

LUND UNIVERSITY

RESEARCH AND INNOVATION

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A BROADER VIEW OF INNOVATION

LUND UNIVERSITY, with its eight faculties, represents a huge bank of knowledge. A university characterised by diversity is a university with good possibilities for innovation and new ways of thinking. Even if the faculties of engineering and medicine still dominate in terms of the number of innovations, we are seeing a new and exciting trend towards a broader view of innovation.

INNOVATIONS ARE NOT an end in themselves, but rather they always rest on the research and education foundation that forms Lund University's core activities. Nonetheless, it is our responsibility to ensure that the research findings which could make life easier for people come to use in society. A common notion is that "we do the research but someone else can take responsibility for its application later". This is a simplification and in many cases may prevent innovations from benefiting society. No external company or organisation would take an interest in or invest in new research findings if they were not first protected from encroachment by other players. However, it isn't all about patents. We work hard to get all the faculties on board so that innovations cover more than just the products that traditionally spring to mind. Innovation can also take the form of services or processes, and it is here that the Lund University Innovation System (LUIS) can play an important role, for example through the Experts for Hire programme, which aims to help services gain commissions and business contacts. A dream scenario would be to have an equal number of innovations from all the faculties.

A COMMON PRECONCEPTION when the concept of innovation is discussed is that everyone must focus on 'useful' research. Nothing could be further from the truth. The aim of the innovation system is to take advantage of and utilise the research that is already carried out at the University today. There is no desire to influence the direction of research, but only to make use of that which is already being produced at the departments and get some of it out into society. The third-stream activities include this very task; allowing society to partake of our knowledge and trying to solve industrial and societal problems – which in turn can lead to new research – and not shying away from that challenge. We must be prepared for both – research and innovation!



CARL BORREBAECK
Assistant Vice-Chancellor
with responsibility for
innovation



LINK BETWEEN IDEA AND REALITY

The path from research results to finished product or service on the market is often long and rarely smooth. But help is at hand. the Lund University Innovation System (LUIS) offers advice and support to researchers who want to disseminate their research ideas outside academia. TEXT Anna Knutsson

► **"LUIS IS RESPONSIBLE** for an important part of the University's duty to interact with society", says Linus Wiebe, acting director of innovation at Lund University since the start of July 2011.

The duty to interact means that Swedish higher education institutions have a responsibility to share knowledge with society. This includes trying to ensure that the research conducted also comes to use in society. One way to do this is to help researchers establish companies based on the products, services, processes or methods of working created through their research.

"OUR TASK IS to build a platform that facilitates researchers' interaction with the business sector. We do this, for example, through programmes such as Innovation Officer, where one of our staff is working with a specific focus at Lund University Diabetes Centre to facilitate cooperation with industry and society in general", continues Linus Wiebe.

The challenge, in his view, lies in identifying which projects actually have commercial potential. Starting a company on the basis of research findings is not always the best way to spread knowledge.

"Commercialisation is not the best solution for all projects. However, it is always worthwhile to interact with society."

LUIS'S ACTIVITIES SERVE as a bridge between the business sector and academia, linking people with different experience and areas of expertise. As well as advice, researchers are offered help with licensing and patent issues, business development and initial marketing. In the long run, the activities are intended to contribute to the development of both the University and the region.

"By working in a structured and goal-oriented manner we will show that we succeed with our aim – making research come to use by establishing successful companies which create new jobs in Skåne and Sweden", says Linus Wiebe.

"Our task is to build a platform that facilitates researchers' interaction with the business sector"



Luuas founder Jennie Nilsson (r) and VentureLab project coordinator Mikaela Färnqvist.

VENTURELAB – THE NEW ENTREPRENEURS

Since the service started in 2001, VentureLab has helped hundreds of students to realise their dreams of becoming their own boss. One of them is Jennie Nilsson, who is behind the art and design company Luua. **TEXT** Anna Knutsson **PHOTO** Kennet Ruona

► **JENNIE NILSSON HAS BEEN AN ARTIST** for four years, but she has enjoyed being creative for as long as she can remember. The company she now runs works with different types of graphic design.

“I work on everything from book covers to advertising and posters. But I have also done the graphics for the iPhone app ‘d-zide’, a little aid to help people make decisions”, says Jennie Nilsson.

JOHAN JOHNSON, manager of VentureLab, says that there is generally a lot of interest in entrepreneurship among Lund students.

“Young entrepreneurs often feel quite lonely. Many have good, intelligent ideas, but relatively few dare to take the plunge and start their own company. We are here to help the students accomplish their ideas”, he says.

WHEN VENTURELAB was started it was first intended as a one-year project to encourage entrepreneurship and self-employment. However, students showed so much interest that it was decided to allow the initiative to continue. During the first year, the project was only aimed at economics students, but the following year the Faculty of Engineering also got involved. Since then, VentureLab’s activities have expanded to encompass all faculties at Lund University. Johan Johnson sees this as a major advantage.

“Broad diversity is extremely important for our operations. It is often in meeting people who think differently from you that new ideas come into being. Therefore we are keen to see as wide a variety as possible among the students”, he says.

CENTRE FOR ENTREPRENEURSHIP HEADING FOR NEW INTERNATIONAL HEIGHTS



A donation of SEK 20 million from industrialist Sten K. Johnson has given research and teaching on entrepreneurship at the School of Economics and Management the opportunity

to take the step from being one of the best in Sweden to becoming among the best in the world in the field. The School of Economics and Management is working to turn the donation into a coherent centre for entrepreneurship, where three areas will be in focus: links to the business sector, internationalisation and strengthening research.



VENTURELAB IN FIGURES

- Between 3 000 and 5 000 students receive information about VentureLab every year.
- Around 300 students receive advice from VentureLab every year.
- Between 20 and 25 new companies come to the incubator every year.
- 17 student-run companies are currently based at the incubator.
- Three members of staff run the VentureLab project.
- Each student company has one year to develop its business at the incubator.

For more information, see the VentureLab website www.venturelab.se

EFFECTIVE LINK BETWEEN DIABETES RESEARCHERS AND BUSINESS SECTOR

The Lund University Diabetes Centre has been conducting cutting-edge research on diabetes for a number of years. However, this has not been matched by corresponding success on the commercial side. Not a lot has happened – until now, when the centre has its own innovation expert as part of a new programme from the Lund University Innovation System, LUIS. TEXT Ingela Björck PHOTO Kennet Ruona (lab)



► THE EXPERT IS SYLVIE BOVE, who has long experience from the pharmaceutical industry. She sees herself as a link between the business sector and the researchers

– an intermediary who can speak both parties' language. She has invested a lot of time in getting to know the diabetes researchers and understanding their way of thinking.

“In order to achieve results, I must be able to make suggestions that suit them”, she says. From her previous experience of university researchers and doctors, she expected to meet quite a lot of scepticism, but was pleasantly surprised.

“With my business background, I'm out of place in the research environment. Nevertheless I have been met with openness, curiosity and a surprising amount of interest”, she says.

SYLVIE BOVE HAS SUCCEEDED in starting four concrete projects in the six months she has worked at LUDC, the Lund University Diabetes Centre. Two of the projects involve new companies under the University's holding company, LU Bio, while the other two are cooperation projects with the pharmaceutical giant Novo Nordisk. She has also arranged a meeting for large and small companies in the pharmaceutical and biotechnology industries, at which LU's leading diabetes researchers presented their work.

“The business representatives were impressed to meet a research group that was



actively looking to cooperate with them. They had never come across that in Sweden before”, explains Sylvie Bove.

She thinks the time is right for this type of cooperation. The pharmaceutical industry, which has had increasing difficulty finding new big sellers, has realised that it needs help with the early stages of the research. At the same time, the universities are becoming more and more interested in opening the doors to their laboratories and offices.

Sylvie Bove therefore has a lot of plans for the future; she is going to organise innovation seminars, produce a brochure about the diabetes centre aimed at businesses, and develop a ‘quick reference guide’ with points for researchers to remember when they sign agreements with companies.

SYLVIE BOVE'S POST is being financed for three years by Tillväxtverket (the Swedish Agency for Economic and Regional Growth) and the Lund University Innovation System as part of the “Innovation Officer” programme. The programme has its origins in the question of why the University's strong research environments have not led to corresponding strength in the area of innovation and can be regarded as an offer from LUIS to the strong research groups at the University. For this reason, Sylvie Bove will also be contacting the cancer researchers in CREATE Health and the BioCARE network to see what skills they need for business development.

“I think there are a lot of possibilities for commercialisation of products and techniques in the field of cancer as well”, she says.

BETTER STEM CELL IDENTIFICATION COULD LEAD TO NEW LEUKAEMIA DRUG

An entirely new type of drug to treat leukaemia is one of a number of research successes that are coming closer to the market through cooperation between medical researchers and Lund Bioaccelerator. TEXT Ola Isaksson PHOTO Charlotte Carlberg Bårg

► **AT THE BIOMEDICAL CENTRE** (BMC) in Lund, Professor of Clinical Genetics Thoas Fioretos and postdoctoral fellow Marcus Järås have come up with a way of identifying stem cells which cause leukaemia, a form of blood cancer. The research will make it possible to use antibodies given to patients to identify cancer stem cells, which are then killed by the body's immune system. In the long term this could lead to more effective treatment of cancer patients.

"There is still a long way to go until the treatment can benefit patients, but we are now going to test the research using experiments on animals, which are necessary before we can proceed any further", explains Thoas Fioretos.

THE LEUKAEMIA RESEARCH has caught the attention of Jesper Bristulf at the Lund University Innovation System, LUIS, and Eskil Söderlind at LU Bio. They have started Lund Bioaccelerator, a programme and platform to assist and inspire researchers to turn their research findings into products and companies.

Jesper Bristulf and Eskil Söderlind both have backgrounds in research. They consider this to be important for their credibility; they understand the language the researchers speak and can speak it themselves. The Bioaccelerator visits researchers to tell them about the concept and the help and support available. Researchers often work under pressure and enterprise generally comes low on their list of priorities. The task of the Bioaccelerator is to ensure that the researchers develop an interest in commercialisation and to provide practical support for this. At the same time, it is im-

portant that the researchers don't feel that commercialisation has a negative impact on their research time.

"We're not trying to make the researchers into entrepreneurs, but when we see things that are of commercial interest we can help them to do something about them. We can offer suggestions of people to work with, take responsibility for the commercialisation process and make sure that the research comes to use", says Jesper Bristulf.

THOAS FIORETOS AND Marcus Järås's discovery on leukaemia is one of the Bioaccelerator collaborations that has resulted in a company, Cantargia AB. The long-term aim is to develop a treatment for leukaemia and to get it out onto the market. The company now employs a full-time managing director. The Bioaccelerator managed a lot of the initial practical work – everything from evaluating the commercial potential to company registration and patent application. The investment company LU Bio has then invested capital in the start-up company.

"AN EXCITING PART of research and development takes place in the interface between universities and the business sector. The research we do here could lead to new drugs and discoveries of great use to society", says Thoas Fioretos. Professor Fioretos hopes and believes that the view of entrepreneurship and innovation is changing within academia. Having previously been somewhat taboo, it is now on the way to becoming a matter of course.

"Within research we must be open to new environments and dare to expand



Thoas Fioretos (centre) and colleague Marcus Järås have moved a step closer to a treatment for leukaemia.

projects beyond the university", says Thoas Fioretos. In his view, researchers have a duty to spread their knowledge and the Bioaccelerator has an important role to play in facilitating this process.

LUIS, LUND UNIVERSITY INNOVATION SYSTEM

Has the aim and responsibility of making research at Lund University accessible to society. LUIS provides support and resources to researchers who want help to commercialise research findings.

LU BIO

Investment company partly owned by Lund University. The company gets involved at an early stage with capital and expertise to start new biomedical companies and help them to establish themselves on the market.

LUND BIOACCELERATOR

Offers advice and support for commercialisation of research in life sciences, for example biomedicine. The programme is run as a collaboration between LU Bio and LUIS.

CITIES AS ENVIRONMENTAL ROLE MODELS

Is it possible to invest in solar power in a climate with little sunshine? How can we support more sustainable home electronics? At the International Institute for Industrial Environmental Economics in Lund, researchers are trying to find answers to sustainability questions and contribute to new innovations in collaboration with the business sector. Environmental initiatives in cities are often highlighted as good examples. **TEXT** Ola Isaksson **PHOTO** Kennet Ruona

► **“BUSINESSES ARE AN INCREDIBLE** motor in the work on sustainable development. They possess the knowledge and experience that can combine with that at universities to help create more sustainable social development”, says Professor Lena Neij, director of the International Institute for Industrial Environmental Economics (IIIEE).

Professor Neij is an expert on issues related to sustainable construction, increasing energy efficiency and greener energy supply. Her task, and that of the Institute as a whole, is to work for more sustainable development and a greener economy on international, national, regional and local levels. Lena Neij says that since the Institute was started in 1994, environmental and sustainability issues have become a natural consideration for businesses and other organisations.

“IT HAS BECOME IMPORTANT for cities and companies to work with environmental issues and to emphasise their environmental credentials. I have seen a noticeable change for the better over the years”, she says.

The IIIEE focuses on the control mechanisms and strategies that are required to create a more sustainable society. Today,

45 people from 17 different countries work at the IIIEE, which in addition to research also offers higher education to Master’s level.

“International cooperation is very important for increased understanding and exchange of ideas”, says Lena Neij.

THE FOCUS OF THE RESEARCH is on removing the barriers that prevent new technology and new business models gaining success.

“It is a matter of finding control mechanisms and strategies that support change and bold new ways of thinking. For example, daring to build houses in new ways”, says Lena Neij. Now and again she encounters the view that nothing is happening in the world as regards energy and climate issues. However, she thinks that is an unfair picture. In her view a lot is being done, particularly on local and regional level, and environmental issues are often pursued more actively there than on the international stage.

“There is a saying that ‘while the nations are talking the cities are acting’ and I think there’s something in that. Cities are often one step ahead and welcome exciting technical and social innovations”, says Lena Neij.

IN 2011, THE INTERNATIONAL INSTITUTE for Industrial Environmental Economics was awarded EUR 2.6 million for a three-year project called Urban Transition. The project is a collaboration between universities, municipalities, county councils and organisations in the Öresund region. The aim is to make the region into a centre for sustainable urban development and green innovation and growth. This will be achieved through the establishment of a platform where the business sector will be invited to collaborate on sustainability issues. Lena Neij is convinced that the project will contribute to new innovations and serve as a strong role model for areas such as sustainable construction, refuse management and transport.

“THE ÖRESUND REGION is often referred to as the third strongest growing region in Europe. There is a strong interest in more sustainable development, a good relationship between urban and rural, a rich range of cultural activities and exciting companies. Urban Transition will highlight possibilities which we hope could spread to other places.”





The translational cancer centre CREATE Health is based at the Biomedical Centre (BMC) in Lund

SIMPLER METHOD TO DIAGNOSE CANCER

TEXT Liselott Fritz PHOTO Kennet Ruona

► **IN THE FUTURE**, it will be possible to diagnose different types of cancer with a simple blood test.

“We use a pattern of different biomarkers in the blood to find out what type of cancer it is”, say Carl Borrebaeck, Professor of Immunotechnology and programme director for the translational cancer research centre CREATE Health at Lund University, and Christer Wingren, reader in Immunotechnology, who both have high hopes for future cancer care.

THE BIOMARKERS in the blood sample could be described as a fingerprint which indicates disease. Biomarkers are proteins that

originate from either the tumour itself or the immune system’s response to it. Within healthcare today, a small number of markers are used when diagnosing various diseases. There is still no good way to use individual biomarkers to diagnose cancer, but the new research has found a certain number of proteins that are different for different types of cancer. The researchers in Lund are focusing mainly on breast cancer and pancreatic cancer.

“There is currently no good way to diagnose pancreatic cancer, which means that the tumours are generally discovered very late and the patients often receive a poor prognosis”, says Dr Wingren.

FOR PATIENTS WHO have recently developed breast cancer, the five-year survival rate is good, but for the quarter of women whose cancer returns, the rate is considerably lower.

“We hope to be able to identify these women at an early stage and adapt the treatment to the relapse risk”, says Carl Borrebaeck.

The two researchers hope to be able to offer the method as an experimental diagnosis at Skåne University Hospital within one or two years. Patients in southern Sweden will in this case be the first in the world to be offered this form of treatment.

A SELECTION OF

INNOVATIONS AND DISCOVERIES FROM LUND

1944

TETRAHEDRON PACKAGING – THE MODERN MILK CARTON



The tetrahedron milk carton was the first step towards one of the world's most successful industrial companies. In early 1944, newly appointed laboratory assistant Erik Wallenberg was given the task of designing a disposable milk carton from paper. The solution developed was a paper tube, which was folded flat at the bottom and in the opposite direction at the top so that it formed the shape of a three-sided pyramid. A couple of years later, an impregnated kraft paper was developed and a further six years later, the first tetrahedron machine was delivered to Lund dairy. Tetra Pak was born and today the company has over 21 000 employees and is active in over 170 countries.

1946

ALWALL'S ARTIFICIAL KIDNEY

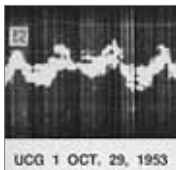
In September 1946, the dialysis machine was used for the first time on a patient – a 47-year-old man who was suffering from acute renal failure. Thus the first crucial step was taken towards a life-saving treatment that would also form the foundation for the multinational company Gambro. The machine used had been constructed by Nils Alwall, a reader in medicine who used his physiological knowledge to develop the first artificial kidney suitable for clinical use. Together with industrialist Holger Crafoord, he founded Gambro in 1964 and launched the first artificial kidney three years later.



1953

ULTRASOUND IN MEDICINE

On 29 October 1953, it was possible to see a heart beating for the first time. This was all thanks to the groundbreaking technology for ultrasound scanning, developed by physicist Helmuth Hertz and cardiologist Inge Edler. The two Lund researchers were nominated for the Nobel Prize on several occasions, but had to settle for the next best thing – the American Lasker Award.



1964

ALMÉN'S X-RAY CONTRAST AGENT

Radiologist Torsten Almén noticed that patients sometimes found the contrast agent injected into the blood vessels painful. He therefore developed a new type of X-ray contrast agent which was less painful – and which also worked much better than its predecessors. Today, contrast agents based on Torsten Almén's principles are used in 75–80 million examinations worldwide each year.



1967

NICORETTE

On 12 December 1967, Professor Claes Lundgren and his colleague Stefan Lichtneckert presented a joint proposal to the pharmaceutical company Leo – to develop a product to help people give up smoking. The two doctors had previously found that chain smokers could avoid the problems associated with abstinence by using chewing tobacco. The discovery convinced them that the urge to smoke was due to nicotine addiction and they therefore decided to develop an alternative to chewing tobacco. The result was the world's first nicotine drug – the nicotine chewing gum Nicorette, which is said to have saved the lives of millions of smokers around the world.



1971

SERVO VENTILATOR – THE MODERN VENTILATOR

The Servo ventilator was the starting point for the modern and gentle ventilator treatment which characterises modern health care. By utilising compressed air, teaching assistant Björn Jonson and his colleague Sven Ingelstedt managed to construct an almost silent ventilator. The device, which was equipped with unique technology to measure the gas flow rate and pressure, formed a breakthrough in the establishment of intensive care worldwide. Nowadays, almost all ventilators work according to



the principles introduced with the Servo Ventilator.

1982/1983

MRI SCANNER

Sweden's first MRI scanner was constructed in the early 1980s by Bertil Persson, professor of medical radiophysics. By sending harmless radio waves through a patient's body placed in a magnetic field, the scanner could take cross-sectional images which showed both an organ's anatomy and its function. The MRI technology revolutionised diagnostic imaging and enabled different therapy methods to be followed up.



1985

PROVIVA

To prevent patients' normal gut flora being knocked out during major operations, Lund professors Kåre Larsson and Nils Molin advised that patients be tube-fed with oats. The substance which went on to be developed contained the healthy bacteria culture *Lactobacillus plantarum* 229v, which is naturally present in a healthy stomach. In order to pursue the research further to a finished consumer product, the company Probi was founded in the early 1990s and the fruit drink ProViva was later launched in collaboration with the dairy Skåne-mejerier. On 1 October 2010, the fruit drink was sold to French dairy giant Danone.



1990

OATLY

After Professor Arne Dahlqvist's discovery of lactose intolerance at Lund University in 1963, researchers began to develop an interest in finding a substitute for milk. In the late 1980s, Professor Rickard Öste saw the possibilities of oats and a few years later his research group patented a fluid oat base as an alternative to milk drinks. The company Oatly was founded in 1994 (then under the name of Ceba) as a spin-off company from Lund University. Today, Oatly is the market leader in Sweden with a turnover of around SEK 160 million.



1993

QLIKTECH

Software company QlikTech started as a consultancy firm at Ideon in Lund in the early 1990s. The business idea – to quickly and simply analyse information in different databases using a piece of software – was developed by QlikTech founders Björn Berg and Staffan Gestrelus together with Håkan Wolg . QlikTech was listed on the Nasdaq Stock Market in summer 2010 and last year had a turnover of SEK 1 540 million. Today the company's software, QlikView, is used by over 19 000 companies in more than 100 countries.

1995

BLUETOOTH

Just over 15 years ago, Sven Mattisson, an adjunct professor at Ericsson, and his colleague Jaap Hartzen were given the task of investigating the possibilities of wireless communication between mobile phones. After a few years of development work, they were able to present a prototype called "MC Link" – a wireless standard which opened up a whole new world for the electronics branch. The prototype, which was later given the name Bluetooth after the Viking king Harald Bluetooth, was introduced onto the market in 1998. Today, more than half of all mobile phones manufactured are equipped with Bluetooth and the technology is installed in well over two billion devices.



1999

DECUMA – THE TECHNOLOGY THAT INTERPRETS HANDWRITING

In connection with an industrial project on three-dimensional image analysis, Professors Gunnar Sparr and Kalle  str m of Lund University, together with mathematician Dr Richard Berthilsson, discovered, quite by chance, a new method of interpreting human handwriting. By using the same mathematical algorithms as they had applied in the industrial project, they were able to develop an effective program to interpret handwriting electronically.

2001

LUCAS CHEST COMPRESSION DEVICE

The first time LUCAS was used was at Sk ne University Hospital in Lund. The doctors had already given up hope for the patient, who had suffered a cardiac arrest, when permission was given to try using the machine. After only three minutes, the nurse in charge was able to get the heart started again.



The idea for LUCAS, which stands for Lund University Cardiopulmonary Assist System, was developed by Professor of Medicine Stig Steen. The machine, which is both mobile and easy to use, uses compressed air or oxygen to push the patient's rib cage up and down.

2003

TAMAM

Having noticed newly arrived young immigrants' great need for social contact and activity, Philip Sandberg initiated an organisation called Tamam in January 2003. The group, which was made up of student volunteers, initially helped the young people through activities at local sports and arts associations. As interest in the organisation grew, its activities were gradually expanded. Besides Lund, Tamam now also operates in the cities of Malm , Stockholm and Uppsala.



2004

POLAR ROSE

Image retrieval company Polar Rose was founded in 2004 by mathematician Jan Erik Solem at the Faculty of Engineering. Using three-dimensional models of objects in two-dimensional images he developed a search engine with advanced image analysis and facial recognition. In September 2010, Polar Rose was sold to Apple for over USD 20 million.



2008

CANCER DRUG

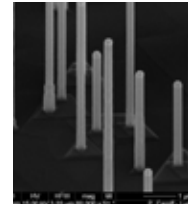
Since 2007, biotechnology company BioInvent has used a technique it developed to produce pharmaceutical drugs based on artificial antibodies. Together with development partner Thrombogenics, the company signed a licence agreement for EUR 500 million with the Swiss pharmaceutical giant Roche. The agreement was for antibody TB-403 which blocks blood vessel growth and can thus starve cancer cells. The following year, BioInvent won the "Licensing Deal of the Year" award.



2009

SOLAR CELLS BASED ON NANOTECHNOLOGY

Fredrik Boxberg, Niels S ndergaard and Hongqi Xu – three researchers from the Division of Solid State Physics at Lund University – developed technology that could replace the conventional usage of solar cells and photodetectors. Piezoelectric photovoltaics, or solar cells based on nanotechnology, are both more efficient and more cost effective.



2010

NOCTURNAL VISION

Using mathematical algorithms based on zoological research, mathematics researchers Magnus Oskarsson and Henrik Malm were able to develop night vision cameras. The technology works by allowing the pixels to work together in the same way as the retinal cells of nocturnal animals. It is hoped that the technology, for which a patent is pending, will be used in devices such as mobile phone cameras. Car giant Toyota is also using the innovation from Lund to try to construct safer night-vision cars.



HIGH EXPECTATIONS FOR POWERFUL MICROSCOPE

In fifteen years' time, the world's most advanced centre for research using neutrons, ESS, is expected to be in operation in Lund. There are already high hopes that the venture will lead to new and improved products in a range of industries such as food, pharmaceuticals, vehicle manufacturing and computer development. TEXT Ola Isaksson ILLUSTRATION ESS

► **THE PLANNED FACILITY** – the European Spallation Source, ESS – can be described in simple terms as a huge microscope. Neutrons are used to illuminate materials and explain how they behave. Materials such as medicines, molecules, membranes, proteins and plastics will all be studied to provide researchers and businesses with a better understanding of their structure. ESS is expected to greatly improve and change research within many fields, for example environmental science, climate science, health, energy, pharmaceuticals and archaeology.

“It will be possible to study in real time how a material changes, for example when the temperature increases or the material undergoes a chemical reaction”, says researcher Axel Steuwer, who is in charge of inspiring researchers and companies and increasing their knowledge of ESS.

PROFESSOR STEUWER BELIEVES that ESS could impact on everything from the development of more environmentally friendly turbine motors for aeroplanes and catalytic converters for cars to batteries and drugs.

Studying how different types of material behave, for example when they are exposed to extreme conditions such as high temperatures or water, will give a major boost to research and development of new products.

A SIMILAR RESEARCH FACILITY already exists in the US and one will shortly enter operation in Japan. The level of detail that can be studied is determined by how many neutrons a neutron source can produce. ESS in Lund is expected to become the most powerful neutron source in the world when it is completed in 2019. The facility will be open to both business and academia – preferably in collaboration with one another, says Axel Steuwer.

“Innovation can convert research into worthwhile products. We see major potential with ESS in most fields and industries. I can't think of a single field which couldn't benefit in some way.”

RESEARCHERS AND COMPANIES will be able to rent space by the hour at ESS, which is expected to be in operation around the clock. ESS already cooperates with

other similar facilities, such as MAX-lab in Lund, a synchrotron radiation facility which also works like a large microscope, although not as powerful. It is important to highlight the possibilities now, stresses Axel Steuwer. For many people, ESS is still something diffuse and difficult to grasp, even if awareness is increasing all the time.

“**ESS WILL NOT** conduct any research of its own. Instead, we provide the equipment. A major challenge will be showing companies the importance of ESS for their research. Many don't know what they can really use it for. One problem is a language barrier – in the research world we don't speak the same language as they do in the business sector”, says Axel Steuwer.

As well as the facility's performance, he believes that the location could also help attract international visiting researchers and companies.

“Lund and the proximity to the universities in the region are very important. This is an urban region with a high intellectual density and good links to innovation, for example at Ideon Science Park.”

“ESS in Lund is expected to become the most powerful neutron source in the world when it is completed in 2019”

WHAT ARE SPALLATION AND NEUTRONS?

The ESS facility in Lund will serve as a huge microscope, which instead of light will use neutrons. These can illuminate different types of material and provide information about their structure and behaviour. A neutron is a particle without an electric charge. They are commonly found in atomic nuclei together with protons, positively charged particles. They can be knocked off from the atomic nuclei with the help of protons – a process known as spallation. (Source: www.ess.se)



LEDs TO REPLACE LIGHT BULBS IN YOUR HOME

TEXT Charlotte Löndahl Bechman

► **NOW THAT TRADITIONAL** light bulbs have been outlawed and are being phased out, cheap and efficient replacements are needed. At the Nanometer Consortium in Lund, researchers have developed a technique for manufacturing light-emitting diodes (LEDs) by carefully controlling how nanowires grow on silicon plates; research which will greatly benefit from the synchrotron light source at MAX IV. Glo, the company behind the commercialisation of the technology, has opened a pilot plant in Lyngby, Denmark, and a development lab in Silicon Valley, where the LED technology will be adapted for mass production. The research, however, will remain in Lund. In the future, the LEDs will be able to replace old incandescent light bulbs. The LEDs will provide an environmentally friendly alter-

native because they use even less electricity than current energy-saving light bulbs.

“In a year or two, the LEDs will be under production and competing out on the market”, says Professor of Physics Lars Samuelson, who heads the Nanometer Consortium in Lund and who has been named as one of the world’s most productive nanotechnology researchers by the journal Nanoletters.

TODAY LIGHTING CONSUMES almost 25 per cent of all electricity. When the nanodiodes, which are ten times more efficient than traditional light bulbs, have become cheaper, LEDs are expected to take over most of the market, which could result in reductions in electricity consumption of up to 20 per cent, explains Lars Samuelson.

He doesn’t give much for the other options currently available. Compact fluorescent lamps (energy-saving light bulbs shaped like incandescent bulbs) present a risk because they contain mercury, and halogen lamps are not particularly efficient.

So, the future belongs to the LEDs, if only they can be manufactured more cheaply than at present.

LARS SAMUELSON HOPES that the next step will be a full-scale factory in, or close to, Lund, with its unique expertise and facilities for materials science.

“The key technology is our nanowires. It would therefore be natural for production to take place here. But that all depends how Lund Municipality, Region Skåne and the University play their cards”, he says.

MUSICAL EAR – A UNIQUE COMPUTER PROGRAM FOR EAR TRAINING

When Björn Roslund and Carl-Axel Andersson, university lecturers and now also innovators, met businesswoman Sophie Persson, sweet music was heard. She saw the possibilities and took care of the management of their company MusicalEar, which has recently launched a unique teaching resource on the international market. TEXT Maria Lindh PHOTO Shutterstock

► **THE TWO MEN** behind the invention know that their product, a computer program for ear training, is unique because as soon as they got the idea for it, they travelled to the US to learn more about this type of program development.

“But there was nothing like it”, says Björn Roslund, who along with his colleague Carl-Axel Andersson teaches at the Academy of Music in Malmö.



“We want to continue teaching, despite the fact that we now own a business. We have neither the skills nor the

interest to run a company – Sophie does that!”

The story began six years ago when the two lecturers began to compile teaching material based on their own music. They considered books and CDs before they decided on the computer program that now exists in both a Swedish and an English version.

In the USA they realised that their idea was very good and that more than just their students could benefit from such a teaching resource. This is why they turned to LUIS, a unit at Lund University which helps research come to use by commercialising research findings.

“THE HELP AND SUPPORT we received there was invaluable and crucial to our further

development”, they testify. The Swedish version of the program, MusicalEar, was launched a year ago at the Swedish Council of Schools for Music and the Arts conference. This was an important milestone, say the music lecturers.

This year, financier Sten K. Johnson invested in the company and made an international launch possible. The launch took place in February and feels like the big break for the music company.

“We gave a presentation that felt good and we are already wondering about a follow-up – a MusicalEar II”, say the two lecturers, who see both Swedish and international colleges of music, secondary schools, adult education centres and arts and music schools as future users of their teaching resource.



FinjaFive CEO Måns Svensson believes that social innovations are on the rise.

FINJA FIVE – SOCIAL INNOVATION TOGETHER WITH ERICSSON

The researchers had an idea to teach children about human rights. Ericsson, with its global business network, was the perfect partner. Their collaboration laid the foundations for the company FinjaFive – a social innovation from the Faculty of Social Sciences.

TEXT Anna Johansson PHOTO Charlotte Carlberg Bårg

► **FINJAFIVE'S BUSINESS IDEA** is to teach school-children in poor parts of the world about human rights. The product is a holistic solution, with online teaching via computers placed in the schools. The program content is stored on central servers and is controlled and managed by FinjaFive with the help of its business partners.

The idea for the company was born out of a collaboration. Researchers in sociology of law had the knowledge of how norms work and how they are spread online. They had the idea of finding a way to spread knowledge of human rights and the UN Convention on the Rights of the Child via the Internet. Ericsson took an interest in the project and collaborates via a part-owned computer company in India. The CEO of FinjaFive, Måns Svensson, says

that researchers should make the most of the support available at the University through the innovation system, LUIS.

“**RESEARCHERS' EVERYDAY DUTIES** do not include running businesses. Therefore, it was good that we got support, both from the University's holding company and from a major international company”, he says.

Many companies are started in medicine, engineering, science and life sciences. FinjaFive is the first company developed from the Faculty of Social Sciences.

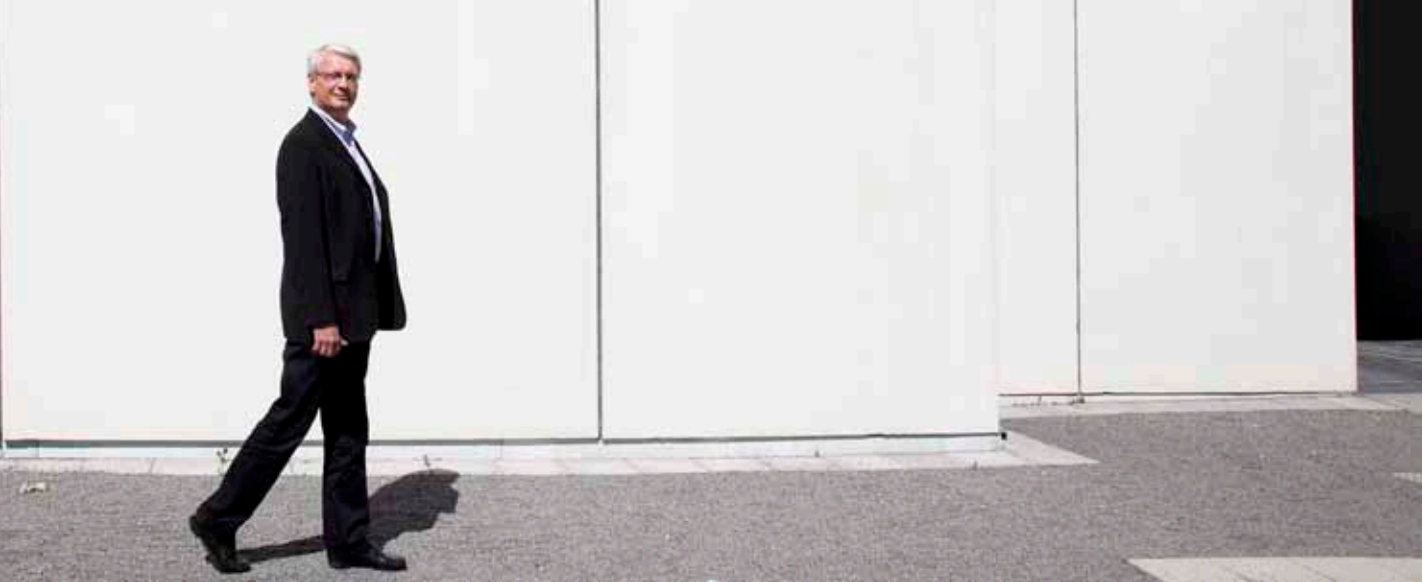
Måns Svensson believes that social innovation is on the rise. “I find that it's easy to get companies interested in social innovation. Many companies have seen that commercialisation doesn't conflict with social responsibility.”

BUSINESSES HAVE LONG worked with corporate social responsibility (CSR) as part of their image and have sponsored projects that improve life for people. However, they have not necessarily expected to make a financial profit out of it.

“Now I have seen phrases like ‘social innovation – business as usual’. There is a realisation that it is possible to take social responsibility on commercial terms and the emerging markets in developing countries are huge”, says Måns Svensson.

FinjaFive is working hard on developing its product.

“In 2011 we will be rolling the product out on the market; it feels good that we already have a structure in place to do that as soon as the product is ready.”



BUSINESS AND ACADEMIA MEET IN NEW MEDICAL RESEARCH VILLAGE

Offering 80 000 m² of laboratories and offices reserved for research and enterprise in medicine and life sciences, Ideon Medicin Village in Lund will welcome its first occupants in 2012.

TEXT Ola Isaksson PHOTO Charlotte Carlberg Bärq

► **“REALLY GOOD IDEAS** come about in natural meeting places; for example, at breakfast meetings, over lunch or during an afternoon coffee break”, says Mats Leifland, president of Ideon Medicin Village.

Mats Leifland is leading the work on the new research facility. Emphasis is placed on finding the right ‘members’, as the tenants at Ideon Medicin Village will be known. Mats Leifland believes in close proximity between the companies and researchers who will be moving in and hopes for many spontaneous meetings and exchanges of ideas. There must be a common motivation to develop the concept among those involved, he says.

BY THE END OF 2012 it is hoped that there will be 400 people working at Ideon Medicin Village, and in the long term up to 1000 or more. It is intended to become a dynamic environment housing research companies, university researchers and larger companies making complete products.

“We want to have the entire value chain, from the individual researcher to the large companies. Our shared goal is to improve health and wellbeing”, says Mats Leifland.

THE IDEA OF IDEON Medicin Village developed in connection with AstraZeneca’s decision to move its activities from Lund. The new venture became possible with the Mats Paulsson Foundation’s purchase of AstraZeneca’s well-equipped premises, which were well suited to the new use. The foundation then founded Ideon Medicin Village, at the same time declaring that all the profits from the company would be reinvested in research and innovation initiatives.

The foundation’s express goal is to promote scientific research and innovation within medicine and other life sciences.

“This will influence the entire Öresund region and we hope that we will also be able to attract Danish companies”, says Mats Leifland.

The first tenancy contracts will be signed in autumn 2011, but Mats Leifland doesn’t want to rush things. It is more important that the members based at the facility really fulfil the criteria than that the facility is filled straight away. Lund University is planning, among other things, a centre for cancer research at Ideon Medicin Village.

Mats Leifland hopes that the facility will lead to more research findings resulting in

products and companies. There are also plans for a business incubator for life science start-up companies.

“There are often many good ideas at universities, but it may not be clear from the start whether they are profitable. However, in the right environment and in symbiosis with other companies, these ideas can be developed and become profitable”, says Mats Leifland.

HE COMES FROM A POST as deputy CEO at Peab. He hopes that Ideon Medicin Village will contribute to significant progress in both the short and the long term.

“The lead times for the development of drugs are extremely long; it often takes a long time before new drugs are ready for use. Often, small companies do the research for products and then larger companies buy them.”

In addition to the Mats Paulsson Foundation, where Mats Paulsson himself has donated SEK 100 million, Göran Grosskopf has also chosen to finance a chair in medicine, which is likely to be based at the facility. Ideon Medicin Village is expected to gain access to the premises in early 2012.

ON THEIR OWN TWO FEET

RESEARCH FROM ACADEMIA
TO THE MARKET

A selection of business ideas originating from Lund University which are now independent concerns.

TEXT Maria Lindh PHOTO Kennet Ruona

► MEASUREMENT DEVICE CAN DIAGNOSE SCHIZOPHRENIA

SensoDetect was founded in 2005 and is based on psychiatry research at Lund University. The company's product is a measurement device which enables objective measurements of mental illness, both in clinical practice and research. Clinically, it is used to assist in the diagnosis of diseases such as schizophrenia.

"This year we are focusing on launching our product internationally and reinforcing the research findings on which it is based. We have tried to make money to invest in the development of the company from an early stage by selling measurements, at the same time as conducting research", explains Johan Källstrand, CEO of SensoDetect.

► STUDENT CONSULTANTS IN HIGH PLACES

Lunicore was founded in 2003 by students at the School of Economics and Management to offer students work experience and contact with industry during their studies. Today, Lunicore provides consultancy services in the fields of economics, engineering, IT and law – thus covering many of Lund University's programmes.

"At the moment it's full speed ahead. We are now a fully fledged consultancy firm and often work on a strategic level for our clients, which is unusual for a student company. The companies we work with include E.ON, Sony Ericsson, the Trelleborg Group and Perstorp AB", says Johannes Ivarsson, CEO of Lunicore.

► TECHNOLOGY IMPROVES BIOGAS PRODUCTION

Bioprocess Control was started in 2005 and today employs 10 people. The company sells technology and services for biogas production and is based on research carried out at the Division of Biotechnology at Lund University.

"We're in the process of going from being a pure development company to

being a commercial one. Our international distribution network is complete", says Thomas Egelstig, an investor and chair of the board of Bioprocess Control.

► TEST SHOWS RISK OF PRE-ECLAMPSIA

Worldwide, over 8.5 million women annually suffer from pre-eclampsia, which can lead to premature birth or, in the worst case, death of mother and child. Researchers at the Department of Clinical Sciences are behind the company Preelumiina, which has developed a test to show whether a woman is at higher risk of being affected if she has raised levels of a specific 'marker' in the blood. The company is currently in negotiations with commercial partners to launch the test on the market. Preelumiina is also working on a cure, and within 1–2 years, CEO Tomas Eriksson expects to be able to start looking for partners for the continued development of the product.

"By commercialising our research we can help women. If our cure makes it all the way, it will be unique", he says.

In 2007 Preelumiina received the University's innovation prize, the same year that the researchers founded the company with the help of LUIS, which invested money in the idea.

► SPECIAL YEAST TURNS WASTE INTO ETHANOL

Taurus Energy AB was founded in 2006 and is based on a technique developed from

research partly done at the Faculty of Engineering. The technique uses a yeast that can convert waste products from maize and fruit into ethanol. Because the yeast ferments waste products such as stalks, valuable food is not used. The business idea is to commercialise the technique by selling licences for a wide range of uses.

"We are nearing a commercial breakthrough. Our product is a yeast which we can use to make ethanol. Since it is fairly easy to copy the yeast, it has been difficult to allow our customers to test it in their home environments. We are working on placing an identification code in the yeast so that we can track it. Once the code is in place, we will be able to send yeast samples and let the customers test it to see that our product works", explains CEO Lars Welin.

► SURGICAL IMPLANT LAUNCHED

Carponovum was established in 2006 and currently has three permanent employees and three consultants. The company originates from the Faculty of Medicine at Lund University. Its products are a surgical implant and an application tool.

"The first certified products have just arrived. We've started selling and already have a distribution network in many countries. Now we will get reference clinics, where surgeons can try out our product. We have one so far in Malmö", says Anders Grönberg, CEO of Carponovum.





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