Annual report 2008

I am delighted to see that the year 2008 has been very successful for our department. I will use this opportunity to thank our employees for their hard and impressive work during the year. The success of our department within almost all areas is indeed due to their work.

Growth within many areas

It is indeed encouraging that we continually increase the admission of new students. From 2006 till 2008 the admission to our two bachelor programmes has more than doubled, and our department has nearly 25 per cent of all new bachelor students at the Faculty of Science. The new IT bachelor programme, which started in the year 2007, has indeed been a great success and at the same time the intake at the computer science bachelor programme has increased significantly. However, we still have much too few female students. We have for several years tried to improve the intake of female students e.g. by inviting girls to a yearly Girl Camp.

There is no doubt that the increase of new students is due to "IT-Byen Katrinebjerg" , a very well-known and highly respected brand – both locally, nationwide and in international societies. We have indeed benefitted from the excellent PR work contributed by Alexandra Instituttet. However, the foundation of our success is the daily work provided by our employees.

We will continue to focus on the promotion of our research and study programmes. A new 80 pages Computer Science Magazine will be published in the beginning of March. The magazine describes the variety of our activities. The magazine will be used in PR and recruiting activities. Moreover, it has been a great success to employ Søren Poulsen as a manager for the IT bachelor programme. With help from IT University West, we have therefore employed another full-time manager to support the recruiting activities, planning and completion of our study programmes.

We warmly welcome the Engineering College of Aarhus which has decided to move all their electronic and IT activities to Katrinebjerg. This is the culmination of many years of fruitful cooperation within the Civil and Constructional Engineering programme in Technical information technology. The activites of the Engineering College of Aarhus is moved to Katrinebjerg in order to intensify the teaching and research cooperation with the university. The planning of new buildings and the reconstruction of buildings has already started, and we expect to finish in the summer 2011. At that time the third stage of the IT-Park on the corner of Helsingforsgade and Finlandsgade will be finished. The new building will, among other things, have an auditorium for 250 people, student workstations and a library. Moreover, there will be enough room for the computer science master's thesis students to move from the Codd building and thereby be closer to the different research groups. The engineers will then move into the Codd building. The engineers will also take over the Shannon building. Our teaching rooms in the Shannon building will be replaced by new teaching rooms in the almost finished second stage of Incuba Science Park. Søren Christensen will continue to be our representative in the various building committees, and we will like to take this opportunity to thank Søren for his excellent work, which has been of great importance to the creation of our excellent physical settings.

Academic staff

- Michael Schwartzbach has been appointed professor within Programming Languages and Formal Models, and Peter Bro Miltersen has been appointed professor within Mathematical Computer Science. Furthermore, Morten Kyng has been appointed professor within Pervasive Computing (in continuation of a five-year professorship with special responsibilities). Congratulation to all of them. They very much deserve it.
- Klaus Ostermann has been employed as associated professor within Software Engineering. Klaus is one of only 250 special talented young scientists (within all areas) who have received a European Research Council grant in 2007.
- Unfortunately, the department has lost tenured academic staff during the year, as Lars M. Kristensen has started a professorship in Bergen, while Louis Salvail of personal reasons has decided to move to Canada.
- Ole Østerby has celebrated his 40th jubilee and Susanne Bødker has celebrated her 25th jubilee.

The department has a very efficient scientific staff. They are placed in the top of all prevalent parameters to measure research and teaching activities – both compared to other Danish computer science departments and compared to other departments within our own faculty.

The fact that we within the last 15 years have lost more than 15 tenured scientific staff members – primarily to professorships at other Danish and foreign universities – mark the high quality. We expect that this development will continue. This means, that we need to hire two to three new tenured scientific staff members each year if we want to obtain a much needed increase of scientific staff members. We are therefore very pleased to see that the faculty, in spite of the overstretched financial situation, is willing to bring into effect the job advertisements/search committees, which are included in the 2009 part of the five years strategy plan, made by the research committee last year. The plan aims at a slow but continual increase in the number of tenured scientific staff members. In 2018 the number of tenured scientific staff members should be 35. We want to hire scientists from abroad and from other Danish universities and especially more women.

Technical and administrative staff

- Last spring Karen Kjær Møller resigned after 37 years at Computer Science. Through all these years Karen has worked extremely hard as head of the administrative staff. Her willingness to help new employees and guests is legendary, and she still has contact to many of these people. We wish her all the best in the future and thank her for her impressive and unsurpassed work.
- It was with regret that we had to say goodbye to Uffe Engberg, who started a new job at the faculty secretariat. In many areas Uffe has been of great importance to our success. First by his work at the Center of BRICS and later on by his work at Head of Administration. It is very much to his benefit that our department – also administratively – is considered one of the best.
- We have hired a new Head of Administration, Annemette Hammer. For the last seven years she has worked at the Faculty of Science, hereof four years at the Steno Institute (now Department of Science Studies). Hence she is already familiar with the administrative functions at a science department.
- Arne Nis Jensen has been employed in the secretariat to handle the staff administration.

- In both the IT and web area we now assist a number of other departments, centers and faculties. We have therefore hired Jacob Styrup Bang and Rune Bolding Broberg in the IT staff and Søren Madsen and Morten Nisker in the web staff.
- Kirsten Boddum Andersen has celebrated her 40th jubilee, whereas Søren Ertmann has celebrated his 25th jubilee. Kirsten was awarded the Queen's Silver Medal of Honour.

The department has an extremely efficient technical and administrative staff that performs an excellent, highly qualified and very committed job.

The IT and probably also the web areas will experience important changes in the nearest future. The faculty and also the university expect that these changes will result in efficiency and service improvements. The advances of these changes are not evident at our department as we have a very efficient IT and web department. Regardless of this, the department is an ardent proponent of these changes. It is the right thing to do – from both the faculty and university point of view. The IT staff at the department has met these changes positively with great energy and an open mind. For that they deserve much credit and thanks. Under the leadership of Søren Christensen, Søren Ertmann and Poul Bang they have achieved very impressive and unique results within IT cooperation at the faculty.

The administrative areas will also experience changes in the nearest future, as several departments together with the faculty secretariat cooperate more closely about finance and accounts. We are looking forward to seeing the much needed efficiency improvements by means of a better and more interconnected IT support where electronic work flows replace paper and thereby eliminate many trivial routines with little professional substance. We want to keep the administrative staff at the department, because the physical appearance is very important. But it is necessary to streamline the work flow to avoid unnecessary duplication of work.

Appointments and awards

- Kurt Melhorn has been appointed honorary doctor at Aarhus University for his practical and theoretical work within the development of effective algorithms. He is one of six core researchers in the MADALGO project and has for many years contributed to the development of the algorithm research at the Department of Computer Science
- Lars Arge has become member of the Royal Danish Academy of Sciences and Letters, which has approx. 250 Danish and 250 foreign researchers as members.
- The Special Interest Group on the Design of Communication ISIGDOC has awarded Professor Susanne Bødker (and Professor Pelle Ehn, a former employee) the RIGO Award 2008 as an appreciation of "an individual's lifetime contribution to the field of communication design".
- Thomas Mailund has received the Danish Independent Research Councils' Young Researcher's Award in relation to his research in software development to isolate cancer genes.
- Bjarke Hammersholt Roune has received the Danish Independent Research Councils' Travels Grant of DKK 250,000 in relation to a project in algebraic computation.

- Lars Arge and Peter Bro Miltersen represent the Department of Computer Science in two of five UNIK projects, which Aarhus University choose to submit. It is indeed a seal of approval, but unfortunately none of the projects obtained finance this time.
- Troels Bjerre Sørensen won the unofficial Poker Robot World Championship arranged in connection with the AAAI 2008 conference. The referee nominated the winner by letting the programs play against each other.
- Two teams from the Department of Computer Science were placed in top-five at the North-west European Programming Championship. The teams, coached by Thomas Mølhave, consisted of: Mark Greve, Kasper Dalgaard Larsen, Jakob Truelsen, Jens Boldsen, Thomas Dueholm Hansen and Adam Ehlers Nyholm Thomsen.

New Projects

The department has been granted approx. 40 million DKK. Thus more than 50 per cent of our funding is external. In 2008 the following external financed projects have started:

- A Scalable Programming Language, Klaus Osterman, European Research Council, 10,5 million DKK
- A Platform for Galileo Based Pervasive Positioning, Kaj Grønbæk, Danish National Advanced Technology Foundation, 5,9 DKK
- Exploring Design & Use of IT in Local Government beyond Web 2, Susanne Bødker, NABIIT, 4,1 million DKK
- Languages and Analyses for Web Programming, Anders Møller, The Danish Research Council for Technology and Production Sciences, 3,4 million DKK
- Disease Mapping, Thomas Mailund, The Danish Natural Science Research Council, 2,2 million DKK
- Denmark's Most Beautiful Festival system, Preben Holst Mogensen, The Danish Council for Technology and Innovation, 1,6 million DKK
- Computational Complexity Theory, Boolean Functions and Circuits, Kristoffer Arnsfelt Hansen, Carlsberg Foundation, 0,9 million DKK
- Computational Mathematics, Peter Bro Miltersen, The Danish Natural Science Research Council, 0,8 million DKK
- Visual Interaction in Wind-turbine Repair, Preben Holst Mogensen, The Danish Council for Technology and Innovation, 0,8 million DKK
- Sameksistens af trådløse teknologier til styring aog overvågning af energi, Jeppe Rørbæk Brønsted, The Danish Council for Technology and Innovation, 0,8 million DKK

Last November the inauguration of the three year CareTech project within health care technology was celebrated. CareTech has been granted 37 million DKK. It is rooted at the Alexandra Institute and is managed by Morten Kyng. The money is to be used to start new projects, which incorporate the newest research and have a clear commercial perspective. Many of the future projects are expected to take place at the Department of Computer Science.

Workshops and summer schools

The department has hosted the following events:

- Workshop on Algebraic complexity theory (Peter Bro Miltersen)
- Workshop on IT Security (Ivan Damgård)
- 9th Workshop on Coloured Petri Nets and CPN Tools (Kurt Jensen)
- Workshop on Interactive and Adaptive Furniture (Marianne Graves Petersen)
- MADALGO Summer School on Cache-Oblivious Algorithms (Lars Arge and Gerth Stølting Brodal).

Furthermore, we have successfully continued Friday Lectures, a series of talks for a broad computer science audience:

- From Indoor Positioning Towards Pervasive Positioning (Mikkel Baun Kjærgaard)
- Evolution of Software Modularity (Klaus Ostermann)
- Parallel Computing on Graphics Hardware for Surgical Simulation and Reconstruction of Magnetic Resonance Imaging (Thomas Sangild)
- When is the Pen Mightier Than the Keyboard? (Andries van Dam, Brown University)
- Pervasive Computing, Emergency Response and the Skanderborg Festival (Preben Holst Mogensen)
- Little Programming Language Secrets (Erik Ernst)
- Transparency – looking Back at Three Decades of Research (Susanne Bødker)
- Deciding the Undecidable – Who's That Rice Fellow Anyway? (Michael Schwartzbach)

At the end of June the department organized the yearly "Computer Science Day 2007", where a broad range of the research activities were presented in ten short talks by representatives from the different research groups. The event is addressed to students as well as employees and people outside our department. It is an easy way to give an overview of our different activities.

Presentation and use of research results

Each year the department participates in different kinds of events, which present our research and study programmes. The events range from practical training for public schools and Upper secondary schools over Open Day events for people outside the university. In 2008 we were among other things involved in:

- **World Robot Olympiad**. Our department was the main organizer of the Danish qualification tournament, which took place in the Lakeside Lecture Theatres. 12 teams fought to represent Denmark at the final. Both categories were won by girl teams who performed well at the international final in Japan. One team obtained a fifth place among 42 teams in the category.
- **Interactive sofa at Aarhus Festival**. The Center for Interactive Spaces created in cooperation with Aarhus Festival and BoConcept the world's longest (a well-attended) sofa at Store Torv in Aarhus. The interactive element consisted of several small computers and censors integrated in the sofa. With different sound images the sofa reacted to how people moved on the sofa.

- **Girls Camp** took place during the autumn holiday. 18 girls in the age of 15-19 participated. During three days the girls were able to experience the everyday life as computer science students and they worked with several IT-related subjects, such as design processes in IT development, robot technology and cryptography. The camp was arranged by Søren Poulsen and was presented by Marianne Graves Petersen, Ole Caprani and Ivan Damgaard.
- **@aGlance at Skanderborg Festival.** After last year's success with Tall Ships' Race another and even more comprehensive version of PalCom's system to improve the security at larger events was tested at Denmark's most Beautiful Festival in Skanderborg. The other partners in the project, besides the Department of Computer Science, are 42D Aps and the Alexandra Institute A/S.
- **Research Day.** Climate was this year's theme. We participated with two projects. With a header saying "Flooding! Where? How much?" MADALGO presented ideas and research on the development of the software system TerraStream. Additionally, Ole Caprani presented a well-attended test traffic lane with LEGO-nxt cars illustrating how much the energy consumption can be reduced with driverless cars and adaptive speed control.
- **Visitors service.** As usual numerous guests have visited the Department of Computer Science, e.g. trade organizations, secondary and primary school classes. We have informed about our study programmes and showed various research projects. A special thank to all who have contributed with talks, exercises, demos etc.

Teaching

The new IT bachelor programme continues its success with an even bigger intake than last year. At the same time the computer science programme experienced a similar increase in the intake, contrary to the rest of the country and to the faculty of science. The total result is an intake of 166 bachelor students in 2008.

During the first year the IT bachelor programme has demonstrated its own creative character. The peak of the first year was a seven week interdisciplinary project where the students showed their visions of the future newspaper. The results were presented at a public exhibition and showed impressive, thoroughly prepared and original solutions.

Several courses at the computer science study programme were enriched with contacts to the corporate world. The students at the database course were offered to follow up on their examination results with a professional IBM certification. Approx. fifty per cent of the students took the opportunity to do so. Numerous advanced courses have had visiting lecturers from the corporate world, mainly former candidates. Finally, Google Århus conducted a course about the new V8-engine technology – this product was world news on Monday and a computer science course on Tuesday.

Since September 2007 Master's Thesis contracts have had a statutory formal significance whereas they were earlier seen upon as a pedagogic device. Fortunately, the new contracts seem to have a positive effect on everyone involved. If the extrapolations are proved correct, we can look forward to a huge increase in the production of candidates in 2009.

During the last few years the influx of applicants to the diploma programme in Software Construction has been 20 - 30 students. The master programme in Software Construction, however increased the intake after a somewhat slow beginning in 2006 and 2007. The result is that 25 students were admitted to the additional qualification package on software architecture in practice and likewise on the additional qualification package on pervasive computing.

The department has produced al large number of degrees at all levels:

- 9 PhD degrees
- 40 graduate degrees (MSc)
- 20 graduate degrees (graduate engineers)
- 60 bachelor degrees
- 3 master degrees and 2 diploma desgrees (Master and Diploma programme)

The number of PhD degrees is from the calendar year 2008, whereas the other numbers are from October 2007 – September 2008.

The number of PhD students has increased from 56 to 74 over the last three years, i.e. a 30 per cent increase and many of the scholarships are externally co-financed.

Committees
The planning and coordination of our activities are managed by different committees. This means, that the permanent staff is directly involved in the daily decisions and which thereby become more insightful and qualified. At the moment the department has the following committees (with chairman of the committees in parantes)

- Library Committee (Susanne Bødker)
- Part-time Education Committee (Henrik Bærbak Christensen)
- Research Committee (Kurt Jensen)
- IT Committee (Erik Ernst)
- Office Committee (Olav Bertelsen has replaced Søren Christensen)
- PhD Committee (Ivan Damgård)
- PR Committee (Søren Poulsen)
- Seminar Committee (Christian Storm Petersen)
- Teaching Committee (Michael Schwartzbach and Gudmund Frandsen)
- Web Committee (Preben Holst Mogensen)

New domain name

The department has decided to change daimi.au.dk to cs.au.dk in all mail and web addresses. Originally, Daimi was the acronym for for "Datalogisk Afdeling I Matematisk Institut" and the acronym was inspired by Daimi, a well-known Danish singer. Daimi is well-known in Danish circles, but it is difficult to use and explain to foreign people. We have therefore decided to use CS, which is the international acronym for Computer

Science. However, there is no doubt that many of our employees will continue to use DAIMI as a nickname in the future.