What do you think you will regret on your deathbed?"

Towards the end of the 1990s, the gender perspectives started making an impact. The government even provided regulations stipulating that officials should be trained in gender issues.

"And it actually made a difference", says Roger Klinth. "Messages became more gender neutral and no longer dealt solely with getting men to take parental leave. They now dealt with the whole issue of equal parenting, something that is not simply a possibility but a duty and responsibility."

ONE ALLOCATED MONTH of paternal leave was introduced in 1995. Seven years later, it became two. "Half each", say the slogans of the 2000s.

But the idea that men would be "forced" to stay at home with the children is still provocative. Words like "force" are virtually unthinkable when it comes to men's parental leave.

"There is a difference in how people view gender and parenthood. Increasing the quota is still controversial, so it is much simpler for the politicians to just display that they have the power to act by investing a few more million in new campaigns."

Most men take their first two months of paternal leave, but the majority leave it at that. So, today, a particularly clear educational aim is evident in the campaigns.

"It is all to do with enlightenment, to tell people that men are entitled to more than two months off. Efforts are taken to ensure that the message is positive and doesn't impose guilt upon men who choose to work instead."

And what results are there to show from all these campaigns?

"I believe that they are quite ineffective. The campaigns constitute a tiny voice that is being drowned out amongst the cultural bedlam that shapes ideas about gender and parenthood. Parenting is also a question of age – and generations", says Roger Klinth.

In our society, it is possible to combine a successful career with having children. Roger Klinth has conducted a number of interviews with men who have chosen to stay at home with their children for an extended period of time.

"It is not uncommon for fathers who have their careers behind them to have a more positive attitude towards fatherhood, but a change is also noticeable amongst many younger men who are not brought up so strictly in old gender patterns." ■

Pappa, kom hem

Det har varit många kampanjer för att få fäder att ta ut sin lagstadgade föräldraledighet sedan den infördes i mitten av 70-talet. Roger Klinth har studerat kampanjerna och de argument som använts. Resultatet har han samlat i en nyutkommen bok.

Portrait of a LiU alumna

SHE KNOWS THE IMPORTANCE OF STATISTICS

When Monir Dastserri grew up in Iran, she wanted to be an architect. But things changed, and today she has a top position as a statistician. And she is very proud of her profession.

text **GUNILLA PRAVITZ**
photo **ANNA MOLANDER**

Name	Monir Dastserri
Job	Coordinator/ methodological statistician at the Swedish Association of Local Authorities and Regions
Education	Statistics, Master's degree, 1996
Lives	Kungsholmen, in Stockholm
Likes	Long journeys, to be able to see other ways of life. The trip should last for at least a month. The last excursion was to Latin America.
Favourite teacher	Gösta Forsman, who taught selection methodology. We still keep in contact.

"I CANNOT UNDERSTAND why more people don't become statisticians", says Monir Dastserri.

She quotes Google's chief economist Hal Varian, who predicts that, within a decade, the job of statistician will become the sexiest around. People usually think he is joking: "... but who would've guessed that computer engineers would've been the sexy job of the 1990s? The ability to take data – to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it – that's going to be a hugely important skill in the next decades".

"In addition to that," adds Monir Dastserri, "it is absolutely fundamental for a working democracy. Without any answers to the right questions, politicians do not have anything accurate to base their decisions on."

But, truth be told, she hadn't planned on working as a statistician after graduation back home in Iran.

"No! I wanted to be an architect."

But politicians intervened and the university in Iran was shut down. Monir Dastserri wound up in Katrineholm, Sweden and a long way from her childhood dream.

AT 31 YEARS OF AGE and with a 7 year-old daughter, she chose the statistics programme at Linköping University.

"Job prospects as an architect were just too poor, it wasn't worth trying for. But I've always been good at maths and interested in social issues, so statistics suited me well."

"There are a lot of people who think that statistics is just about counting. I think that is a shame. It has mainly to do with methods and planning how to do surveys properly so as to provide information about what you really want to know."

Nothing annoys her more than being put on a project too late, and having to solve problems because the project has already advanced far enough for incorrect methods to be used or wrong questions to be asked. ▶

Today, Monir Dastserri works in methodological statistics at the Swedish Association of Local Authorities and Regions (Sveriges Kommuner och Landsting - SKL) in Stockholm. Her place of work commands a spectacular view over the city. She is a kind of consultant, working as coordinator and with internal methodological support and project management.

WHAT WAS IT LIKE to start studying after thirty – and with a young child?

"It was tough", she replies.

"I didn't have any trouble with the maths, that was mostly a fun challenge. You don't just calculate, but you prove formulas, and I get a kick out of that every time I manage it. But I couldn't speak Swedish well enough, and – for me – the most difficult thing was to just keep up with the lectures and understand the assignments. I often had to sit there with a dictionary."

But she had made her mind up. She was determined to manage her studies.

"In a way, the studies also saved me. I didn't have so much time to think and feel."

Each day, she was at university at eight o'clock in the morning. By four o'clock in the afternoon, it was time to collect her daughter, and, at eight o'clock in the evening, she sat down to study.

Not one missed exam. Monir Dastserri remembers how she used to come up with some kind of reward for herself after every successful test.

"You know – consumer society!" she says with a laugh.

"There was no possibility of having a normal student's life, but I did have wonderful classmates – we had a lot of fun together and studied together. It is our 15th class anniversary this year, but, unfortunately, I'll be in southern France by then and won't be able to attend."

Completing her bachelor's degree after three years, she decided to continue her studies.

"I specialised in biostatistics and took a master's degree in Health and Society."

BEFORE MONIR DASTSERRI had even completed her degree, she got her first job at the Women's Clinic in the Linköping University Hospital.

"That's another thing people don't think about – that research is also completely dependant on statistics. I worked with studies carried out for medical research and there was a lot of work to do with various research articles."

Two years later, she went on to her next job, at The National Centre for Work and Rehabilitation (Rikscentrum för arbetslivsinriktad rehabilitering) in Linköping.

In 2001, she noticed that what was then the Swedish Integration Board (Integrationsverket) in Norrköping was looking for methodological statisticians.

"The job was about using more advanced quantitative methods and touched on social issues that interest me", Monir Dastserri explains.

Monir Dastserri

A year later, she was put in charge of all statistical work at the Board.

"It was really the kind of work that allowed me to develop in every possible way", she says.

Among other things, she developed the Board's statistical database.

THERE WAS, however a catch – after a few years, the government decided to shut the whole authority down.

"My 'baby' – the statistical database – was to be transferred to Statistics Sweden (Statistiska Centralbyrån), but I decided to look for work elsewhere."

Statisticians hardly need to feel anxious about finding work. Even before the Swedish Integration Board had been closed down, in 2007 Monir Dastserri had a new job at the head office of the Swedish Social Insurance Agency (Försäkringskassan), in Stockholm.

It sounded interesting. It would involve method development that required analytical skills on issues to do with sickness pay and activity compensation. She also had friends in Stockholm who could conveniently lend her their flats for a while.

"I did the long commute between Stockholm and Linköping, and it went better than expected."

But the job was not everything it was made out to be.

"I resigned", says Monir Dastserri, "carefully calculated after seven months and seven days."

A new job was already waiting for her at the Swedish Association of Local Authorities and Regions.

"We sold the house in Linköping and bought a flat in Kungsholmen, out towards Lake Mälaren", she says.

HER PARTNER, Behzad Koucheki, also from Iran, is a statistician as well, and he, too, learned the trade in Linköping. Today, he works at the National Board of Health and Welfare (Socialstyrelsen).

"But, no, we don't talk about work at home", Monir Dastserri says with a laugh, "although we do sometimes deal with each other within the framework of our respective jobs."

What about the future? What is the next career move?

"Right now I have a great job. On the other hand, I have always worked for national or municipal agencies. Maybe it would be interesting to work for an international organisation", she muses.

So if an offer comes in from, say, the OECD or the UN, then she probably would not say no. ■

Sexig statistik

Statistiker är ett riktigt framtidsyrke, menar Monir Dastserri, och citerar Googles chefsekonom som förutser att det kommer att vara det sexigaste jobbet inom de närmaste tio åren.

Monir Dastserri understryker också vikten av statistiker för en fungerande demokrati. LiU-alumnen med rötterna i Iran har idag ett toppjobb på Sveriges kommuner och landsting (SKL).

KRISTOFER SANDBERG

Everyday situations, such as gathering around a dinner table, can give rise to very complex sound environments for persons with hearing impairment.

Hearing is about communication

EXCELLENCE CENTRE FOCUS ON COGNITIVE ASPECTS

At Linnaeus Centre HEAD a new field of research is emerging – cognitive hearing science. Researchers from different areas are working together to gather new knowledge that can help make everyday life easier for persons with hearing impairment.

text **LENNART FALKLÖF**
photo **VIBEKE MATHIESEN & KRISTOFER SANDBERG**

HEARING PLAYS an important role in our communication with others. When our hearing fades it affects the quality of life. We become unsure of whether we correctly perceive what people say, find it harder to take part in conversations and can become isolated in social contexts.

In June 2008 the Swedish Research Council approved Linköping Universitys plan for a ten-year interdisciplinary research programme on hearing impairment and deafness. Linnaeus Centre HEAD is now focusing on the cognitive aspects of communication in various everyday situations.

"With this centre, we establish cognitive hearing science as a new science field. We study the physical and cognitive basis of hearing and its interplay with signal processing in hearing aids in listening environments with varying demands and complexity", says Jerker Rönnberg, psychology professor and head of the centre.

Jerker Rönnberg

It is not just a question of hearing – you also have to able to swiftly interpret and construct meaning from what you hear. For this process, people who are hearing-imparied are more or less dependent on their working memory capacity and ability to mentally complete distorted and incomplete information (see figure on next page).

EVERYDAY SITUATIONS where several people talk at once – such as in a crowd, around a dinner table or at a party – can be very demanding for those with a hearing impairment.

"We have carried out several large studies about speech perception in disturbing ▶

background sounds. They show that there is a clear correlation between working memory capacity and hearing well in these environments", says Thomas Lunner, adjunct professor in cognitive hearing science at LiU and senior researcher at Oticon in Denmark.

In the middle of the nineties he and other LiU researchers participated in developing the world's first digital hearing aid. Now he is aiming at hearing aids adapted to a person's cognitive abilities.

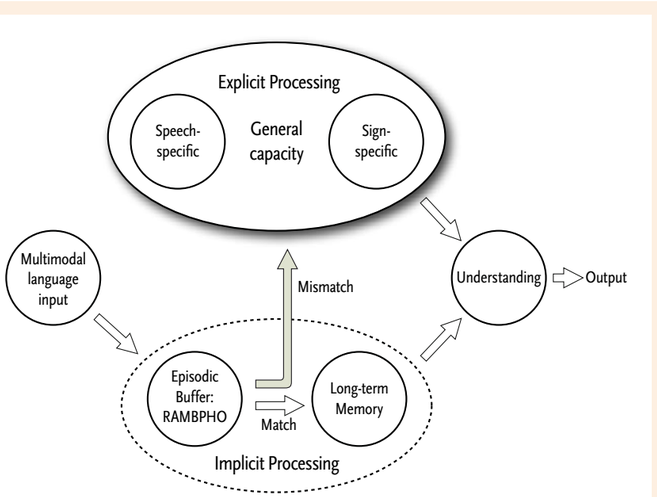
Thomas Lunner tells about studies which have examined the ability to listen in the short gaps which arise in our conversations, i.e. catching another conversation while speaking to somebody.

"That ability is substantially worse with a hearing impairment. Generally, you become worse at distinguishing between different sound sources."

Thomas Lunner

This is a challenge when developing new hearing aids.

"We need to find new kinds of signal processing which can compensate for the consequences of the hearing impairment in noisy sound environments."



Working memory model for Ease of Language Understanding,the ELU model.

Cognitive model show how we hear

Jerker Rönnberg, director of Linnaeus Centre HEAD, has developed a cognitive model for how we hear. He calls it the Working memory model for Ease of Language Understandling (the ELU-model).

Hearing is something you do with lightning speed – if you hear normally. It takes ten milliseconds for the sound to enter the ear, another maybe 100 milliseconds for the brain to interpret it as a linguistic sound and 100 - 200 milliseconds later the words are brought forth from our semantic lexicon in the long-term memory.

"But if you have a poor input, e.g. in difficult hearing environments or when you have a hearing impairment, you tend to get stuck. A mismatch arises when the incoming signal is checked against the long-term memory", says Jerker Rönnberg.

Instead the working memory has to fill in the gaps. The incomplete or distorted information is processed on your mental workbench: you make guesses and inferences to try to understand what is being said.

"How well we manage this varies a lot from person to person. Somebody who has good working memory capacity also finds it easier to understand the language", says Jerker Rönnberg.

RESEARCH ABOUT COCHLEAR IMPLANTS (CI) is and has been the main focus for psychology professor Björn Lyxell during the past decade.

A cochlear implant is a kind of hearing aid. The outer parts of the implant, a microphone, a signal emitting speech processor and a radio transmitter, are fastened behind the ear. The radio transmitter signal is fed to a receiver inside the cranium and this sends signals to an electrode inside the cochlea. The electrode impulses are in turn caught by auditory nerves and fed to the hearing centre in the brain.

"Today everybody in Sweden who is born deaf or with a severe hearing impairment is given a pair of cochlear implants", says Björn Lyxell.

The implants allow these children to live almost as other children.

Björn Lyxell

However, having a cochlear implant inserted by operation does not mean that your hearing is normal. In the cochlea there are 17,000 hair cells which represent different frequency areas. A cochlear implant only has 22 electrodes with different frequency sensitivity.

"The sound is much more muffled than normal. It is like talking on the telephone using Skype", says Björn Lyxell.

A current study has examined cognitive development among children with cochlear implants.

"The study shows that hearing stimulation strengthens the development of the child's cognitive abilities. They get a better working memory, quicker lexical access and better phonological skills which affect their reading and calculation ability positively and also provide better conditions for communication", says Björn Lyxell.

Together with hearing scientists in Örebro he is also doing a study which is aimed at facilitating working life for those who have a hearing impairment.

"We have developed a cognitive test which works clinically. This facilitates diagnosis and is of help when adapting sound environments and assisgments. In certain jobs it is crucial to hear and understand information correctly", says Björn Lyxell.

OTHER RESEARCHERS at Linneaus Centre HEAD study what happens to the sound signal until it reaches the cognitive system of the brain.

"We are trying to get a more detailed image of what relative importance deficiencies in different parts of the peripheral auditory organ has for a person's hearing and understanding of speech", says Stefan Stenfelt, professor of technical audiology.

The programme also studies sign language and similarities in how the brain processes signs and speech. Tinnitus, dyslexia and deaf-blindnes are other topics studied in relation to hearing status.

Several researchers also study how people cope with a hearing impairment.

"In interviews, people with impaired hearing often talk about uncertainty which creates insecurity. It is extremely important that questions regarding self-esteem and identity are discussed during rehabilitation", says Berth Danermark, professor of sociology.

"To be hearing impaired affects that which is most central in life, namely the ability to communicate." ■

FOOTNOTE: Read more about the research at www.headcentre.se.

Hörselforskning vid fronten

Hörande spelar en viktig roll i vår kommunikation med andra. Men vilken betydelse har kognitiva förmågor för vårt hörande? Den frågan står i fokus på Linnécentrum HEAD. Här möts forskare för att från olika infallsvinklar mejsla fram ett nytt vetenskapsområde – kognitiv hörselvetenskap.

Tillsammans tar de fram ny kunskap som underlättar för personer med hörselnedsättning i deras arbets- och vardagsliv.

At the international forefront

Linneaus Centre HEAD strives to be a truly international research environment. Researchers and postgraduate students from all over the world demonstrate that cognitive hearing science at LiU stays at the forefront.

Ingrid Johnsrude from Canada is one of the professors in the research team. Her encounter with Linneaus Centre HEAD was a pleasant and unexpected discovery.

"When I first heard of the HEAD initiative in cognitive hearing science, in November 2008, I was tremendously excited. I had never before had a name for my research area – that was it!"

Ingrid Johnsrude

Her research focus is on exploring how different sources of knowledge contribute to speech perception.

"As people get older and the sense of hearing becomes less acute, they must rely more and more on what they can piece together to make sense of spoken language, especially in the busy and noisy listening conditions of everyday life."

Many sources of knowledge can assist perception of speech. If a particular talker is well known to you it is easier to guess what that person might be likely to say and how they might say it. Other important cues are knowledge of the topic of discussion, knowledge of the structure of the language being used and knowledge of the world.

"All of this can help a listener to restrict the pool of possible identities that a particular degraded word can take. For example, if I hear 'the witness spoke a solemn ...' I can probably guess that the final word will be oath, even if it is not spoken very distinctly", explains Ingrid Johnsrude.

The HEAD Graduate School attracts postgraduate students from all over the world. This is Sushmit Mishra from India.

In the research she uses both behavioral studies and neuroimaging methods such as functional magnetic resonance imaging (fMRI).

Her research has been highly recognised. Last year she received two prestigious awards.

Ingrid Johnsrude is really satisfied with her new research environment.

"When I first contacted the group, they were very welcoming. People in the HEAD team come from many different backgrounds and bring different skill sets and expertise to the table. This results in a multidisciplinary approach to the problem of communication in hearing impairment which is enriching and productive. I also appreciate the double focus on both basic and applied research."

MARY RUDNER, director of studies at the HEAD Graduate School, has her roots in England. She is very pleased with the ongoing internationalisation of the school with visiting professors, visiting researchers and postgraduate students from all over the world – evidence that the research is at the forefront.

Mary Rudner

"But most of all the internationalisation means that we widen the perspectives. It is so obvious when for example an Indian audiologist prioritises differently: simple solutions for many is put up against advanced technology which few can afford."

"In everyday life it is a great advantage that we are forced to express ourselves in English and get used to using scientific English", says Mary Rudner. ■

LiU research

EU funds fight against Alzheimer's disease

The EU has granted nearly 5 million Euros to establish novel molecular tools and technologies for diagnosis and treatment of neurodegenerative diseases, such as Alzheimer's disease. The project is coordinated by Linköping University.

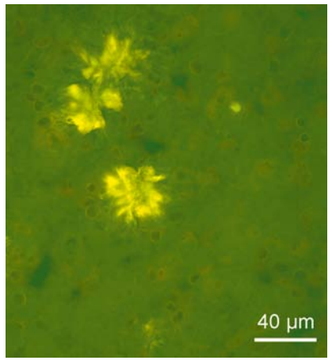
It is called the LUPAS project and seeks to bridge the gap between diagnosis and treatment of both Alzheimer disease and prion diseases. By developing novel agents and methods for diagnostic imaging of accumulations of misfolded proteins, so called amyloid plaque, it is possible to improve quality of diagnosis as well as facilitate monitoring and understanding of the disease progression.

The novel molecular imaging tools are based on luminescent conjugated polymers, LCPs, a material normally used for electronic applications, such as light emitting diodes (LEDs). It was discovered by the researchers forming the LUPAS consortium that these molecules bind effectively to amyloid plaques. Through the specific luminescent fingerprint of the LCPs, the amyloid plaques can easily be visualised and recognised. Moreover, the molecular scaffolds will be tested as therapeutically active agents for prevention of protein aggregation diseases and could possibly facilitate treatment of Alzheimer's and prion diseases in the future.

"The skills within the LUPAS consortium will undoubtedly bring forward novel tools for understanding the pathological hallmarks of Alzheimer's disease and prionoses," says Professor Per Hammarström, the LUPAS coordinator. "Within the 3 year time frame of LUPAS we will develop these tools for use in disease models systems in vivo and on histolological ex vivo samples from humans. If successful it will take a few more years to apply this technology in the clinic", he adds.

The LUPAS partners are Linköping University (Sweden), Université Claude Bernard Lyon 1 (France), University of Tübingen (Germany), Norwegian University of Science and Technology (Norway), Zürich University Hospital (Switzerland), Charité - Universitätsmedizin Berlin (Germany), Applied Spectral Imaging (Israel) and Genovis AB (Sweden). ■

Professor Per Hammarström coordinates the LUPAS project.



A plaque in a mouse brain detected by the luminescent polymer.

World leaders in computer graphics in Norrköping

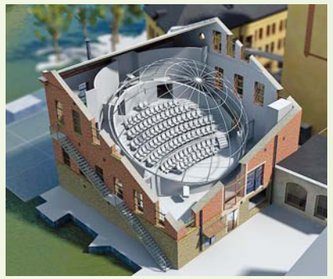
The world's leading researchers in computer graphics gathered in Norrköping in early May to attend the Eurographics Conference.

Linköping University hosted Eurographics 2010 together with SIGRAD, the Swedish Association for Graphic Data Processing. Anders Ynnerman, professor of Scientific Visualization at LiU and chairman of the conference was proud to have been given the opportunity to host the world's leading scientific event in this area.

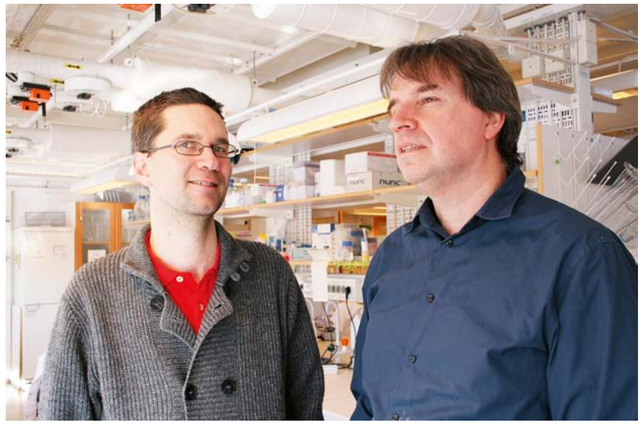
"It is a testament to the position LiU and Norrköping have gained in visualization and computer graphics research", he says.

Eurographics 2010 attracted 600 researchers from around the world to Norrköping. The keynote speakers were Alexei Efros, researcher at Carnegie Mellon University, USA, Erik Hägersten, professor of computer architecture at Uppsala University and Erik Reinhard, who works with applications of perception- and neuroscience at the University of Bristol, England.

Participants were also given a preview of Norrköping Visualization Centre C. ■



At the end of May Norrköping Visualization Centre C was inaugurated. Among the activities for visitors are journeys into space. The centre also has ongoing research, education and artistic creation. The picture shows a model of the dome that is part of the centre.



The 156 year old seed planted by geneticists Matti Leino (left) and Johan Edqvist grew up to a healthy acacia plant.

They brought an acacia seed to life after 151 years

When the French had just started building the Suez canal, a seed ripened on an acacia tree in the Egyptian desert. 151 years later, it came to life in a laboratory at Linköping University.

In 1856, Oskar Theodor Sandahl, a physician Stockholm, travelled to Egypt to cure a problem with his trachea – it may have been tuberculosis. Just like Carl von Linné and other physicians of the time, he was also interested in biology – especially botany. Whilst travelling in the country, he collected plants, seeds, insects and other creatures.

His collection was shipped home – each item carefully packed and labelled in glass jars – and deposited in the drug museum at Karolinska Institutet. For over a hundred years, the seeds were moved back and forth until finally ending up at their final home at Nordiska Museet in Stockholm.

It was not until 2007 that someone took an interest in examining them more closely – would it be possible to get such old seeds to grow?

"As with the seeds of other desert plants, acacia seeds have great longevity. They need to be able to lie in dry desert sand year after year, waiting for rain", says Matti Leino, doctor of genetics and plant breeding at Nordiska Museet and guest researcher at Linköping University.

He started a project together with molecular geneticist Johan Edqvist for analysing DNA and testing the germinating power of 30 seeds from five different kinds of acacia, some of which no longer belong to the genus.

IN APRIL 2008, 151 years and five months after being collected in Egypt, the first seeds were sown in bowls of sterile sand. They were placed in a special climate-controlled room in Linköping University's biology department at 20 degrees Celsius, with 16 hours of daylight each day, a little water and no extra nutrition.

After just two weeks, the first sprout emerged from the sand – a seed from an acacia aroma (*A.farnesiana*). Within a few weeks, two more little seedlings were reaching out towards the light.

There were no more seeds that germinated during the 100-day experiment, and, today, a single robust specimen remains and can be seen at the orangery in Julita, Nordiska Museet's garden in Sörmland.

It is a world-record class result: only a few publications report successful attempts at germination using seeds of that age.

STUDYING THE DNA of old seeds can provide information about how plant species evolve over time. Through plant breeding, mankind has changed the properties of his crops, with inevitable consequences for diversity.

"We can see that the genetic variation is much more limited today than it is in the old kinds of grain. Technology can also provide an explanation as to what it is that creates the properties we try to achieve", says Matti Leino.

The new research results show that seed collections and herbaria are to be viewed as more than mere curiosities. They are also biobanks for research in plant genetics.

ÅKE HJELM

Like other desert plants, the acacia have seeds with great longevity.

Biofuel or food?

COMPETITION OVER DESIRABLE FARMLAND

The rich countries of the world need enormous quantities of biofuel. It will mainly be produced – cheaply and efficiently – in the poor countries. Old colonial core-periphery patterns persist and are tightly locked into the visions outlined by the heavyweight international agencies.

text **ANIKA AGEBJÖRN**
photo **LENNART KJÖRLING & ANIKA AGEBJÖRN**

THE VITAL ISSUES of our world are all to do with energy, food and climate change. These three are also interlinked: consumption of fossil fuels affects the climate, and the production of alternative energy – biofuels – affects availability of food by increasing competition over desirable farmland.

Magdalena Kuchler is studying the arguments put forward by some important international organisations on these three vital issues. She is a postgraduate student at the Department of Water and Environmental Studies and linked to Climate Science and Policy Research (CSPR) at Linköping University.

She has studied documents from the Food and Agriculture Organization of the United Nations (FAO), the United Nations Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), which was created by a small number of high-income countries in connection with the oil crisis in the 1970s. According to Magdalena Kuchler, these organisations and their view of the future have a big part to play in influencing political decisions, which is why she decided to critically examine how they reason on the future.

She finds that it is the needs of richer nations that take control in the debate. Their top priority is the energy issue. After that comes climate, followed by availability of food in last place.

"The debate revolves around how we can produce sustainable energy", she says. "On the other hand, nobody talks about how much energy we can sustainably produce, and the idea that we would have to save energy does not seem to cross their minds – despite the fact that we know that large quantities of biofuel can hardly be produced sustainably."

The case is quite the opposite: it appears that the international organisations see a future where we can continue increasing our energy consumption thanks to cheap biofuels from poor countries. With their vast tracts of arable land, good climate and cheap labour, they are supposed to save us from the energy crisis and solve the climate issue in one fell swoop.

ANIKA AGEBJÖRN

The rich countries of the world need enormous quantities of biofuel. Magdalena Kuchler studies the arguments put forward by some important international organisations on energy, food and climate change.

LENNART KJÖRLING

Brazil is the world's biggest exporter of ethanol. The raw material used is sugar cane, which is grown in large monocultures. The pictures show harvesting (above) and the landscape afterwards (below).

BUT EVEN THE POOR COUNTRIES are portrayed as winners. They can produce a commodity that is attractive on the global market, which provides both an income and plenty of work opportunities.

The FAO even says that investing in biofuels could bring about a renaissance for rural development and agriculture in Africa, which, today, is poorly productive and neglected.

Brazil is often highlighted as a good example in their commitment to biofuel. The country is currently the world's biggest exporter of ethanol. The raw material used is sugar cane, which is grown in large monocultures. A sizeable and growing proportion of Brazil's arable land is, according to the country's own plans, going to be used for ethanol production. What this means is that other crops are pushed aside and that, in the long term, those same rain forests that we want to save are threatened. Brazil's president, Lula da Silva, is also travelling around countries in Africa, encouraging them to follow their example and offering technical assistance.

"The problem", explains Magdalena Kuchler, "is that, in the face of the enormous quantities of biofuel that are needed, small-scale, long-term sustainable farming is never going to be profitable. A peasant farmer in Africa cannot deliver the solution to first world's energy problems. These require large-scale plantations."

Brazil's success story does have a dark side, which the international organisations do not mention, she says. The environmental damage is huge. There are not even that many job opportunities, since efficient production requires a high degree of mechanisation – even in countries where labour is inexpensive.

THE ISSUE OF HOW LONG-TERM sustainable food production is affected by large-scale efforts to manufacture biofuel is not discussed very much by the international organisations. This is in spite of the fact that every sixth inhabitant of our planet – over a billion people – are still lacking daily food. The number of the world's hungry has even increased in recent years; from 850 million by almost 200 million to arrive at the number we have today. ▶

"But even the poor countries are portrayed as winners. They can produce a commodity that is attractive on the global market, which provides both an income and plenty of work opportunities."

"This should worry at least the FAO more than it does", says Magdalena Kuchler.

"The peasant farmers in the poorest countries are expected to have greater purchasing power when they can sell biofuel to us", she continues, "but, at the same time, we expect cheap products."

Even now, because the rich countries of the world are greatly subsidising their own agriculture, farmers in the poorer countries are finding it difficult to compete. Food prices are kept artificially low because of the subsidies, and farmers in poor countries – who do not receive any subsidies – are poorly paid for what they manage to grow. In the future scenarios presented by the international organisations, they are to instead concentrate on growing crops suitable for biofuel production and buy food from the rich countries.

"Becoming reliant on food imports is hardly going to improve the food security situation", Magdalena Kuchler points out, "as proved by the recent food crisis."

HER CONCLUSION is that the international agencies concentrate on problems faced by the rich countries.

"We do not face any food crisis here. The issue of food security lacks importance for us, and that is reflected in their documents."

She then poses a question that may seem completely obvious but is rarely, if ever, asked:

"If we are so interested in stimulating agriculture in Africa, how come we are putting so much emphasis on biofuel instead of directly on food production? It is food they need."

She also says that the future as seen by these international agencies would have the poor countries permanently confined to their role as producers of agricultural raw materials in constant dependence upon the rich. The colonial legacy lives on.

And not only does it live on, it is growing stronger. Magdalena Kuchler explains that, already, countries and multinational companies (often those in the oil business) are buying up massive tracts of land in Africa – or renting them for 50 years – so as to ensure biofuel production.

Short-sightedness and a lack of realism pervade visions of the future right up to the highest international level, she concludes.

"However we try to wriggle out of it, the problem needs a serious global reduction in energy usage. That is never discussed, though." ■

Biobränsle eller mat?

Världens rika länder behöver enorma mängder med biobränsle. Det ska huvudsakligen produceras, billigt och effektivt, i de fattiga länderna. Magdalena Kuchler studerar argumenten i de framtidsbilder som förs fram av tunga internationella organisationer.

Biosensors will detect tropical diseases

LIU MOLECULAR PHYSICIST SETS UP NEW LABORATORY IN SINGAPORE

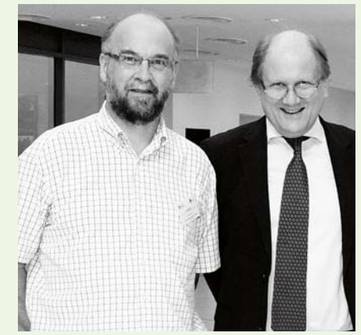
Singapore has a high tempo and the economic conditions for research are generous. Within seven months, Bo Liedberg managed to set up a laboratory for the manufacturing and characterisation of new sensor materials that can detect contagia and toxins.

Bo Liedberg is a professor in molecular physics at Linköping University and, since the autumn of 2009, has been spending a third of his time at Nanyang Technological University (NTU) with the task of launching the Center for Biomimetic Sensor Science (CBSS). The management also includes professors Wolfgang Knoll from the Austrian Institute of Technology and Freddy Boey from the School of Materials Science and Engineering, NTU. The main force behind the project is Bertil Andersson, a former rector at Linköping University. For three years now, he has been the provost responsible for research and education at NTU.

Biomimetics is the science of imitating nature's solutions to various problems – one of the cornerstones of the Liedberg group's research back at home. One example of biomimetics is studying the Arctic flounder's antifreeze mechanism; another is trying to create surfaces that repel barnacle larvae from ships' hulls.

A medical application is to detect disease markers by taking advantage of the ability that biomolecules have to hook on to each other. The main focus at the Singapore-based lab is to develop simple field sensors for detecting tropical infectious diseases, such as dengue fever and malaria, and poisonous substances in connection with accidents and acts of terror or war. An important collaborator is DSO National Laboratories, which has good opportunities to field test and evaluate the sensors.

Tropical diseases such as malaria and dengue fever are spread by mosquitos.



Bo Liedberg and Bertil Andersson, both LiU-professors now working in Singapore.

"These things have to be foolproof and robust in order to work", says Bo Liedberg. "In the places we are talking about there are no refrigerators and no advanced laboratory resources."

THAT BEING THE CASE, the sensors are based on synthetic molecules that can tolerate extreme environments. Biosensors are normally made from natural antibodies, but these do not tolerate high temperatures; many attempts have thus failed. The specially-tailored molecules, often of the peptide family, are manufactured with the help of recipes from a former professor at Linköping University, Lars Baltzer.

Malaria is caused by single-cell parasites of the genus *Plasmodium*; dengue fever by viruses, but both are spread by mosquito bites. The pathogens are encased in proteins that can be captured and detected by the right sort of peptide. A couple of drops of blood on a test card could be all that is needed for an early diagnosis and to stem the parasites' rampage through the body.

The second focus at the lab is basic research about new concepts for optical and electrical sensors, using materials such as gold, carbon nanotubes and graphene. The ultimate goal is to develop new ways of detecting toxins and other pollutants in water, foodstuffs etc.

BERTIL ANDERSSON CALLS the new laboratory a unique effort, a world-class network for the next-generation biosensors.

"Singapore is investing a great deal in strategic research that can lead to applications. Dengue fever is a serious disease that occurs in the country, and malaria is common in the neighbouring lands", he says.

The city-state of Singapore is in a special position as a rich and research-intensive land surrounded by relatively poor, developing countries. Very large investments mean that they are now in the middle of a "quantum leap".

"It is fantastic to be able to work in a system where there are plenty of resources. The new funds have made things very dynamic. This has, for example, made it possible for us at NTU to set up a new medical faculty in cooperation with the Imperial College in London", says Bertil Andersson, who is scheduled to return as a professor at Linköping University in 2012.

ÅKE HJELM

LiU partner

Singapore's 694 square kilometres hold 4.5 million inhabitants and three large universities. NTU is the technical one, with 24,000 students in undergraduate education, over 8,000 postgraduates and 5,500 employees. Half of the students and many employees live on campus.

There are ten postgraduates and postdoctoral researchers working at the biosensor laboratory today. Five researchers at NTU are engaged as tutors. If all goes according to plan, staffing will be doubled within a year.

The initiative, funded by NTU together with partners Linköping University and AIT, also includes an exchange programme for all academic levels, from undergraduate students to professors. There are also well-advanced plans for cooperation between NTU and Linköping University within electronics, materials science and interactive media.

Biosensorer ska varna

LiU-professorn Bo Liedberg är med och bygger upp ett helt nytt biosensorlabb i Singapore. I ett samarbetsprojekt ska enkla och fältmässiga sensorer utvecklas för att upptäcka tropiska infektionssjukdomar, som denguefeber och malaria, och giftiga ämnen i samband med olyckor, terrordåd eller krigshandlingar.

LiU alumni

NEW CEO FOR Q-MED AB


Maria Carell

LiU alumna Maria Carell will be new CEO of Q-Med in September.

Maria Carell was born 1973 and has studied international economics at Linköping University. She now comes from Actavis, a leading company within the development of generic pharmaceuticals, where she has been the Country Manager for Sweden.

Q-Med AB is a medical device company that develops medical implants for esthetic and medical use. The dominant product is Restylane, which is used for filling lines and folds in the face.

NEW DIRECTOR GENERAL

Thomas Allard is the new director general for LFV, a public enterprise that operates air navigation services in Sweden.


Thomas Allard

LFV has almost 1,350 employees working at 40 locations from Malmö in the south to Kiruna in the north. Since April 1st LFV is focusing entirely on air navigation services, while a newly established company called Swedavia manages the 14 state-owned airports.

Thomas Allard is 55 years old, from the city of Linköping. He has previously held a number of managerial positions within LFV and the SAAB Group. He is an engineer, educated at Linköping University and is today a member of the Campus Council at Linköping University in Norrköping.

Want to know more about LiU Alumni?

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Alumni world

MARTON CARLSWÄRD is a consultant at Softronic AB. He gained a Bsc degree with a major in Information Systems Analysis in 2010.

DIANA EKMAN works with bioinformatics at Karolinska Institute in Stockholm. She gained her MSc in Techical Biology and Enginering in 2004.

ELIN FALK is postgraduate student at Ecole Polytechnique Fédérale in Lausanne, Switzerland. She received a MSc degree i Medical Biology in 2009.

MIKAEL HASSLUND is Gameplay Programmer at Agony Games in Villingen-Schwenningen, Germany. He holds a MSc degree in Media Technology and Enginering which he gained in 2008.

CHRISTINA JONSSON is a teacher at the library in Surahammar. She gained a Bachelor of Education in 1988.

ANNE LILJEDAHL is a doctor at Vrinnevi Hospital in Norrköping. She received her MSc in Medicine in 2009.

HENRIK NYGREN is Technical Sales Engineer at Texas Instruments in Germany. He gained a MSc degree in Industrial Engineering and Management in 2009.

INGRID NYLANDER is Business Analyst at Wipro Technologies in Bracknell, England. She holds a BSc degree in Electronics from 2008.

ILSE SARADAY is Builing and Administrative Coordinator at the Society Promoting Environemental Conservation in Vancouver, Canada. She gained her BSc with a major in Environmental Science in 2006.

ANNA SAMUELSSON is purchaser at the Swedish Public Employment Service in Stockholm. She gained a BSc with a major in Commercial and Business Law in 2010.

LENA ÖHLIN is After Sales Manager at Scania in Windhoek, Namibia. She received a MSc degree in Industrial Engineering and Management in 2002.

LiU Alumni broadens international work

SOCIAL MEDIA WILL PLAY IMPORTANT ROLE

It will soon be easier for international alumni to keep in contact with one another and with Linköping University when they return home. Facebook groups are just one way.

"Alumni can teach us what we need to develop", says Karin Gibson, who is heading a project aiming to strengthen the ties between Linköping University and former students from the four corners of the world.

"They are also our best ambassadors. They can tell others what it is like to study at Linköping University, and demonstrate what a person can become."

The project is aiming at both exchange and master's students. Some are only here for perhaps three months, others for two years. Whichever group they belong to, they are all equally welcome to be a part of the new network.

In the middle of June, a new website will be launched (see www.liu.se/alumni), where international alumni will be able to register to join the network. They will also be able to find alumni portraits, see information about activities and offers, as well as read news from Linköping University.

"It will also be possible to search for old classmates", says Karin Gibson.

DURING THE PROJECT, a concept will gradually be established for how to develop contacts in the future – with both Linköping University centrally and various master's programmes. Students primary contacts are with the programmes and the teachers.

"We will start with a pilot scheme involving a few different programmes. Social media, such as Facebook groups, will play an important role."

The idea is that the pilot scheme will generate ideas that can later be extended to other programmes.

Early on in their course, international students will receive information about the opportunity they have for keeping in contact after leaving the university. Hopes are that many will jump at the opportunity.


PETER MODIN

Karin Gibson is heading a project aiming to strengthen the ties between LiU och international alumni.

"We aim to get at least 20 percent of this year's alumni in on the network", says Karin Gibson. ■

Popular Alumni Day with environmental theme

150 new and old alumni from different programmes – and different decades – gathered in mid-March to meet, remember and learn something about the environment.

The annual alumni day was held in the style of the 80s and the C-building was especially decorated with furniture and accessories from the 80s. On exhibition displays were everything from ice creams to music charts and movie posters representing the era.

The day's theme was the environment. There were lectures about climate change and man's ability to influence developments. In parallel workshops, participants learned about what a sustainable daily life might look like, what industrial ecology is, organisational changes impact on the work environment and how to design a sustainable logistics system. A number of exhibitors in the C-building showed examples of practical environmental work that is being done on campus and in various businesses and organisations in the region.


MAGNUS JOHANSSON

Irene Persson 69-74, Technical Physics (left), Lars Andersson, 00-03, Industrial Electronics (middle), Lena Kinnersjö 03-07 from the Religious Studies programme (right) helped each other solve the quiz.

In the evening there was an 80s style celebration with plenty of laughs.

Camilla Smedberg, responsible for LiU's alumni activities, was very happy at the end of a long day.

"We received many positive comments from the participants. The programme turned out really well, the lectures were interesting and I really want to thank everyone who helped make this a successful alumni day", says Camilla Smedberg. ■

NO REASON TO RUSH HOME

A great interest in biotechnology and a strong desire to challenge herself lured Klara Tiitso away from the small town of Eskilstuna, via Linköping University, to the great metropolis of London.

text **EVA BERGSTEDT**
photo **ÅSA WESTERLUND**

KLARA TIITSO is now into her fifth year in London, and plans to return to Sweden 'one day' – although she does not seem to be in a hurry to do so.

She is a technical biologist working at the European Medicines Agency (EMA) in London. EMA is a European agency that recommends approval of new medicines, primarily those relating to serious illnesses such as cancer, diabetes and HIV/AIDS.

Most of her colleagues have a pharmaceutical background and are therefore very knowledgeable about medicine.

"I, on the other hand, have more of a technical expertise. It is beneficial as well as stimulating to have that kind of mix of educational backgrounds", says Klara.

The work is carried out in close cooperation with the various national medical products agencies within the EU. EMA works as secretariat for a number of scientific committees that are made up of experts from every European member state. These expert committees have a central role in the work and issue recommendations about whether or not a new medicinal product should be approved. It is, however, the European commission that makes the final decision.

AS SCIENTIFIC ADMINISTRATOR, Klara's assignment is to act as coordinator for this approval process. When a company develops a new medicine, an application for approval is sent to EMA, whereby it is the responsibility of Klara and her colleagues to make sure that all necessary information is included, that the application is legally correct, to liaise with the company and provide support to the experts evaluating the product.

"It is administrative work, but I have to understand what the applications involve", says Klara Tiitso. "A suitable scientific education is needed in order to work as scientific administrator."

An degree from Linköping University, together with a supplementary education in medicine and biotechnology, stands her in good stead at work.

"It is true that I have acquired a broad scientific knowledge, plus I have learned a certain way of doing things and to be able to take in and analyse information. Then again, of course, wherever you end up, you have to learn the finer details on the job. But I have my educational background behind me."

HOW DID SHE END up working here?

As Klara explains, it was probably a combination of her determination to seek out new challenges, to work internationally, and her interest in biotechnology. During her education and in the years that followed, she spent some time in Vienna, where she did her thesis, and also Germany, where she trained at a biotechnology company and studied German.

She has also spent seven months in New Zealand, although her main focus there was altogether different: growing cut flowers. That and the adventure of being on the other side of the world, or course.

During her supplementary education, she found out about her current place of employment and decided to apply as a trainee there. She was accepted, along with ten other young students from Europe.

"I was quite simply very interested in these issues. That the office is in London was an added bonus."

Klara Tiitso is a technical biologist at the European Medicines Agency in London.

THE FIVE MONTHS OF WORK experience whetted her appetite. She applied for a job at the agency and was accepted after a tough application process. She now instructs trainees herself.

For the first few tentative months in London, she lived in cramped communal accommodation. She now lives in a rented two-room flat in Greenwich, South London. The job is challenging as well as very pleasant from a social aspect, with colleagues from all over Europe. She also finds London itself very stimulating, with its abundance of absolutely everything.

So there is no reason for Klara Tiitso to rush back home.

"I never imagined that I would be away for so long, never saw myself as a city person. I love the outdoors, but I can get that on holiday instead!" she says with a laugh.

"London is also great if you want to travel – from here, you can easily get to anywhere in the world." ■

Teknisk biolog i London

Ett starkt intresse för bioteknik och en vilja att utmana sig själv förde Klara Tiitso från småstaden Eskilstuna via studier på Linköpings universitet till världsstaden London. Där jobbar hon på en europeisk myndighet som granskar nya läkemedel.

Posttidning B
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