

Articles

Don't supersize, be nanowize

By Lotte Finck

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Two and a half years ago Aalborg University (AAU) and the private company NanoNord A/S set out to establish an environment that technically lives up to the demands which both the commercial company and the research institution have when it comes to Nano Technological research and production., Thomas Kjaer Nielsen explains.

Since then AAU and NanoNord have bought a used 1000 square meters clean room facility from England which has been disassembled, moved to Denmark and reassembled in the facility at Skjernvej, Aalborg. It required 65 large DFDS ship containers to be sailed across the North Sea and 30.000 man hours to reassemble the 4000 cubic meters large puzzle. It was only possible because every single part, from the smallest to the largest, had been marked and numbered.

Furthermore new Physics and Nano-Bio laboratories totalling 1000 square meters (including biological class 1 laboratories totalling about 300 square meters) have been added to the facility.

This means that today AAU and NanoNord have one of Denmark's largest facilities for research in nanotechnology, physics, biotechnology and biophysics at their disposal. For the more technical oriented readers the equipment covers a wide range in PVD, CVD, diffusion, photolithography, metrology etc. Some of the used equipment was not even unpacked yet, nor delivered, when the English company went belly up. Therefore the equipment was only used in the sense that it had been bought and delivered. However by buying used equipment Aalborg University and NanoNord has been able to create a facility which contains the necessary climate and has a range of equipment with

a sensible pallet of functionality to get started with nanotechnology at a price which is about a factor of ten less than if new equipment had been bought.

During the same period AAU has started a new engineering education in nanotechnology as well as has increased its focus on the area of nanotechnology by placing the activities in nanotechnology under the Interdisciplinary Nanoscience Center (iNANO) which is run in cooperation with Aarhus University. With this as a starting point the facility will in future years be extended with new functionality in line with new research activities as they are initiated by the institution and the industry.

Clean Room Facilities

The structures you work with in nanotechnology are smaller than the dust particles in the air. This makes demands on partly the machines that are used since they should be able to work with extreme precision and partly on the environment in which the machines are placed. The solution is a clean room and the solution is simple: By a combination of filtering the air in the clean room and a high circulation of the air, a cleanliness which is about a factor of 5.000-50.000 less than in a normal environment, can be achieved.

Not only the air has to be clean, but also the water and other supplies which are used in the facility are treated and filtered so that the amount of particles are significantly reduced – all in order to work with components in nano- and microscale under optimum conditions. It is e.g. important for researchers to know that the same test can be repeated under the same conditions.

More information about the research performed in the laboratory can be found at: <http://www.nanonord.com/>

Please feel free to mail articles or other input for the next ECIU newsletter to:

saskia.hansen@strath.ac.uk

The next edition will be published in June/July. The deadline for submitting articles will be **10 June 2006**.



Booster grant for nanotechnology and biosensors

Two LiU professors, Lars Hultman and Ingemar Lundström, will each receive six MSEK for long-term research endeavors. The funds are an extension of earlier senior grants from Swedish Foundation for Strategic Research, SSF. Two years ago SSF earmarked allocations to enable 18 established Swedish researchers to take a leave of absence to explore new areas of research.

Thin film physicist Lars Hultman, accompanied by two of his doctoral students, traveled to the University of Illinois in the United States, seeking new perspectives on nanotechnology and ab initio-calculations. The visit engendered a research program to study the growth of super-hard materials on an atomic level. An evaluation of the program places Professor Hultman in the international vanguard of thin film physicists. Resulting transfers of significant technological know-how will benefit Swedish industry.



Ingemar Lundström, who holds the LiU chair in applied physics, completed a six-month scientific sojourn at Tor Vergata in Rome. This university houses one of the world's few laboratories where chemists and electronics researchers collaborate on biochemical sensor technology. Professor Lundström will introduce a new program at LiU to focus on organic materials for biomedical diagnostics and monitoring. One track will be nitrogen oxide and the significance of this gas in health care as well as in the public environment.

This new LiU field is anticipated to lead to innovative medical instruments and industrial products. *Source: News section on LiU website*

Professor Lars Hultman together with Ph. D. student Jenny Frodelius in the clean room of the Thin Film lab. The deposition system is called "Laura". The photographer is Göran Billeson.

£5m Research Funding

The University of Strathclyde has won a £5m award to expand its groundbreaking research into nanometrology - the ability to measure and characterise molecules.

The prestigious Science and Innovation Award announced today is made up of £2.8m from the Engineering and Physical Science Research Council (EPSRC), £1.5M from the Scottish and Higher Education Funding Councils and £0.5M institutional support.

The project is led by Professor David Birch, Head of the Department of Physics, in collaboration with Professor John Pickup's team at King's College London School of Medicine. The Strathclyde team includes Professor Duncan Graham, Pure and Applied Chemistry, and Professor Martin Dawson, Strathclyde's Institute of Photonics. These awards aim to address the shortage of academics capable of leading future research in areas of strategic importance to the UK, and will lead to the recruitment and support costs of at least three lecturers, six research fellows and six PhD students, across the two institutions.

The global market for nanotechnology is predicted to reach \$1 trillion by 2015. However, without the ability to measure and characterise molecules at the resolution of a nanometre (one thousandth millionth part of a metre), much of the predicted potential of nanotechnology will go unrealised. The new field of measurement science, nanometrology, is still in its infancy but is widely seen as crucial to bridging the molecular measurement gap needed for the next level of nanoscale innovation.

For example, one of the many challenges is not only to measure on such a small scale, but also to be able to do this on molecules in their natural environment and track their dynamics at a level that even single-molecules can be studied, perhaps one-day non-invasively inside the human body to detect the early onset of disease.

The generic nature of the research means it will find diverse applications which span materials manufacture as well as molecular science and medicine. The Science and Innovation programme in nanometrology will find new directions to help shape the future of areas of importance such as disease pathology, diagnostic tools in nanomedicine and the design of new structural materials, while facilitating knowledge transfer into the healthcare, chemical and instrumentation industries.

The project will be focused around the new Centre for Molecular Nanometrology, set up at Strathclyde in 2005 with over £2m investment. The Centre combines capabilities in physics and chemistry based on novel molecular properties for emitting and scattering light as means of revealing molecular structure and dynamics on the nanometre scale. Taken together these new developments contribute further to the enhancement of the international standing of Scottish science brought about by the recent Scottish Universities Physics Alliance (SUPA) and ScotCHEM collaborative initiatives.

Source: Press Release, University of Strathclyde

34 official new master's degrees at the UAB



Universitat Autònoma de Barcelona

The Catalan Ministry of Universities, Research and the Information Society (DURSI) has approved the incorporation of 153 official master's degrees into the Official Postgraduate Programmes for the coming academic year. In accordance with this programme, which is part of the process of adaptation to the European Higher Education Area (EHEA), the UAB will provide 25 master's degrees and will participate in a further 9 inter-university master's degrees.

From the 2006/07 academic year, the Catalan university system will continue to offer official courses that fit the structure that has been in place until now, but will also launch the first postgraduate courses that fit the new structure for university studies. This process means that postgraduate studies will for the first time receive full official recognition.

As part of this programme, the UAB will provide 25 new master's degrees covered by 14 Official Postgraduate Programmes (POPs). Five of these master's degrees will be inter-university courses, i.e., they will be coordinated by the UAB and shared with other Catalan, Spanish and European universities, such as the University of Barcelona, the Universidad Autónoma de Madrid, the University of Paris and the University of London. Similarly, the UAB will participate in nine master's degrees coordinated by other universities.

Source: UAB Website

UAB and the European Higher Education Area

During the 2004/05 academic year the UAB drafted a proposed model for the undergraduate and postgraduate courses with the aim of adapting to the European Higher Education Area (EHEA).

The UAB model meets the desire to provide courses comparable to those available in many universities in the rest of Europe, and aims to facilitate student mobility. In short, by creating a new model the UAB aims to:

- promote the value and benefits of being a campus university;
- integrate teaching and quality research;
- create a more international university and promote mobility.

The general model aims to fulfil two roles:

1. For the students: the model should be used to present the university courses to the students integrally

and to enable them to visualise the different paths open to them according to their future study and vocational training plans within and outside the UAB.

2. For the institution: the model represents a proposal for organising the studies, anticipating the integration and harmonisation of different types of courses and establishing guidelines for the basic criteria that will govern new undergraduate and postgraduate syllabuses.

The model must serve as the driving force for a progressive process of designing courses and introducing the European Credit Transfer System, as well as for new teaching methods designed to promote the development of a university with high-quality, diverse courses that are sufficiently interlinked, making the UAB attractive to students and comparable to universities in the rest of Europe.

Source: UAB Website

ECIU Joint Masters' Workshop

On 24 February a group of some 20 staff members from Aalborg, Aveiro, the UTC, TUHH and Strathclyde met to discuss both the progress within the development of the European Masters' in Innovation and Technology (EMIT) and more broadly to discuss a framework for how the ECIU might best handle issues related with fees, degree structures and quality assurance.

Work is currently ongoing to formulate a general Guide for other programmes on the basis of the conclusions reached at this meeting, and the Guide will be circulated to all ECIU institutions later this spring.

The Guide is intended to make it easier for staff who are interested in starting work on developing Joint Masters' Programmes to address issues associated with setting an appropriate fee for the programme, choosing a degree structure that suits all partners etc.

The aim is to finalise the Guide no later than the end of April, so that a copy can be circulated in advance of the ECIU Board meeting in May.

If you are interested in a copy, please send an email to the ECIU Secretariat: saskia.hansen@strath.ac.uk.

Tuition Fee Exemption for Dependents of Post-Graduate Research Students in the State of Victoria, Australia.

The Minister of Education & Training, Victoria, Australia, Minister Lynne Kosky, recently announced that dependents of international post-graduate research students will receive full exemption from tuition fees in government primary and secondary schools in Victoria, from January 2006.

Swinburne University of Technology is able to take advantage of this announcement as it is located in the state of Victoria. It means the exemption applies to dependents of post-graduate research students enrolled at Swinburne University of Technology (and all other Victorian tertiary institutions) in doctoral or masters by research degree courses, who hold a Subclass 574 Visa issued on or after 1 July 2004.

The announcement also indicates there is no restriction on number of dependents and the exemption applies for the duration of the Subclass 574 Visa (postgraduate research Visa).

Rostov named sixth for its academic performance in 2005

By Alla Batchenko

Annually the Ministry of Education and Science of Russian Federation rates the performance of universities using the following indicators: quality of academics and scholars, quality of instruction and research, number of degree students, number of international students, volume of research, number of publications, provision of hostels and so on.

In 2005 the Ministry named Rostov State University sixth in the Universities group which includes 86 Russian universities that offer a wide range of undergraduate programmes as well as master's and doctoral degrees; many strongly emphasize research.

The first 7 universities are:

1. Moscow State University
2. Saint Petersburg State University

3. Moscow University of Physics and Technology
4. Peoples Friendship University of Russia (Moscow)
5. Tomsk State University
6. Rostov State University
7. Kazan State University

The Vice-Rector for International Relations, Executive Representative for the ECIU, Vladimir Zhukov expressed his delight with the rating, saying: "*Strength in academic programmes and research together with innovation development and diversity of international activities enabled us to achieve this remarkable result*".

Please read more about Rostov on: <http://www.mis.rsu.ru/foreign/>

European Typology Project

From November 2004 to summer 2005 a group of researchers, led by Prof Frans van Vught, CHEPS, conceived a research project with the aim to develop a proposal for a typology of higher education institutions in Europe. As a follow-up to this, ECIU member institutions were asked to take part in a practical pilot which will test the criteria that has been proposed.

To recommendations from the initial research project is that the proposed typology will be composed of a number of parallel schemes, each based on a different characteristic (the four groups of schemes are: 1) on education, 2) on research and innovation 3) on student and staff profiles and 4) on institutions). Each scheme is presented by:

A description of the characteristics of higher education institutions that stand central in the scheme, a description of the indicator(s) that can be used to differentiate between institutions within the scheme, a description of the different categories used within a scheme based on the indicators suggested.

The full research report is available from CHEP's website:

<http://www.utwente.nl/cheps/documenten/engreport05institutionalprofiles.pdf>

Seminar at RSU

Within the framework of Salzburg Seminar, Rostov State University hosted the 5th Symposium of the Russian Higher Education program "Universities and regional development: Effectively managing research and innovation" on December 14-18, 2005.

This conference brought together academic leadership, governmental authorities, higher education leadership, representatives of business, industry and international organizations, as well as policy makers from the Russian Federation, USA and countries of Central, Eastern and Western Europe.

The first presentation – " Strategies of the Russian Federation in the area of science and innovation development up to 2010" – was given by D. Livanov, Deputy Minister for Science and Education of the Russian Federation. His presentation was focused on the existing contradiction between the structure of R&D sector and growing demands of some entrepreneurs for high tech in Russia. The Deputy Minister emphasized the fact that some research findings of the internationally excellent quality can't be introduced into Russian economy because of the unbalanced national innovation system and low level of commercialization of innovation ideas.

To overcome this he offered the following scenario: a. to allocate the federal budget resources on the development of fundamental science and priority research directions, on creating innovation infrastructure and a number of technological windows to increase competitiveness of national technologies; b. to expand partnership with private companies (to diversify the funding base).

During discussion of this presentation 3 different aspects were being considered: how to finance Academy of Sciences and universities within this concept; how to improve interaction between the Ministry of Defense and the Ministry of Science and Education; how to support innovation processes in regions.

Within the theme " Support of innovation development in region: problems and solutions" V. Vakula, Deputy Minister for Economy and International Relations of Rostov region, presented the Programme of innovation development in Rostov region, based on the formation of infrastructure, venture and innovation funds, and on the development of small business.

V. Motin, Deputy President of Rostov High-Tech Association, claimed that the key factors hampering dynamic interaction between universities and industry on creating new technologies are low motivation for both parties at selling/purchasing intellectual property and imperfection of legal environment.

Yevgeny Aidarkin, Vice Rector for Research of RSU, examined innovation implications of university integration. As an example he presented the Southern Corporate

University, formed 2 years ago by joint efforts of RSU, Taganrog Radio-engineering University and Southern-Russian State Technical University, which essentially has fostered academic and research mobility, has increased competitiveness of these universities and helped them in getting several project grants.

Increased interest in the project on creating technological consortiums has been apparent across academics and practitioners. While training staff for and providing technologies for small business, such consortiums should focus on developing firm links between industry and universities.

The symposium closed with a plenary panel session, the results of which can be summarized in the following way:

- One of the main problems of innovation development of Russia is associated with the lack of interaction between industry and universities , that is why such issues as effective training of engineers, skilled in the-state-of-the-art technologies, and observation of intellectual property right are vital;
- The crucial element for solving this problem is the project on creating several technological consortiums aimed at strengthening university – industry links. It is financially supported by the Bank of Reconstruction and Development.
- Regional aspects of innovation development are key factors for the formation of a balanced innovation system in Russia.

Rector of RSU , professor
Alexander Belokon.



Participants of the Salzburg Conference at Rostov State University

Does the acquisition of young, innovative technology-based companies by larger, often global, firms undermine regional and national economies?

This is the view of many researchers, but Professor Colin Mason, University of Strathclyde, and Professor Richard Harrison, Queen's University of Belfast, believe that's a simplistic view.

Their study of the acquisition of Scottish technology companies acknowledges that some acquisitions result in the subsequent closure of the acquired company. However, in other cases acquisition by a bigger, resource-rich company removes financial and market access barriers to growth, enabling the acquired company to expand and increase its contribution to regional economic growth.

And there are two important, but often overlooked, benefits of acquisition. First, it triggers a process of 'entrepreneurial recycling' in which the founders, and sometimes other senior members of the management team, reinvest their financial wealth and expertise in new entrepreneurial activities which strengthens the economic environment:

- As serial entrepreneurs: arguably second-time around entrepreneurs will be in a better position to build globally-competitive companies
- As business angels, investing their wealth and, more importantly, their experience to support the emergence of new businesses
- As mentors and advisors to new and

growing businesses

- Developing the institutional environment in ways which enhance its entrepreneurial capacity.

Secondly, Mason and Harrison argue that fundamental changes in the nature of multinational investment, notably the declining competitiveness of developed countries – and peripheral regions in particular – for greenfield site investments and the growing importance of asset-acquiring investment, means that building knowledge-based companies is a way in which such countries and regions can continue to attract foreign direct investment.

The challenge for policy-makers is to prevent such companies from being closed down and their technological assets moved elsewhere. Mason and Harrison suggest that the best defence is to develop strong clusters: technology companies that are deeply embedded in their regional economy, through workforce ties and collaborative and co-operative interactions with local firms and institutions. Companies will then be 'locked-in' because of the place-specific nature of their knowledge assets, learning and innovation capabilities, meaning that their knowledge assets then cannot easily be transferred and reproduced in other locations.

Source: Press Release, University of Strathclyde

European Institute of Technology

In late February the European Commission published a communication about "Implementing the renewed partnership for growth and jobs. Developing a knowledge flagship: The European Institute of Technology." The Executive Summary specifies that the Institute will be designed to:

- Integrate teams from universities, research centres and companies in its structure and operations;
- Have resources seconded (not just networked) from existing organisations to that they become legally part of the EIT and can jointly develop an integrated strategy;
- Have an independent and self-renewing Governing Board drawn from the highest levels of the scientific and business communities;
- Not be constrained by the boundaries and obstacles which fragment European higher education and research today.

In the actual document itself, it is furthermore specified that a Governing Board for the EIT would be charged with the responsibility for:

- Setting the strategic priorities for the activities of the EIT;
- Managing the central budget and allocating re-

sources to the knowledge communities;

- Establishing excellence criteria for the EIT, including for degree awards;
- Organising the selection, monitoring and evaluation of the knowledge communities;
- Awarding EIT degrees;
- Strategic oversight of the knowledge/IPR portfolios.

As the Executive Summary clearly indicates that the EIT will be based on a "networked" approach, the latter parts of the document is somewhat confusing as the EIT here is described as an entity that would have its own legal personality and independence from national regulation, which would enable it to define its own rules for degree awards, staff management, IPR oversight, and the operation of its core business.

The ECIU Executive Board will be discussing the EIT in more detail at the upcoming Board meeting at Linköping University in Sweden on 19 May.

Please read more on: http://europa.eu.int/comm/education/policies/educ/eit/index_en.html

9th European symposium on Controlled Drug Delivery

Organized by the Biomedical Engineering Department of the University of Twente from 4-7 April 2006, in close co-operation with academia and innovative industrial partners.

The European Symposia on Controlled Drug Delivery are organized biennially during the spring of even-numbered years; the first symposium took place in 1990. Throughout the previous eight editions the ESCDD has established itself as a high-quality symposium on all aspects of Advanced Drug Delivery.

The objective of the symposium is to provide researchers from both academia and industry a leading forum in the field of controlled drug delivery, where the latest developments in various disciplines can be discussed in the perspective of their applicability in innovative drug delivery systems. During the years this approach appeared to be particularly attractive for pharmaceutical scientists, polymer chemists and other life sciences oriented researchers and engineers.

Apart from the plenary presentations of more than twenty European and non-European experts in the field, a poster session will be organized to stimulate informal interactions on specific topics of interest to the audience. All accepted poster abstracts will be published in a special issue of the Journal of Controlled Release in combination with the full manuscripts of the plenary lectures.

For more information with regards to the symposium please go to: www.bmti.utwente.nl/cdd/

Other conferences

AC21, 4-6 July 2006:
www2.warwick.ac.uk/newsandevents/events/ac21/

High Technology Small Firms Conference, 11-13
May 2006
www.utwente.nl/nikos/htsf/HTSF.doc/

Drug discovery within the ECIU

The ECIU Secretariat is in the process of compiling information about drug discovery research within the ECIU institutions. If you are in doubt as to whether your institution has submitted information, please contact your ECIU Local Coordinator. All ECIU Local Coordinators who have not yet sent the information are reminded to do so asap.

ECIU General Meeting

The ECIU General Meeting and Executive Board meeting take place at Linköping University (LiU) on Thursday 18 May and Friday 19 May 2006. LiU has two campuses and the meetings will be taking place on their Norrköping Campus in Norrköping some 40 kilometres North of Linköping.

The programme for the General Meeting on 18 May is:

- 9:00—9:15: Opening and Introduction by Mille Millnert, Rector, LiU
- 9:15—9:45: Linköping University: A Driving force in the 4th Metropolitan Region of Sweden, Mille Millnert.
- 9:45-10:15: Linköping University's Challenging Work with Knowledge Transfer and the Third Mission, Ursula Hass, Provost for External Relations.

Coffee Break

- 10:45-11:15: Innovation and Entrepreneurship at Linköping University, Magnus Klofsten, Professor and Director of LiU's Center for Innovation and Entrepreneurship (CIE) (and involved in ECIU's Entrepreneurship Research project).
- 11.15-11:45: Industrial Affairs and Technology Transfer, Ronan Stephan, President, University of Technology Compiègne, France.

Lunch

- 14:00-15:15: Various Committee Meetings (Steering Committees for the three ECIU Core Areas: 1) ECIU Graduate, 2) Improved Student and Staff Mobility and 3) University Industry Interaction. Alternative programme: Norrköping Visualisation and Interaction STudie and Acreo Laboratory.
- 15:30-18:15: Bus to Campus Linköping and Tour on Campus
Welcome drinks at Terrassen, Kårallen and Dinner.

Invitations for the General Meeting has been circulated directly to the individual ECIU members and partners. For further information, please contact the ECIU Secretariat (saskia.hansen@strath.ac.uk).

Please read more about LiU at: <http://www.liu.se/>

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Université de Technologie de Compiègne, France

www.utc.fr

Universität Dortmund, Germany

www.uni-dortmund.de

Technische Universität Hamburg-Harburg,
Germany

www.tu-harburg.de

Linköpings universitet, Sweden

www.liu.se

University of Strathclyde, United Kingdom

www.strath.ac.uk

Politecnico di Torino, Italy

www.polito.it

Universiteit Twente, The Netherlands

www.utwente.nl

University of Warwick, United Kingdom

www.warwick.ac.uk

Technológico de Monterrey, Mexico

www.itesm.mx

Rostov State University, Russia

www.mis.rsu.ru/foreign

Swinburne University of Technology, Australia

www.swin.edu.au

ECIU on the run

Participate in the campus run of the University of Dortmund

Who will be the fastest and most athletic university within ECIU? The chance to find out is on the 31st of May as the famous "campus run" is going into its 22nd round in Dortmund.

The organisers invite you to run on the campus, running either 2,5, 5 or 10 kilometres. For people, who don't like to run, there is the possibility to discover the campus of the University of Dortmund by joining the "campus walk". Last year over 600 participants attended, all being students and employees of the University of Dortmund, answering the question, who is the fastest in Dortmund. This year we'd like to ask. "who is the fastest within ECIU?"

If you like to join as participant, please register yourself per mail before May 15th to ahs@uni-dortmund.de, subject "campusrun 2006". The entry fee of € 6 and has to be paid before start.



Participants from the 2005 Campus Run

ECIU Activities

A number of project meetings or seminars have or will take place over the coming months:

- Student Wing meeting, TUHH, 7-8 April
- ECIU PR group meeting, LiU, 17 May
- ECIU Annual General Meeting, LiU, 18 May
- ECIU Executive Board meeting, LiU, 19 May
- AC21 Conference with ECIU representation, 4-6 July
- ECIU Executive Board meeting, Torino, 6 October

Please read more about the ECIU and these activities on the website: www.eciu.org

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