



The rector's foreword

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Seventy-five years is no age to speak of in terms of a university. Compared with the earliest universities in Europe, some of which are 800 years old, the University of Aarhus has just started nursery school. We therefore still have much to learn, but can also look forward to some fine, interesting years of development.

The 75th anniversary celebrated in 2003 made an impact in terms of development and innovation at both professional and organisational levels. For many people both within and outside the university environment, 2003 will also be remembered for all the highly necessary celebrations surrounding the day of the jubilee itself on 11 September. Social and festive activities play an important part in any organisation, and when combined with professional events and top-quality celebrations, the result is worth remembering. Of the many professional events, I would just like to mention the awarding of academic and PhD prizes and the conferring of honorary doctorates. At the University of Aarhus, the latter is particularly distinctive, as it only takes place in connection with major "birthdays". The joy associated with this major event was made even greater later in the year when two of the five honorary doctors were awarded the Nobel Prize in Chemistry and Economics, respectively.

This year's edition of *The University of Aarhus* contains more information about these events and also provides brief summaries of some of the year's initiatives within education, research and collaboration with society at large. One of the new initiatives described for 2003 is the publishing of an alumni magazine. The purpose of *AU-gustus* is to maintain contact with the many graduates who have studied at the University of Aarhus over the years. In this way, the university provides information about continued development and activities within research and education.

For further information about the University of Aarhus, please see www.au.dk. To order any of the publications, please call +45 8942 2340 or contact info@au.dk

Niels Christian Sidenius
Rector



The rector's annual report

The most important development in 2003 was the new University Act, which took effect on 1 July following prolonged debate. The University of Aarhus subsequently had to implement the act and make the best possible use of the new legal framework. The conclusion of deliberations among university management and in the Senate was that it would be best to implement the act as soon as possible with due respect for the election periods set out in the previous University Act. In autumn 2003, much work was therefore put into finishing a draft for new articles, appointing the six external members of the University Board, electing the five internal members and appointing heads of department in advance of the changeover date of 1 February 2004.

All in all, the university completed this exercise successfully. Many problems were solved before and immediately after New Year 2003. The University Board was formed, the Senate approved a draft for new articles in mid-January as its last task, and heads of department were appointed for the period until mid-2006. However, the university will not fully implement the new University Act until 2004 and 2005, when new players and new procedures will become a part of daily life at the university.

The University Act is a management reform involving a board with a majority of external members and managers employed at the university. Time will show what changes this new management structure will bring

about, but the university's fundamental objective to provide high-quality research and education is not affected by the change in management structure. The change in the education system as such, which is also part of the new University Act, is probably more important. In addition to the structural changes in the education reform (the 3+2 model in all degree programmes) and the built-in flexibility (easier access to transfer of credits upon change of degree programme or department), it is particularly the act's focus on quality assurance and student guidance that is worth noticing. We are not talking about new activities at the university, but the act emphasises the importance of assessing and developing these areas.

The impact of the changes to the education system brought about by the new act will be particularly noticeable because of the change in the upper secondary education that took place in 2003. The many changes will complicate the enrolment of new students at the university in the coming years and pose special challenges to the future degree programmes for teachers in the upper secondary education system. These challenges can only be overcome through close cooperation between the universities and the educational institutions concerned. It is therefore extremely important to strengthen the cooperation with the upper secondary schools and the professional associations of upper secondary school principals and teachers about the process of change.

Some of the major changes to the long-term physical structure of the university are nearing completion. In that regard, the last two months of 2003 were particularly eventful. In November, the university took over the Aarhus Museum of Fine Arts in the Vennekystsparken park, and the museum will now be rebuilt to house most of the university's geological environment. The extension to the IT City Katrinebjerg was completed towards the end of the year with the result that Computer Science and Information and Media Studies can now be located side by side. The depart-

Looking east along Nordre Ringgade (the northern ring road). On the right of the picture are the old main building, the Main Hall and the University Park. The first red buildings to the left, the former Orthopaedic Hospital, now house the Faculty of Theology. The flat-roofed buildings in the background are the Nobel Park, which houses modern languages and psychology.



ments will continue to be divided between several buildings to accommodate the needs of researchers and students, but a significant regrouping will be possible in 2006, at which stage a planned IT Science Park will have been completed in the area.

Two large projects were completed in December 2003. The extension of the Nobel Park has finally been built, and at the turn of the year 2003–2004, the Department of Psychology was able to move into modern buildings next to the areas used for arts and social sciences. The most important change in the Nobel Park, however, was that a completely different educational institution – the School of Social Work – moved into the university environment at the same time. It will be interesting to see how these very different institutions will influence each other. Finally, the Biomedical Science Park at Skejby Sygehus was completed at the end of the year. The close cooperation between the university and the Aarhus Science Park makes us very positive about this new development in the innovative environment of East Jutland. This also fits in well with the university's increased focus on how to strengthen efforts aimed at innovation.

2003 was the final year in the university's four-year development contract with the Danish Ministry of Science, Technology and Development. It is not easy to sum up the results. Cynics would say that the results failed to match the resources spent over five years in an attempt to put the many different aspects of the agreement into words and reports. Optimists would say that working with the contract caused us to focus on and speed up certain deliberations and activities that would otherwise have been less advanced by now. The objective assessment is that the contract attracted more attention to a number of university activities, but that it did not change much in its own right.

The university now faces the task of preparing a new contract, which the University Board will enter into with the Ministry of Science, Technology and Development. In any

case, one thing that is perfectly clear is that the new contract must focus to a greater extent on the level of the university than the first contract did. It must also be worded in such a way that it allows the maximum amount of freedom in research and innovation.

The University Act of 2003 stipulates that the universities have four tasks: research, education, dissemination of knowledge and exchange of knowledge. The latter two tasks are only new in theory because the university has worked with these aspects for many years. The researchers at the university have also "contributed to public debate". However, in the years to come, we will no doubt see more activities in these areas – some are already in the pipeline. In conclusion, I would like to highlight two examples of the university's traditional, but also future core areas: research and education.

Researchers normally communicate by publishing reports, typically in magazines that target the academic environment. It is therefore a great pleasure to see that the number of research-related articles published in 2003 was higher than ever before and that research-related articles represent 75% of all published items as per the university's annual report. That does not mean that we are perfect, but it is an impressive result.

In the area of education, I would like to mention that the Ministry of Science, Technology and Development authorised the university in principle to use the title graduate engineer (Master of Science) for future graduates from the Centre for Engineering Master's degree programmes. It also appears that the Ministry of Science, Technology and Development will approve the actual engineering degree programmes (3+2 years) at the University of Aarhus, which would give students an additional and very relevant reason to study at the university. This would add some interesting perspectives to the university's collaboration with the business sector and the University College of Aarhus, which will no doubt be very productive.



The flags are all raised when ceremonies are held in the university's Main Hall. The Tree of Knowledge, a relief by the Danish sculptor Olaf Stæhr-Nielsen, has been hanging above the main entrance since 1949. The individual faculties are represented by symbols hanging between the leaves.

The University of Aarhus – in brief

The University of Aarhus was founded in 1928 and was a self-governing institution until 1970. After about thirty years as a government institution, the university has again become self-governing as a result of the transition to the new University Act, which was adopted in 2003.

The university is divided into five faculties: the Faculty of Humanities, the Faculty of Health Sciences, the Faculty of Social Sciences, the Faculty of Theology and the Faculty of Science, as well as a common area. In 2003, the university employed about 5,000 people. Converted to full-time positions – expressed in years of work – this equals approximately 3,400 positions. There are approximately 22,000 students enrolled at the university. The University of Aarhus is Denmark's second-largest university, a large regional workplace and an important international, national, regional and local business partner supplying knowledge and education to the surrounding community.

With effect from 1 February 2004, the University Board is the supreme authority at the

university. The University Board safeguards the university's interests in its capacity as an education and research institution, and determines the guidelines for its organisation, long-term activities and development. The rector deals with the daily management of the university within in the framework defined by the University Board. The remainder of the senior management (the pro-rector and the director of administration), deans, heads of departments and directors of studies act in accordance with the authorisation granted by the rector.

Task

The university's task is to conduct research and provide research-based education to the highest international standard within its subject areas. The university must ensure equal interaction between research and education, undertake ongoing strategic selection, prioritisation and development of its fields of research and education, and disseminate knowledge of scientific methods and results.

The Steno Museum in the southern part of the University Park has exhibitions about the history of science and medicine.



University structure and administration

The university's structure is regulated by the University Act of 2003. This act introduced a University Board as the supreme authority for the university. The University Board consists of eleven members, six of whom are appointed from outside the university. Two members are elected by and from among the academic staff, two members are elected by and from among the students, and one member is elected by and from among the technical and administrative staff. The University Board safeguards the university's interests in its capacity as an institution of education and research, and determines the guidelines for its organisation, long-term activities and development. The University Board came into effect on 1 February 2004 and replaced the Senate.

The rector deals with the daily management of the university within the framework defined by the University Board. The remainder of the senior management (the pro-rector and the director of administration), deans, heads of departments and directors of studies act in accordance with the authorisation granted by the rector.

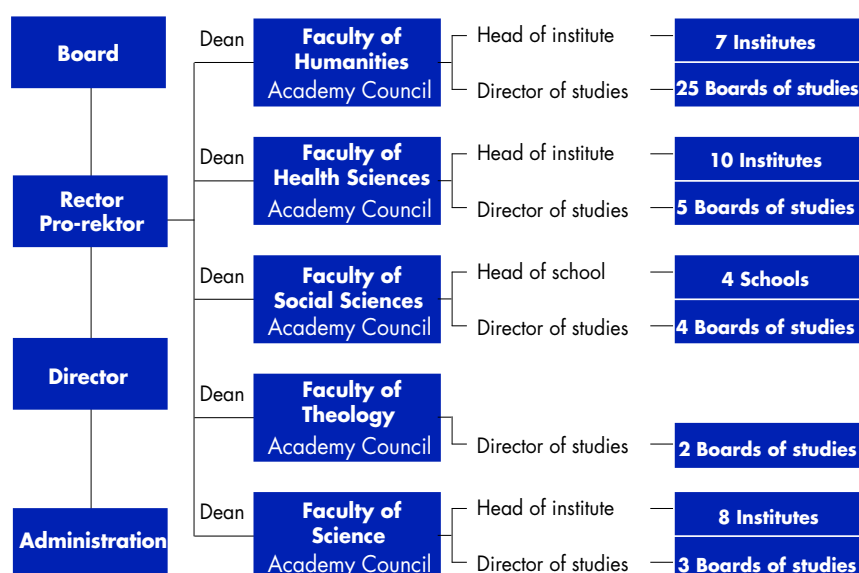
Faculties and departments

The University of Aarhus consists of five faculties: the Faculty of Arts, the Faculty of Health Sciences, the Faculty of Social Sciences, the Faculty of Theology and the Faculty of Science. Each faculty is headed by a dean, who represents the faculty outside the university, and manages the main study area in accordance with the authorisation granted by the rector.

The university has approximately forty departments, which are the smallest administrative units within the university, and the place where research and education takes place. Each department is managed by a head of department, who represents the department outside the university, and is in charge of professional, financial and staff management for the department in accordance with the authorisation granted by the rector and the dean.

In recent years, an increasing number of

Structure from 2004



research centres have been established at the faculties to accommodate interdisciplinary research projects, which often receive external finance.

Board of studies

The dean appoints a director of studies and a board of studies for each of the approximately sixty study areas for which the university offers degree programmes. The director of studies is in charge of the actual planning of the degree programme in question (teaching, examination and student guidance) within the framework of the academic regulations. Each board of studies consists of an equal number of representatives of academic staff and students, who are elected by and from the academic staff and the students, respectively.



New degree programmes

The Faculty of Humanities

New Master's degree programmes

Cultural Environments and Landscape Analysis

In 2002, the Aarhus School of Architecture and the University of Aarhus received approval for a Master's degree programme in *Cultural Environments and Landscape Analysis*, which began in February 2003. This degree targets planners, advisers and administrators of landscapes and those who actively participate in interest groups. The Master's degree programme in *Cultural Environments and Landscape Analysis* studies the history of the landscape. Participants acquire skills in planning and managing an administrative department that takes the interests of culture and nature into consideration.

Ethics and Values in Organisations

The Master's degree programme in *Ethics and Values in Organisations* was approved by the Ministry of Science, Technology and Development and began in September 2003. The degree programme targets individuals involved in staff and organisational development, management, strategic planning, information and communication, human resources, project management and teaching. These are people whose job already requires or will at some stage need theoretically based knowledge of how to decode, formulate, prioritise and communicate the ethics and values of an organisation.

The Faculty of Health Sciences

The Master's degree programme in *Clinical Nursing* was approved by the Ministry of Science, Technology and Development in May 2003, and was launched on 1 September 2003.

This degree programme aims at giving students the necessary qualifications to practise and manage clinical nursing functions. Candidates will be particularly suited for clinical positions that require both practical nursing expertise and supervisory skills as regards patients and nursing staff. The degree programme is also relevant for students

who wish to find employment in teaching positions.

The Faculty of Social Sciences

Combined studies programme consisting of psychology as a subsidiary subject and business administration as a main subject.

This degree programme begins with two years of business administration studies followed by 1½ years of psychology as a subsidiary subject. The degree programme finishes with 1½ years of business administration studies, which includes the Master's thesis.

Master's degree programme in Social Integration

This degree programme targets employees in the teaching profession or the social sector who work with individuals at risk of marginalisation. The target group is therefore employees interested in social integration theories and those interested in the practical application of these theories. These include:

- professionals working with the integration of individuals (children, young people and adults) who are at risk of being marginalised in the education system, the social system or the health system.
- individuals in management positions who are responsible for organising social and educational initiatives.
- individuals in planning, consulting or coordinating functions who are responsible for professional assistance with social and educational initiatives.

See also

www.samfundsvidenskab.au/dk/msi

The Faculty of Theology

With effect from September 2003, the Theology degree programme was divided into a three-year Bachelor's degree programme (plus one year propaedeutic Greek and Latin) and a two-year Master's degree programme. At the same time, a considerable number of existing students accepted a transfer to these new degree programmes, which are distinguished by innovation in offering a greater





degree of scholarly cooperation with other degree programmes, increased integration of language studies, new subjects such as general studies and religion, increased flexibility and study credit opportunities, as well as new forms of examination. New introductory material for the degree programme has been prepared and is available at www.teo.au.dk

The Faculty of Science

New Bachelor's degree programmes

In 2003, the faculty implemented a comprehensive study reform. As a result of this reform, entry subjects have been reduced from approximately forty two-subject combinations to the following eleven Bachelor's degree programmes:

Biology, Computer Science, Physics, Geology, Physical Education and Sport, Chemistry, Mathematics, Mathematics–Economics, Medical Chemistry, Molecular Biology and Nanotechnology.

This has made it easier for the students to get a general idea of their study direction. At the same time, they have more choices within the individual degree programmes and the opportunity to influence their studies according to personal and professional interests. The students thus have the opportunity to choose between a number of subject packages and can combine their main subject with another subject area, either within science or in a completely different area such as languages, communication, environment or business administration.

The study year has also been restructured: the familiar structure with semesters has been done away with, and the study year divided into four so-called quarters, each consisting of seven weeks of teaching followed by an assessment period of two to four weeks. A number of new teaching and evaluation methods were introduced at the same time.

This reform improves the initial study period in a number of ways. For example, during the initial period of the Bachelor's degree, equal weight is given to teaching

traditional subject knowledge and to putting the subject into a wider perspective.

Degree programmes in Engineering

In September 2003, the Ministry of Science, Technology and Development gave the go-ahead for the University of Aarhus to start offering engineering degree programmes.

The ministry's approval affects both the existing two-year technical Master's degree programmes, and also allows the University of Aarhus to establish new technical research programmes that lead to the title of graduate engineer.

The three existing Master's degree programmes – Biomedical Engineering, Technical Information Technology and Technical Geology – are attached to the Centre for Applied Sciences, and are taught in close collaboration with the University College of Aarhus. More new degree programmes are in the pipeline.

There are several reasons to be pleased with this new development. Now that the University of Aarhus can offer engineering programmes, a basis has been established for educating increasing numbers of skilled young people. These graduates will be able to work in high-tech companies already present in the region. They will also become highly qualified entrepreneurs, applying the knowledge and expertise gained at centres of education in Aarhus. The establishment of the engineering degree programmes in Aarhus is important, not just for regional business development, but also to maintain and develop the region as an attractive centre of education.

Japanese ivy.





New graduate schools

The Faculty of Health Sciences

The faculty hosts the *Danish Research School in Molecular Cancer Research*.

The objective of this graduate school is to strengthen the education of young researchers in molecular aspects of cancer research. The main focus is on methodology and the ability to develop and use new molecular technology. The two other health science faculties in Denmark and the science faculty at the University of Aarhus participate in the graduate school.

Danish Research School in Molecular Cancer Research www.mcrs.dk

Danish Cardiovascular Research Academy

The faculty participates in the Danish Cardiovascular Research Academy. The objective of this graduate school, in which the three health science faculties in Denmark participate, is to strengthen the cardiovascular research environment. The graduate school targets PhD students with projects in basic,

clinical and epidemiological aspects of cardiovascular research. The University of Copenhagen hosts the graduate school.

Danish Cardiovascular Research Academy
www.dacra.dk

Danish Stem Cell Research Doctoral School

The faculty also participates in the Danish Stem Cell Research Doctoral School. The objective of this graduate school is to prepare a common PhD programme in which stem cell research, related technologies and ethical aspects can be processed in a joint national forum with the contribution of both basic and clinical research. The University of Southern Denmark hosts the graduate school, in which the three health science faculties – including the Faculty of Engineering and Science, Aalborg University, and the Royal Veterinary and Agricultural University – all participate.

Danish Stem Cell Research Doctoral School
www.dascdoc.dk

The lakeside lecture theatre 1.





The Faculty of Science

The graduate school for Industrial-related Molecular Biotechnology

The objective of the new PhD programme is to work with a number of small businesses in biotechnology, which is one of the fields that most rapidly turns basic research into product development and manufacture.

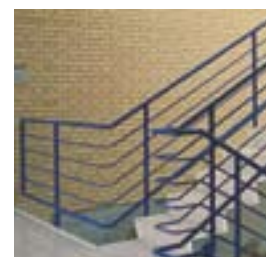
The graduate school for Industrial-related Molecular Biotechnology received DKK 5.4 million from the Danish Research Training Council, which in the latest round of grants, favoured the establishment of graduate schools in which the business sector is responsible for a significant part of the financing.

The graduate school, located at the University of Aarhus, is based on collaboration between the Faculty of Business Administration at the Aarhus School of Business, the Foulum Research Centre under the auspices of the Danish Institute of Agricultural Sciences, the County of Aarhus and four small, new biotechnology companies: Borean Pharma A/S,

Loke Diagnostics ApS, ACE BioSciences A/S and Pipeline Biotech A/S.

These companies are represented on the Board of the graduate school and participate in project planning. The graduate school does not offer standard PhD scholarships, but a wide range of projects that are of interest to the companies. These projects form the basis of the education of the young PhD students. Large parts of the PhD courses themselves take place in the companies.

The graduate school for Industrial-related Molecular Biotechnology www.femb.dk



A large part of the Department of Molecular Biology is located in Science Park Aarhus, facing the university.





New research centres



Library facilities are important to both researchers and students. The Ringgade Library is shared by the Institute of Philosophy and History of Ideas, the Institute of History and Area Studies and the Department of Classical Archaeology.

The Faculty of Humanities

The Centre for Business History

The University of Aarhus and the Danish National Business Archives have jointly established the Centre for Business History. The collaboration between these two organisations strengthens research in business history by bringing together authorities in the field. The Centre for Business History is also expected to cooperate with the business community of today to map out business culture and history. The plan is that the centre will provide a framework for research in market history, consumer history, accounting history, socio-economic network formation and business leader generations and profiles. It is the intention that the Centre for Business History will work with institutions from all over Denmark, but with a solid base in Aarhus. Just as the Centre for Town History cooperates with the Old Town (Denmark's National Open-Air Museum of Urban History and Culture), the

Centre for Business History is yet another example of collaboration between the university and local cultural institutions.

The Faculty of Science

The Centre for Structural Biology

A grant from the Danish Natural Science Research Council made the Centre for Structural Biology a reality. The Centre for Structural Biology is a multidisciplinary centre at the Department of Molecular Biology. The centre is based on the already established Macromolecular Crystallography group, but has a strong component of national and international partnerships. The overall focus of the centre is the molecular basis of life. By determining the spatial composition of selected proteins and RNA molecules, the centre will conduct research into how the cell's proteins are formed on the ribosome and how this process is regulated in higher organisms. The selection of proteins in the cell can be extended beyond what is given by the genome through RNA modification. The interaction between proteins and RNA responsible for such extensions will be studied at the centre. Finally, the centre will study the structure and function of selected membrane proteins that are key components in the cell's communication with the external environment.

Centre for Structural Biology

<http://xray.imsb.au.dk>



2003 at the university

New University Board

The new University Board took over in the autumn of 2003, only a few months after the Danish Parliament had adopted the new University Act.

The University Board has eleven members altogether. The six external members of the University Board are Jens Bigum, former managing director of Arla Foods aamba; Sys Rovsing Koch, solicitor; Bech-Bruun Dragsted, chairman of the Danish Bar and Law Society; Annette Kruhøffer, principal of the upper secondary county school in Paderup; Johannes Riis, editorial director of Gyldendal; Arne Rolighed, managing director of the Danish Cancer Society; and Arild Underdal, rector of the University of Oslo. Elected by and from among the students are Dina Bloch, MSc student (political science) and Kasper Rasmussen, MA student. Elected by and from among the staff are Professor Jørgen Grønnegård Christensen, Department of Political Science; Professor Jens Ulrik Andersen, Department of Physics and Astronomy; and Kirsten Jakobsen, administrative officer, School of Law.

As was the case with the former Senate, the University Board's primary function is to handle general issues such as budgets and development contracts and plans. In addition, the University Board naturally becomes involved further down in decision-making matters such as the creation of new departments and centres. However, it is not the job of the University Board to deal with staff issues, with the exception of the appointment of the rector, the pro-rector and the director of administration. The rector of the university may, in fact, be more affected by the changes than anyone else.

New magazine for graduates from the University of Aarhus

As the first university in Denmark, the University of Aarhus now publishes a magazine for its graduates.

Approximately 40,000 Bachelor's and Master's degree graduates from the University of



The University Board assembled for the first board meeting. Below (pictured from left): Jens Ulrik Andersen, Jens Bigum (chairman of the board), Arild Underdal. Second row: Kasper Rasmussen and Jørgen Grønnegård Christensen. Third row: Kirsten Jakobsen, Annette Kruhøffer, Johannes Riis. Fourth row: Sys Rovsing Koch, Dina Bloch. At rear: Arne Rolighed.

Aarhus now have a new and different way to keep in touch with university life. Four times a year they will receive a magazine with news, debates, personality profiles, offers for continuing studies and events, etc. The name of the new alumni magazine is *AU-gustus*, which is a combination of AU for the University of Aarhus and the Latin word *gustus*, which means a taste sample. The name therefore aptly describes the purpose of the magazine.

Graduates are an important part of the efforts made at the University of Aarhus to integrate the universities into society and increase collaboration with the private business community. At the same time, the university wants to be first in line when a serious need arises for high-quality, targeted continuing education.

In each edition, *AU-gustus* will discuss a specific topic or a major research area from different angles. The first edition focused on the new University Act, collaboration with the private business sector and the 75th anniversary celebration, which had just taken place.



2003 at the university

The University of Aarhus establishes new contacts with the private business community

On 1 May 2003, the University of Aarhus opened a new department, the Business Liaison Office. This office is the result of a joint effort undertaken by the university and the County of Aarhus, which has granted DKK 4 million for a four-year project. The job of the Business Liaison Office will be to promote and draw attention to the university's contacts with the private business community.

The new department was established in the belief that there is an unexploited potential for businesses on the one hand and research environments at the university on the other. The purpose is to facilitate access for private businesses to the latest research results in a large number of areas and, at the same time, to give university researchers access to private businesses where research theories can be tested in practice, and where some of the research results can be put to commercial use.

The university also hopes that additional contact will be established between students – the researchers and staff members of the future – and the business community in the region, which would benefit not only the two parties involved, but also the status of both the region as a growth area, and Aarhus as an attractive university city.

As one of its first tasks, the department has created a Web site that describes the initiative and provides a systematic presentation of relevant activities already taking place at the university.

The Business Liaison Office
www.au.dk/erhverv

PhD awards to five promising young researchers

In connection with the university's 75th anniversary in 2003, the Aarhus University Research Foundation awarded for the first time five PhD prizes to promising young research-

ers. Each of the university's five faculties recommended a candidate who had completed a PhD degree within the past year. The awards were of DKK 50,000 each.

The PhD prizes were awarded to Mads Rosendahl Thomsen, assistant research professor, Institute of Aesthetic Studies; Malene Hollingdal, senior registrar, Aarhus University Hospital, Århus Sygehus; Susanne Schmidt Pedersen, associate professor, Tilburg University, the Netherlands; Jørn Borup, freelance; Peter Teglbjerg Madsen, scientific director, RV Odyssey in the Indian Ocean.

Academic awards to five prominent researchers

The awarding of academic prizes to five researchers marked the start of the 75th anniversary of the University of Aarhus in May 2003.

An anniversary trust was established at the university's 50th jubilee in 1978, mainly supporting research and education. It was a continuation of this trust that was responsible for the awarding of the academic prizes of DKK 75,000 each at the 75th anniversary in 2003. These awards were not subject to application, but were intended as a mark of respect to researchers who, in their academic work, have produced one or more substantial results that indicate a promising future.

The academic awards for 2003 were given to the following five researchers: Dorthe Jørgensen, associate professor, Institute of Philosophy and History of Ideas; Henning Rud Andersen, honorary associate professor, consultant, Department of Cardiology, Skejby Sygehus; Torsten Iversen, professor, LLD, School of Law; Per Ingesman, associate professor, DTheol, Department of Church History and Practical Theology; Flemming Besenbacher, professor, DSc, Department of Physics and Astronomy.

See the profiles of the five researchers on pp. 16, 20, 24, 28 and 30.

75th anniversary

From 70 to 22,000 students

The University of Aarhus was officially opened on 11 September 1928 and could therefore celebrate its 75th anniversary in 2003 – as the second-largest and second-oldest university in Denmark. In 1928, 70 students began their studies in Aarhus, and the university has grown since then to become a work centre for about 22,000 students and 5,000 staff. Today, the university makes its mark on both Danish society and the international world of research.

A group of very active students who had helped organise the 25th anniversary fifty years ago took the initiative to organise an “anniversary meeting” to which they had invited all former students who graduated from the University of Aarhus before 1965. Their evening included a special lecture by Rector Niels Christian Sidenius, a musical memory

lane, dinner and a retrospective student revue, and finished with a ball at the Stakladen Canteen that lasted until 2 am. In the afternoon, the graduates elected bookseller Henning Clausen as their honorary citizen.

The official celebration of the university’s jubilee took place on 12 September, in the attendance of both HM Queen Margrethe and HRH Crown Prince Frederik. The anniversary celebration was attended by 650 guests, and Rector Niels Christian Sidenius officially opened the afternoon’s programme with an anniversary speech. The Aarhus University Choir and the Royal Academy of Music, Aarhus performed Knud Jeppesen’s *Aarhus University Cantata* (1946) with text by Tom Kristensen, and finished with *We seek it fearlessly in the depths*, composed for the occasion by Associate Professor Jens Johansen, with text by Professor Morten Kyndrup.



Solidum petit in profundis says the Latin text on the university seal, which is combined here with the anniversary logo. It means “Seek a firm footing in the depths”.

VI SØGER DET FRYGTLØST I DYBET

Ved Aarhus Universitets 75-års jubilæum september 2003

Tekst og musik: Morten Kyndrup og Jens Johansen

Cm /b A**6** /g Fm9 /e**b** /d /c
 Vi sø - ger det frygt - løst i dy - bet og
 Bbm9 Eb7 A**b** Fm7 B**b**7
 selv når vi in - gen - ting ved så svøm - mer vi ud - ad og
 Gm7 Cm Fm7 Abmaj G
 ind - ad og ned og hå - ber vi når det, at tæn - de før
 Fm6 G Fm7 B**b**7 Eb G7
 il - ten er væk: så får - ligt det er at er - ken - de

Vi søger det frygtløst i dybet og selv når vi ingenting ved så svømmer vi udad og indad og ned og håber vi når det, at tænde før iltten er væk: så farligt det er at erkende

At bære det frem gennem verden en tanke man ikke kan se at følge et spor, at føle det ske at vide man nok lar sig blænde en smule måske – så lysfyldt det er at erkende

Så farligt at tro man er sikker så pinligt hvis nu man tar fejl alligevel sættes hvert eneste sejl hver eneste dag, også denne hvor lyset er lavt og intet er let at erkende

At få en idé mens man sover og vågne og mærke det gro igennem den blåsorte vinterdags ro og pludselig føle det hændende et lykkeligt nu: så dejligt det er at erkende

Jeg tror det er dig der skal vide at alt det jeg aldrig har vidst det tynger og kapper hver eneste kvist der er, også den jeg skal sende af sted, når jeg ser hvor onsdet det er at erkende

Vi ved at vi drømmer om viden og drømmer vi ved det en dag hvor drømmen får farver og fyldes med smag og liv og et lys der kan vende det om, det vi ved om verden – og om at erkende

Both Crown Prince Frederik and Queen Margrethe took part in the anniversary celebrations.





2003 at the university

The gift from the Royal Academy of Music, Aarhus was a performance of Vivaldi's The Four Seasons, performed by the academy's own orchestra in the Main Hall, which was full to capacity. Between 7,000 and 8,000 guests braved the rain to attend the concert.



On the actual "birthday" itself, Thursday 11 September, twelve canteens served free tea, coffee and Danish pastry for the university students and staff. In the afternoon, Aarhus University Sports held their annual sports day with competitions in basketball, hockey, handball, football, volleyball, campus relay and cake throwing.

About 80 different events made up the university's "Open House" day from 1 pm to 5 pm on Sunday 7 September, which featured themes such as samba, stories, sense of smell and much, much more. Everyone was welcome to join in conducted tours, listen to stories, learn to fold paper, watch the dancing, have their sense of smell tested, indulge in sweets, ask questions about God, visit three museums, listen to songs, attend a "translation concert" and much more.



"The heart celebrates the brain". Louise Gade, Mayor of Aarhus, took this picture on 11 September – the day of the anniversary – when the heart (the town hall) had invited the brain (the university) to attend an evening reception. The mayor presented Rector Niels Christian Sidenius with a present from Aarhus City Council: a grant of DKK 100,000 for the new Aarhus Centre for Business History.





On Saturday 13 September, the Student Council converted the University Park into the venue for a celebration that lasted from 2 pm to 8 pm. The popular local “Friday pubs” had teamed up to create a number of bars, each featuring a different decade as its theme. About ten different groups provided live music on three separate stages throughout the day. The Aarhus pop group TV-2 finished off the evening with a concert for students and staff – with more than 18,000 partying guests singing along. They paid tribute to the popular TV-2 group in a colourful display made by lighting cigarette lighters and switching on bicycle lamps and mobile phones.

The convivial atmosphere can be confirmed by the fact that there was only one alert during the entire evening. The professional security guards use three types of alert codes – green, yellow and red. The only alert to be investigated was caused by two people discussing loudly whether or not they really were a couple. Apparently, the outcome was that they were not.

The staff also held their own parties in the different departments and faculties. Approximately 3,500 staff members and their partners joined in, finishing with a combined staff party in the Stakladen Canteen and the Students’ House.



One of the Friday pubs responsible for drinks on Saturday 13 September.

Steffen Brandt and an enthusiastic audience of 18,000 sang “I only dream of you” at the large concert held in the University Park for students and staff.



In conjunction with the jubilee celebration, the university appointed five honorary doctors, one from each of the five faculties. From left to right these are Professor Fredrik Barth, Oslo (the Faculty of Humanities), Professor Clive W. J. Granger, San Diego (the Faculty of Social Sciences), Professor Peter Courtland Agre, Baltimore (the Faculty of Health Sciences), Professor Gerd Theissen, Heidelberg (the Faculty of Theology) and Professor Gerhard Ertl, Berlin (the Faculty of Science).

A few weeks later, Professor Peter Courtland Agre was also awarded the Nobel Prize in Chemistry, and Professor Clive W. J. Granger received the Nobel Prize in Economics. Both have worked closely with researchers from the University of Aarhus for several years.



Dorthe Jørgensen

“You can’t prove beauty”

“The aesthetes have monopolised aesthetics for far too long. It’s time the philosophers have their turn,” says Associate Professor Dorthe Jørgensen.

By Mikkel Hvid

You experience it one evening at the beach, just at the moment the sun is going down, casting its last warm rays on the sand dunes and the stiff lyme grass – that’s exactly the moment you feel it.

Or one morning in church, there it is again; it creeps up on you mixed with the tones of the organ, the beautiful words of the hymn and the grandeur of the moment.

Or maybe it pops up on a perfectly ordinary Thursday when you’re sitting in the kitchen, enjoying a glass of red with your boyfriend. Time suddenly becomes fluid, the room takes on a special depth, and you experience the moment more intensely and clearly than ever before – that is it, there it is again. Beauty. The aesthetic experience of something more.

The vestibule of the university’s first building – inspired by the Bauhaus style. This is now home to the School of Law.

Dormant philosophy

Many people experience that kind of aesthetic awareness, but if they approach Danish

philosophers and historians of ideas to learn more about the nature and meaning of the experience, they do so in vain. Danish philosophy has not dealt with philosophical aesthetics in a systematic way, and that is a huge problem, according to Associate Professor Dorthe Jørgensen, the Institute of Philosophy and History of Ideas.

Aesthetics came to Denmark as early as the end of the 18th century. It arrived from Germany, where it had been founded by the philosopher Baumgarten. Inspired by that tradition, the University of Copenhagen created a professorship in aesthetics in 1788.

“The Baumgarten tradition and German philosophy nevertheless never really caught on,” says Associate Professor Jørgensen.

“During all the years the professorship existed, it was occupied by authors and other aesthetes. At first, they adopted a subjective approach to questions of aesthetics. They later became more academic, but they never developed a philosophical approach to aesthetics. In 1918, the professorship was abolished and replaced by a professorship in comparative literary history. And as the philosophers did not protest, philosophical aesthetics disappeared, and it became up to individuals to preserve its future.”

Art is only a small component

In other parts of the world, art theory and art philosophy also pushed philosophical aesthetics into the background. Many actually confuse philosophical aesthetics with an analysis of the idiom of an artwork in terms of art theory or with considerations of what actually defines a work of art in terms of art philosophy.

“But,” says Associate Professor Jørgensen, “there is something missing. On the one hand, the beauty of art and beauty as such are not the same thing. On the other hand, philosophical aesthetics are about aesthetic experience.

The aesthetic experience is a special form of true cognition that many people encounter





without it having anything to do with art. If you reduce aesthetics to a question of analysing the idiom of an artwork, you cut yourself off from exploring an experience that many people share with each other, and that has a special meaning for them.”

Be open to beauty

45-year-old Associate Professor Jørgensen would like to see a renewed focus on philosophical aesthetics. This time, the task would be tackled in earnest and an actual philosophical approach to aesthetics developed – and philosophical aesthetics are completely different from art history.

“Art history is about the artwork as an object that is academically analysed. Others should be able to repeat the analysis; otherwise the results are not valid. However, it does not make sense to deal with aesthetic experience in this way. You cannot repeat my special aesthetic experience; that which I experience as beautiful. My experience is nevertheless valid. It says something important. The task is therefore to define the common denominator in the individual aesthetic experience, and you do that through philosophical reflection. In that way, I can share my experience with you, and you will be able not just to recognise it in yourself, but also to better understand your own experiences,” says Associate Professor Jørgensen.

Missing component

Denmark is not the only country in which philosophical aesthetics have been replaced by art history. The same thing happened in the English-speaking world, and only Italy and Germany have a tradition for philosophical aesthetics.

The tradition is particularly strong in Germany, and in the 20th century, it includes philosophers like Benjamin, Heidegger and Adorno. As early as Plato, thoughts about beauty constituted a key part of philosophy. Plato perceived truth, goodness and beauty as three aspects of the same thing, and thoughts

of beauty were entertained throughout the Middle Ages.

But with Kant, the equilibrium was lost. He mentions somewhere that beauty in fact is the symbol of virtue – i.e. goodness – and in that way, morals get the upper hand.

In Germany, philosophical aesthetics nevertheless survived despite this twist. In Denmark, however, things developed differently. One of the reasons for this was that Danish philosophy was for many years more influenced by the analytical philosophy of the English-speaking world, which sees itself as a science, than by the German philosophy, which is more open to metaphysics.

“That’s a shame,” says Associate Professor Jørgensen, “because aesthetics are basically metaphysics, the metaphysics of experience. It is a lack of understanding or acceptance of this that causes aesthetics to be reduced to art history. Instead, philosophical aesthetics should be the philosophical basis for work with aesthetic subjects. Just like the metaphysics of experience, it can function as a new and more modern form of theory of cognition.”

When the park is covered in snow, the children of Aarhus soon crowd the large toboggan run on the “Island”.





Else Roesdahl

Medieval Europe seen in a new perspective

In Tromsø, Dublin, Seville and many other places, researchers are busy writing a story that began in Aarhus seven years ago, based on an idea created by Professor Else Roesdahl from the Department of Medieval Archaeology.

By Mikkel Hvid

Many Danish churches have baptismal fonts that date from the Middle Ages. The church at Nr. Snede has a beautiful font, typical of those found in Jutland: about a metre high, cut out of solid, grey granite and ornamented with four large male lions, each pair sharing a human face.

In most Danish churches, the baptismal font is placed in the chancel. That can hardly surprise anybody. That is just how it is. And if we read historical documents, we do not find anything that contradicts our perceptions about where in the church the baptismal font should be.

“That just shows how dangerous it is to use only written material when reconstructing one’s past,” says Professor Else Roesdahl from the Department of Medieval Archaeology. Written information is much less comprehensive, precise and detailed than one would think, and that is why we tend to take too much for granted and presume that the world always appeared the way we know it.

However, that is not always the case. Not even when it comes to baptismal fonts. Archaeological diggings have in fact revealed that the baptismal font was originally placed near the entrance at the rear of the nave. And that is not all – it was not placed on the floor. The font was placed on a podium with some steps, which meant that it was raised about half a metre above floor level.

“That also explains the ornamentation on the baptismal font,” continues the 62-year-old archaeologist. Today, not many people really see the ornamentation. We look at the baptismal font from above, and the amount of ornamentation we can see from that angle is very limited. Previously, when the font was placed on a podium, it was at eye level for the congregation, and from that angle, the work of the artist was presented at its best.



The baptismal font in the church at Nr. Snede dates back to around 1150 and is one of Jutland’s many granite fonts that feature lions. It is seen here at an angle from below.

Physical vestiges provide a new perspective

“The baptismal font is just one of many examples,” says Professor Roesdahl. “It’s an example of how archaeologists’ studies of the physical vestiges that culture leaves in the landscape, in the earth, in buildings and tools provide completely new knowledge and allow us to see the past in a new light. If written material was the only testimony of the past, our knowledge would be very restricted,” she adds. “Many aspects have never been described in written material. Trelleborg, for example, is not mentioned in as much as one written source, but it is nevertheless an important part of our history. Many of the other royal centres are only known from diggings or from the physical traces remaining in the landscape. The material sources we work with in archaeology therefore expand and supplement our historical insight. At the same time, archaeological studies often contribute with historical knowledge about completely different aspects of life than those the historians deal with,” says Professor Roesdahl.

“Written sources often deal with politics, legal matters and famous individuals, but there is not much written material that describes how ordinary people actually spent their lives, what they ate, how they adapted, what technical methods they used, etc. Archaeology can supply that knowledge.”

Prime motivator of European work

At the moment, Professor Roesdahl is spending a large amount of her time and research on a two-volume work on medieval archaeology in Europe.

If everything goes according to plan, the book *The Archaeology of Medieval Europe I–II* will be published by University College London Press in 2006. In this case, it will be the first book ever to give a complete account of medieval archaeology in Europe.

The professor from Aarhus is not alone in writing the book. Archaeologists from universities in fifteen countries – from Tromsø



to Seville and from Dublin to Prague – are collaborating on writing the two volumes of sixteen chapters each.

However, Professor Roesdahl was the one who came up with the original idea for the book, and she was the one who presented her colleagues with a project plan that would unite them.

“I presented the idea at an archaeological conference in Seville in 1999, and my ideas were so well received that my colleagues and I immediately appointed a work group and soon after an editing committee, which has since been in charge of the project.”

The project involves a lot of work, both professional and practical. It is a huge task. She knew that beforehand, but work on the book has also triggered a number of productive discussions she had not anticipated.

“For example, it was not that easy to define which areas could be considered part of Europe in this context. For many practical reasons, we ended up focusing on the Roman Catholic area. We have therefore included the Baltic States, but neither Greece nor the Ukraine, for instance. You have to be very careful about discussing this issue, because it easily becomes political,” says Professor Roesdahl.

The whole is greater than the sum of its parts

A number of books are available about medieval archaeology in the individual countries, but Professor Roesdahl had long missed a work covering a larger part of Europe – for educational purposes, for example.

“The national works are very good and necessary, but a complete work on medieval archaeology in Europe has a broader, more interesting scope. First of all, we currently need to know about the whole of Europe. By tracking a specific subject throughout Europe, we also gain an insight into the way in which different cultures have developed. How and why do the regions affect each other, and what were their characteristics? In addition to



looking at contexts and developments in medieval Europe, a complete work also gives us the opportunity to study the differences and why they exist. Why did people have stoves in Western Europe, but ovens in Central and Eastern Europe? And why did sailing ships make their entry so late in Scandinavia when they were known in the Mediterranean many centuries before? Those are some of the subjects I am looking forward to reading more about once the book is finished,” says Professor Roesdahl, chairperson of the project’s steering committee.

Increased collaboration

“The book project has also had a positive impact on the Department of Medieval Archaeology,” says Professor Roesdahl.

“Through the work on the book, we have established contact with a large number of archaeologists in Europe, which is very beneficial. Some of them have come to visit and have given guest lectures, and more are still to come. It is an obvious advantage to the degree programme to get this type of inspiration from outside. The students are also very pleased with the broader international horizon,” says Professor Roesdahl.

“Most young people are very internationally oriented, so they are enthusiastic about the broadening of the archaeological perspectives that the project has brought about.”

Then wouldn’t it be a good idea to publish a book about the medieval archaeology of the whole world?

“Well yes, but I’ll have to leave that to someone else,” says Professor Roesdahl.

A well-established road network, including bridges across rivers and streams, contributed to linking the different parts of medieval Europe. This beautiful fourteenth-century fortified bridge is in Cahors, southern France.

Outside the village of Gnojewo near Gdansk in Poland, passers-by still decorate the local roadside chapel with flowers – just as they did in the Middle Ages. The red-tiled chapel has niches for crucifixes and icons of saints.





Henning Rud Andersen

The Andersen Patent

Doctor Henning Rud Andersen is only 53 years old, but nevertheless one of the "grand old men" among cardiac specialists. It is all because he got a crazy idea when he was a young registrar.

By Mikkel Hvid

Phoenix, Arizona, 1988. In a huge auditorium at the Arizona Heart Institute, 1,500 cardiac specialists from all over the world are sitting, listening. Among them is Henning Rud Andersen, a Danish registrar.

One of the pioneers of balloon dilation is on the podium. He is explaining by means of video clips and overheads how he cures narrowed or blocked coronary arteries. Together with a couple of colleagues, he has invented a ground-breaking device. They have attached an elongated balloon to the tip of a plastic catheter. With the balloon still completely folded up, they have placed a fine latticed, metal scaffold over the balloon, which squeezes it so thin that they can introduce the catheter through the patient's vessels until it reaches the coronary artery. When the balloon is inflated, the cylindrical scaffold expands and prevents the artery from collapsing again afterwards.

Balloon dilation using latticed metal tubes (stents) had been described in medical literature, but the technique had not been introduced to Denmark, and it was the first time the 39-year-old Danish registrar had heard the pioneers personally talk about and explain the invention. He was deeply fascinated.

And suddenly something happened. While he was sitting there listening, he came up with an idea. A ridiculous idea. Impossible. It couldn't be done.

And yet?

Doctor Andersen was no longer listening. He was engrossed in his idea. It was too ridiculous. And irresistible. And ... fantastic.

When the conference was over and Doctor Andersen had flown back to Aarhus, he defined his goal. He wanted to be the first person in the world to insert a valve in the heart without resorting to cardiac surgery.



Heart valve mounted in latticed metal tube (stent).

Try it, try it

The heart valve is Doctor Andersen's most original and daring idea, but far from the only one. Already during his medical studies, he registered his first patent, and more followed.

He gets his inspiration from his mentor, Professor Jørgen Fabricius in Odense.

"I was fascinated by his approach to the subject," says the now 53-year-old consultant at the Department of Cardiology, Skejby Sygehus. "He experimented a lot. He always encouraged us to find new solutions. Is there a different way of doing it? Is there a better way of doing it? He was always looking for new answers, always trying to test new techniques and forms of treatment. It was very inspiring."

Pigs' hearts

Back in Aarhus, Doctor Andersen rushed down to the local butcher to buy some pigs' hearts. He opened them, cut the heart valve free and placed it on a latticed, metal tube, which he squeezed around a balloon. This was his idea. To introduce the balloon through the vessels to the heart, where he would manoeuvre it into position, and inflate it so that the stent and the valve expanded and became wedged against the cardiac wall. New valve. No scars.

The pig is alive and well

Deep down below Skejby Sygehus is the Institute of Clinical Medicine, where doctors test and develop new technologies and forms of treatment. Today, it is one of the major institutes at the University of Aarhus with 35 clinical professors and about 1,500 affiliated staff in all. Of all the scientific articles in this field published around the world, 0.2% come from this institute. And up to 2,000 pigs are operated on each year as part of the clinical experiments.

However, at that time in the late 1980s, the institute was just a small room, almost a hobby room, and this was where Doctor

Andersen and his assistants experimented with the new heart valves.

“At that stage, we had really poor working conditions in the basement, so when they had finished operating on the patients upstairs, we sometimes moved the pigs into the operating room,” he says.

The technical solutions were also primitive. They had to construct everything themselves and use whatever means were available. This included different tubes, glue from the DIY centre, etc. However, regardless of what problems they encountered, the researchers stayed on track – new valve, no scars.

“I have always thought,” says Doctor Andersen, “that to cut open the entire body is the most primitive form of treatment. The real challenge consists in solving the heart valve problem without maltreating the patient.”

Finally, on 1 May 1989, they succeeded: the first pig survived with a new heart valve.

People shake their heads

Doctor Andersen was excited. He had reached his goal. He had succeeded. The crazy idea was not that crazy after all.

And he was convinced that he would have no trouble having the article about the experiment accepted by one of the major periodicals. Not so. The editors shook their heads.

“Nobody believed us,” says Doctor Andersen. “Neither the periodicals nor the companies that produced heart valves and similar medical equipment. It sounded too crazy.”

Finally, the article was published in the *European Heart Journal*. They sold the patent to a small American company for USD 10,000.

And then nothing more was heard of the idea. Nothing happened. Nobody believed in the Andersen Patent.

Resurrection

Doctor Andersen continued his work with clinical research, evaluating the effect of different forms of treatment. With his experimental research, he developed new techniques and forms of treatment.



Heart valve stretched over an inflated balloon.

In one of the largest patient studies in the world, he documented that balloon dilation is far more effective against blood clots than anticoagulants. He spearheaded the study with telemedicine and doctors in special coronary care ambulances, wrote a thesis on blood clots in the heart and started research into new pacemaker techniques.

He was also regularly invited to speak about his invention around the world. Although nobody believed him, he had nevertheless become one of the “grand old men” among cardiac specialists.

Then one day in 1992, the notice appeared. An English doctor had inserted a heart valve in a human being without surgical intervention – using the Andersen Patent.

Today, more than 25 patients have heart valves that were introduced by a balloon. In February, *Windhover Information* published an eight-page article about the brave new non-surgical world of the heart valve.

The magazine specifically mentions that Edwards Lifesciences, which has a third of the world market for heart valve surgery, had purchased Percutaneous Valve Technologies Inc for about DKK 1 billion. The company had only one asset – the Andersen Patent.

“We were simply ten years ahead of our time,” says Doctor Andersen, who is now convinced that his idea has a future.

“If you had asked me five years ago, the answer would have been no. At that stage, I was convinced the idea was dead. But now I know that its time will come.”

He does not regret that he sold the patent so cheaply back then.

“The task was too big for us, and nobody else in Denmark could handle it. We tried, but it was impossible. The only thing that I regret a bit is that I did not contribute to developing the idea until it could be used in humans. I would have liked to have been part of that,” he says.



Marianne Hokland

War in the body

The white blood cells wage war against cancer, and Doctor Marianne Hokland is their commander.

By Mikkel Hvid

“When it’s a success? That’s hard to say.”

Doctor Marianne Hokland pauses to think over the question.

“I haven’t really thought about what it would take before I could call the project a success,” she continues, “but I would be happy and proud if our project contributes to improving survival chances for future cancer patients. No. No, let me rephrase that. If our project can help increase the number of cancer patients who survive or get a better quality of life. Yes, that would really make me happy.”

Doctor Hokland conducts research into immune therapy. Her goal is to find and improve the parts of the body’s natural immune system that are best suited to fighting cancer.

The 52-year-old doctor has been interested in this subject since the mid-1970s, when she worked as a student assistant to Associate Professor Iver Heron at the Department of Medical Microbiology and Immunology. His work included using interferon, a substance that inhibits viral infections and that has also turned out to assist the body’s fight against certain types of cancer.

This project was a turning point in Doctor Hokland’s career. After a period at Harvard Medical School, she wrote her doctoral dissertation on a subject that went right back to her initial student project: how does interferon affect the cells in the immune system, and how can this effect be used as part of treatment based on the immune system? How do you strengthen and use the immune system so it can play a part in treatment?

The body versus cancer

During the past fifteen years, Doctor Hokland has focused on immune therapy in connection with skin cancer (malignant melanoma) and kidney cancer.

“The point is,” she says, “that the body has

a natural, but very complex immune defence system against these conditions.”

Two elements are particularly important in this context: NK cells and T cells.

NK stands for natural killers, which are the body’s first line of defence.

The NK cells do not need to come into contact with the cancer before they realise that it is dangerous. They are, in fact, controlled by a “not me” principle, attacking whatever does not resemble themselves – and thus the body.

However, the NK cells present two problems. Firstly, they are not particularly effective, and secondly, they have difficulty identifying certain forms of cancer.

“Cancer cells form within us, so they resemble us,” explains Doctor Hokland. “The NK cells therefore have difficulty identifying them as hostile. They are too much like us.”

It is therefore fortunate that the body also has another line of defence, the T cells.

Once an enemy, always an enemy

The T cells are the body’s elite soldiers. They fight cancer much more effectively, but are unfortunately a bit slow off the mark. They have to come into contact with the cancer at least once to know that it is an enemy.

“The T cells have a memory. Once they have fought against a specific type of cancer, they know they must attack it next time they encounter it. So they attack very swiftly and effectively the second time round. That’s the principle used in vaccination programmes. Tetanus is a good example. You vaccinate the body with a little bit of tetanus to teach the T cells to recognise the organism. If the patient is later infected, the T cells act swiftly and effectively, because now they know exactly what to do.”

Once the T cells recognise a specific antigen, they go straight for the kill, and that is the basis of Doctor Hokland’s project. By using techniques such as flow cytometry, she is trying to find out what characterises the T cells that attack specific forms of cancer, so they can be used in cancer treatment.

“We’ve identified T cells that attack certain forms of cancer, but we do not have enough cells, and they are not effective enough. The main question driving my research at the moment is therefore to find out exactly what cell types we are talking about. Can we develop more? Can we make them more effective? That’s what I’m working on.”

Cells die when they are mass-produced

Doctor Hokland and her team of researchers are using a specific group of T cells to fight skin cancer and kidney cancer. These T cells identify the cancer and fight it. The only problem is that she loses too many of her soldiers in the heat of the battle.

“Far too many of the T cells we have found do not reach the cancer, and we haven’t yet managed to find out how the cells that do reach the tumour differ from those that don’t. And until we can answer that question, the treatment will not be good enough.”

Another problem facing Doctor Hokland is the difficulty associated with producing sufficient numbers of T cells. Normally, researchers remove cells from a blood sample and get them to divide in a test tube. However, doing this with the T cells that fight cancer is not always so easy.

“We can find and isolate the cells, but only in small quantities. We therefore have to activate them to get them to divide, but in doing so, we run the risk of them getting tired. In some cases, they actually commit suicide.”

This is a natural reaction. T cells were never meant to proliferate in uncontrolled numbers. If they did so, they would kill us.

“T cells are meant to go on developing as long as the disease is present and to die when it’s gone. But that makes it difficult for us to get hold of large numbers of them. It’s actually very difficult to imitate the body’s natural functions in a test tube.”

Immune therapy only kills the enemy

Instead of making use of the inherent “licence to kill” feature of the T cells, Doctor Hokland



is conducting trials in another direction. She also uses them as carriers and suicide bombers.

Once the T cells that fight skin cancer, for example, have been identified, they can be used to transport lethal substances to the cancer.

However, Doctor Hokland is also encountering problems in this area. She cannot get enough T cells. And far too many of them do not reach their target.

She has nevertheless managed to get enough T cells to the cancer to allow visualisation on a PET scanner. This principle can be used to trace cancer that would otherwise be difficult to find.

And one day, she will succeed in using the T cells to fight cancer. She is certain of that. One day, they will find the type of T cell that is certain to reach the cancer, and they will also find out how to produce it. When that day comes, Doctor Hokland believes her research will have a decisive impact on practical cancer treatment, but it is unlikely to be the only form of treatment.

“I don’t believe in monotherapy. Combined forms of treatment are the thing of the future. But our therapy will contribute to future cancer treatment, and it has one major advantage. Our treatment attacks the cancer itself and nothing else, whereas chemotherapy and radiotherapy also affect other parts of normal cells. We hit the target, and only the target,” says Doctor Hokland.

The Bartholin Building is named after the Danish anatomist Thomas Bartholin (1616–80), who first described the link between glands and the lymphatic system in humans.



Torsten Iversen

Legal research in practice

In 1988, Professor Torsten Iversen graduated from the university with honours. Four years later, he returned as a researcher. However, he does not regret his years as a lawyer.

By Mikkel Hvid

In 1988, you graduated in law. You left the university with top marks and began working as a solicitor's clerk in one of Denmark's largest legal practices. Why did you return to the world of books and research four years later?

Professor Iversen: "Research and research ... In the School of Law, we have neither laboratories nor test tubes, so the word research is a bit exaggerated in my opinion.

Law is not a highly theoretical subject, and legal research is very practical. In many ways, the work I do as a researcher is similar to what you do working as a solicitor, a judge or in administrative law.

Most lawyers work basically the same way. They look up the sources of law, analyse and evaluate them and then try to explain how a case should be solved on the basis of applicable law. Whether a young researcher is working on his PhD dissertation or a solicitor's clerk is writing a memorandum or a pleading – the procedure is the same."

Law also involves a lot of theory, doesn't it?

Professor Iversen: "Parts of the subject – jurisprudence, sociology of law and legal history – are more philosophical and historical. These subjects are important in their own right, but are particularly important as auxiliary subjects that support what legal research is really about – legal theory, i.e. the teachings of applicable law. Research into legal theory results in statements about what is applicable law, and this research is definitely of practical use."

Your purpose determines how you read

There must nevertheless be a difference between working as a researcher and working as a solicitor, for example.

Professor Iversen: "Oh yes, there are certainly differences. The conditions and requirements associated with my work as a research-

er are different from those of a practising solicitor. A solicitor preparing a pleading, for example, would study the eleven most important judgements in support of his case. It is acceptable if he does not include a twelfth judgement, either because he thinks it's less important, or because it contains aspects that are irrelevant to him. He can even be forgiven for overlooking it.

As a researcher, I have to include everything. I weigh up all aspects of the decisions and explain any uncertainties. I have to comply with requirements for completeness and objectivity that do not apply to a solicitor. On the other hand, judges and administrative lawyers are also subject to the requirement of objectivity.

A solicitor's purpose is more practical than mine. The difference shows in the way we read. In this regard, there are major differences between a student, a researcher and a solicitor. The student reads to learn what is written on the pages. The solicitor skims the sources to find what he can use, but the researcher reads with two specific questions in mind. How can this be summarised as a statement about applicable law? Is the statement sufficiently substantiated?

Another difference is that the researcher not only concerns himself with applicable law, but also with legal policies, i.e. the law of the future. The researcher therefore makes recommendations for amendments to acts, etc. This aspect is obviously completely outside the scope of the solicitor's work."

Researchers have more freedom

What is the difference between working as a solicitor's clerk and as a university employee?

Professor Iversen: "The job as a solicitor's clerk was very interesting, demanding and versatile, and many aspects of the work appealed to me, but it was sometimes very stressful. As a solicitor you have many employers – your clients or customers – and they pull you in all directions. Your clients completely control your time, your work and your



The university's early buildings are situated high up in the moraine formation of the University Park – commonly referred to as the "Island". These buildings now house the School of Law.

priorities."

So you chose a less stressful career at the university?

Professor Iversen: "The university is definitely no rest home – that's not what I'm saying. But as a university employee, I can organise my own work to a great extent, and that's important if you have three children of seven, five and six months, like I do. At the same time, I can concentrate on the subjects I like. The freedom to work with the subjects that interest me is very important to me."

So it was the freedom that lured you back to the university?

Professor Iversen: "Yes, the freedom and the depth. As a solicitor's clerk, I missed the time to study subjects in depth. As a solicitor, once you finalise a case, you settle with the client and move on to the next case. It's rare that you have time to work on the cases later on and reflect on the legal aspects involved. I missed that, because I think law is a very interesting and challenging subject."

Practical work teaches you good working habits

You are now a professor and a researcher employed by a university. Were your years as a solicitor's clerk a waste of time?

Professor Iversen: "No, not at all. The practical training you get as a solicitor's clerk

is very thorough and versatile, and practical legal work teaches young lawyers something they cannot learn at university.

When I was studying, I was determined to work as a solicitor's clerk. I didn't want to go straight from being a student to becoming a lecturer. I wanted experience from real life, and I got that. At the same time, the work as a solicitor's clerk taught me some good working habits. You work under pressure and learn to get things done. The discipline that I learned as a solicitor's clerk has made it easier for me to work as a researcher."

Practical experience makes you a better jurist?

Professor Iversen: "I think so, but in fact it's hard to say what makes a good jurist. You obviously have to know the rules of law, the judgements and the legal literature, but the ability to weigh up different aspects is essential. We often evaluate and compare aspects that really cannot be compared. The ability to analyse, systematise and draw conclusions is important. The late Jørgen Nørgaard, former professor at the University of Aarhus and judge of the Danish Supreme Court, stressed the ability to develop a feel for the material as the most important skill of a good jurist. I think that skill is best acquired in real life, and it is therefore a good idea to get some practical legal experience before becoming a lecturer."



Preben Bo Mortensen

Have: correlations Would like: explanations

He is good at finding out what is not true. But when he discovers a correlation, he still has no explanation. Professor Preben Bo Mortensen is an epidemiologist.

By Mikkel Hvid

One winter's day in 1998 at the Danish National Serum Institute, Professor Preben Bo Mortensen was paging through some material he had received from the statisticians at the institute.

Ever since his days as a medical student, he had been trying to solve the mystery of schizophrenia. What characterises individuals who become schizophrenic? What do they have in common? Have they all suffered from the same disease? Are they children of very young mothers? Or can the answer be found in social and physical conditions?

Where is the factor that causes schizophrenia hiding?

On the face of it, there was no indication that the material he was paging through would provide the answer, but suddenly something caught his eye: 2.5.

An incidence rate ratio of 2.5? Could that really be true? Was there such a strong correlation between city life and schizophrenia?

The answer that raises questions

Yes, indeed there was. The chances that a schizophrenic lived in the city rather than in the country were 2.5 to 1.

Professor Mortensen was both fascinated and happy, but he also knew that what he had found did not solve the mystery.

"That is often how it is in epidemiological research," says 45-year-old Professor Mortensen, Director of NCCR – The Danish National Centre for Register-based Research – at the University of Aarhus.

"Epidemiology is fantastic work. It's a field that really satisfies your curiosity. You get the opportunity to study a lot of correlations, and it's always interesting. But when the results of the study become available and you've had time to think about it, you often say to your-

self, 'OK, was that all there was to it?' Or 'OK, but then what does that mean?'"

According to Professor Mortensen, the problem is that there is an enormous difference between an explanation and a correlation.

"My study showed that many people with schizophrenia live in the city, but do they go to live in the city because they have schizophrenia, or do they get schizophrenia because they live in the city? If I want an answer to that question, I'll have to carry out another study. And if it turns out that they actually become schizophrenic from living in the city, it raises another question. What is it about the city that makes them sick? Is it the noise? The lead content in the air? The many people? Or what is it?"

Denmark registers most data

Epidemiology is about determining the factors that trigger a certain disease, and in Denmark, the opportunities to do that are particularly good. Nowhere else in the world are working conditions for epidemiologists so ideal.

The reason is that we register so much information. By combining registers, researchers are able to find correlations that are inaccessible to researchers elsewhere in the world. Even more important than the number of registers is the fact that the registers date so far back.

"Other countries register just as much information as we do, but we've done it for decades. This also makes it possible to track a disease. If we're interested in schizophrenia, for example, we can trace all the individuals who suffer from the disease, and by studying their history, we can determine whether they have anything in common. That's an incredible advantage."

Correlations are also important

Professor Mortensen, who recently received the August Krogh award for his ability to creatively search for medical knowledge in the

many registers, emphasises that although it can be frustrating for the individual researcher to discover correlations rather than causes, epidemiological correlations are an important contribution to medicine.

He has been working personally on a project about suicide. The study showed that more than half of the individuals who committed suicide had been in contact with the psychiatric health system, and a large part of the suicides took place after the individuals had been discharged.

“Even though our studies don’t explain the correlation between discharge and suicide, the knowledge we provided was important for preventive work. It’s easier to prevent suicide if you know who’s likely to commit it and when,” he says.

The study also showed that people who commit suicide are more socially isolated, more likely to be unemployed and to be financially worse off than others. However, the difficult conditions alone are not enough to explain the suicide rate. In fact, it was the mental illness that explained both the social difficulties and the suicide.

“This is important information if you need to make a decision about what preventive measures to take.”

Statistics explode myths

Epidemiology also plays another important role. It puts an end to myths and excludes correlations.

“Although the registers rarely provide conclusive answers to the mystery of the disease, they’re very good at excluding some of the answers,” says Professor Mortensen.

“We know today, for example, that there is no correlation between autism and the MMR vaccine against measles, mumps and rubella, and this is important information. It means that parents who would like to protect their children against these diseases have less reason to worry. We also know that it is not dangerous to live underneath a power pylon. Or to use a mobile phone. All these correlations

have been disproved by epidemiological studies, but that doesn’t make the studies any less important.”

Collaboration is the way of the future

Professor Mortensen believes that epidemiology will be able to provide more correlations and explanations in the future. Today, epidemiologists base their studies on diagnoses, but in the future, they will be able to work directly with biological material.

As bioanalysts and gene researchers become more and more skilled, it will become possible to combine their detailed knowledge with epidemiological registers, and the combination of the two is likely to provide more definite and positive answers, according to Professor Mortensen.

“When we try to find out what characterises schizophrenics, the fact that the diagnosis of schizophrenia is so imprecise means that our results become very uncertain. Some of the individuals included in our study may have been misdiagnosed. Or perhaps gene research will show that the diagnosis of schizophrenia actually covers several different diseases. Once we know exactly what disease to study, we’ll obtain very definite indications of the correlations involved. It’s a job that involves collaboration with many new groups of professionals, and that will be very exciting,” says Professor Mortensen.



The National Centre for Register-based Research is located in the building between the Faculty of Theology – the former Orthopaedic Hospital – and the Nobel Park.



Per Ingesman

Journey to Rome

Associate Professor Per Ingesman spent eighteen months sitting in one of the reading rooms in the Vatican archives, studying court records. The 500-year-old records written in Latin with a quill pen reminded the church historian of the EU debate taking place back home in Denmark.

By Mikkel Hvid

In 1495, the Danish State threw a group of Benedictine nuns out of their convent on the outskirts of Ribe.

Sixteen years earlier, King Christian I had banished the Benedictines and given their convent to the Order of Malta. In the Middle Ages, it was normally the bishop and ultimately the Pope who controlled the convents, the churches and the clergy, but the secular powers could interfere when people associated with the church diverged from standard practice, which is exactly what Christian I claimed. "The convent was in disrepair," he said, "and 'scandalous acts' took place behind its walls."

The king's decision was not implemented right away – in fact, it did not happen until sixteen years later, when King Hans was on the throne. Even then, the nuns resisted. Not physically, but legally, writing a complaint, which they sent to the so-called Rota Romana in Rome.

Supporter of the weak

The Rota Romana – or just the Rota – was the high court of the Catholic Church. As such, it had the same function in the Middle Ages as the EU Court of Justice has in the Europe of today: a high court and a court of appeal covering all member nations.

The Rota had plenty to see to. To start with, the influence of the church – and thus the Rota – was much greater than it is today. The power in society was divided between king and church, and in addition to questions of faith and matters regarding the church and the clergy, the church was also responsible for social services, matrimonial issues and education. Secondly, the Rota was much used. In a single year, it handled up to 5,000 cases.

"It was mass production," says Associate

Professor Per Ingesman, the Department of Church History and Practical Theology.

He is the first person to have studied and recorded all the cases in which the Rota dealt with Danish matters.

He is not the first to focus on the relationship between the Catholic Church and Denmark during the Middle Ages. After the secret archives of the Vatican were opened in 1881, Danish historians flocked to Rome, and their work resulted in eight volumes of source material published between 1904 and 1943.

However, this work only includes material from the two main departments at the Vatican, the chancellery and the finance department. The Rota's protocols did not become available until 1927 and were therefore overlooked by the Danish researchers. "That is why the Rota's influence in Denmark has never been looked into before," says the 50-year-old church historian.

"Many experts on the Middle Ages were surprised to find out that the Rota had decided cases involving Danes. This fact has only been known by very few researchers."

Scandinavians manage on their own

Denmark was not a large-scale supplier of cases to the Rota.

Associate Professor Ingesman has found 150 Danish cases. Only one seventh of the protocols have been preserved, so his guess is that the total number of cases exceeded 1,000, which is still not very many.

"The major Catholic countries like France, Italy and Spain used the Rota a lot more than we did. Up here in Scandinavia, we were a long way from Rome, and we possibly preferred to handle our own cases – even in those days," says Associate Professor Ingesman, who believes there are obvious similarities between the Rota of the Middle Ages and the EU debate of today.

"In both cases, a supranational court confronts a national or regional court. Both then and today, we're looking at two legal systems competing for influence."

The reading room at the Vatican, as it appears today.





Protector of the weak

“The current political debate shows that having two legal systems complicates matters,” says Associate Professor Ingesman.

“In Denmark, we are very sceptical of supranational systems like the EU. We tend to perceive the EU system in a very negative light, almost like an encroachment on ourselves and on our right to self-determination. EU limits our rights. That’s a consistent argument in the discussion, and there is hardly any doubt that the supranational court has ambitions about extending its influence. However, it doesn’t have to be like that,” says Associate Professor Ingesman.

“You could regard the supranational system as a higher court or a court of appeal that safeguards certain principles and rights.”

That is how many perceived the Rota during the Middle Ages. In a Danish application from 1517, the Rota was described as “the refuge of the oppressed”, and that is what Associate Professor Ingesman considers to have been the Rota’s role in many cases – the protector of the weak against local rulers.

The Rota decided, for instance, that the convent was to be returned to the Ribe nuns, and the Order of Malta was sentenced to pay both compensation and costs in the case.

The Rota came to the nuns’ rescue. And of equal importance, the power-sharing in society was so clearly defined that all parties respected the Rota’s decision. The weak were actually proved right.

A question of power

Associate Professor Ingesman points out that the Rota involved more than just law and solemn principles. As in all other systems, power and influence played an important part.

“Three quarters of the Rota cases were about positions and appointments, and a large proportion of the cases were filed by individuals employed in or closely affiliated with the Rota,” says Associate Professor Ingesman.

One such case occurred in 1486, when the position of archdeacon became available

in Aarhus. King Christian I made sure that the position went to his ambitious young chancellor, the nobleman Johan Jepsen Ravensberg. During his visit to the Pope in 1474, the king had obtained permission to recommend candidates for a number of high, clerical positions, so the case would have been quite straightforward – had it not been for another ambitious civil servant, Jens Pedersen Hostorp ...

Back to Aarhus

Jens Pedersen Hostorp was not a nobleman, did not have the backing of the locals, and was not familiar with Aarhus. However, he knew the Rota inside out after working for about ten years as a scribe for one of the Rota’s judges in Rome. He thought it was time to return to Denmark and therefore decided to use his influence to secure a lucrative retirement post.

In 1494, the international careerist gained the backing of the Rota, which enabled him to return to Aarhus. Once again, there was a conflict of two principles – local versus international. This time, the local principle succeeded. For it is one thing to be right, but another to have power. Jens Pedersen Hostorp was killed the day after having a heated argument with Nils Clausen Skade, the bishop of Aarhus.

The local candidate, Johan Jepsen Ravensberg, then became archdeacon – and later also bishop of Roskilde. Nils Clausen Skade was accused of the murder, both by the victim’s brother and subsequent historians. But that is probably not quite fair.

While in the reading room of the Vatican archives, Associate Professor Ingesman stumbled over another case, in which three Danes applied for forgiveness for the murder of Jens Pedersen Hostorp. One of the three was Johan Jepsen Ravensberg’s servant. And that is how church history can solve crime mysteries.



The Papal high court in Rome, the so-called Rota, consisted of twelve judges. This miniature shows the twelve judges kneeling in a circle.



Flemming Besenbacher

Top-level research requires time, courage and flair

“Money is important for a researcher who wants to be part of the international elite. But without hard work, courage, good ideas and flair, money gets you nowhere,” says Professor Flemming Besenbacher, a front-line researcher.

By Mikkel Hvid

In 1993, 200 projects competed for the DKK 200 million allocated by the Danish National Research Foundation (DNRF), and one of the organisations that received a grant was the Danish Centre for Atomic-scale Materials Physics (CAMF).

In the final, international evaluation ten years later, the centre was described as *outstanding* and *world-leading*. It is difficult to imagine a better reference than the one the CAMF group got, and it generated respect. Young researchers who have been associated with the centre find good jobs, articles written by the group are published in periodicals such as *Nature* and *Science*, the researchers behind the centre are invited to deliver presentations at top international conferences, and colleagues read and quote their articles.

“However,” says one of the driving forces behind the centre for basic research, Professor Flemming Besenbacher DSc, “it has taken a lot of effort to get that far. If you want to be at the forefront of the international research elite, a good idea is simply not enough,” he says.

Freedom to research subject to responsibility

According to Professor Besenbacher, the grant from the Danish National Research Foundation is largely responsible for the excellent international reputation of Danish materials physics.

Two factors made the Danish National Research Foundation a particularly important partner: the size and duration of the grants.

“In a Danish context, DKK 5–10 million is a considerable amount of money, and it allowed us to engage a number of promising young researchers at our centre. At the same time, the project periods were long enough to grant

us the necessary peace and freedom to carry out the work. Freedom subject to responsibility, of course, but unusually good working conditions for a Danish research project.”

The week is not long enough

Good working conditions do not imply short working days. The 51-year-old physicist’s working week is between 70 and 80 hours.

“I don’t have a choice. An international research project requires hard work.”

Many travelling activities contribute to increasing the number of working hours, but they, too, are necessary.

“Leading research at an international level is like a sports match. You compete with the best in the world, so it’s not enough to sit in your office in Aarhus and read periodicals, because the research you find in them is often a year old. You have to travel and deliver speeches at congresses, and meet people who are both competitors and sometimes your friends. The network you create in this way, and the ideas you take home, are essential if your group is to maintain its position at the forefront of international research.”

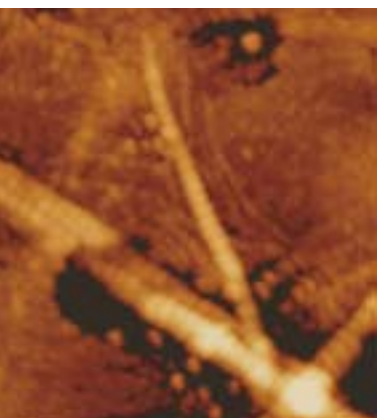
Laziness is unforgivable

The long working hours are also connected with a more personal factor that is equally important if you want to be among the elite: persistence. And Professor Besenbacher has lots of it.

“When I tackle something, I always try to give my best. I persevere until I get a result that I’m happy with and that I believe others will acknowledge as well.”

He is also well prepared. Although he has been invited to hold lectures at many international congresses, he still spends the night before going through his notes and slides.

“There’s no excuse for wasting people’s time, so the least you can do is to be well prepared. I have no problem accepting that people lack knowledge, experience or talent, but I get angry if they don’t do their homework properly.”



AFM image of the protein collagen. About a quarter of all proteins in the human body consist of collagen, which forms molecular cables that strengthen the tendons and protect the skin and the inner organs. Bones and teeth also consist of collagen plus certain minerals.

Speak out

The walls of Professor Besenbacher's office are lined with several international awards and acknowledgements, including one for the best presentation at a congress in the USA.

A good presentation requires exactly the same amount of preparation as a fine academic article or a successful application.

"You have to question yourself all the time. What is my message? What do they have to understand and take home from the lecture? What does it mean to them? The most important thing is not necessarily what you know, but what they get out of it."

A flair for trends

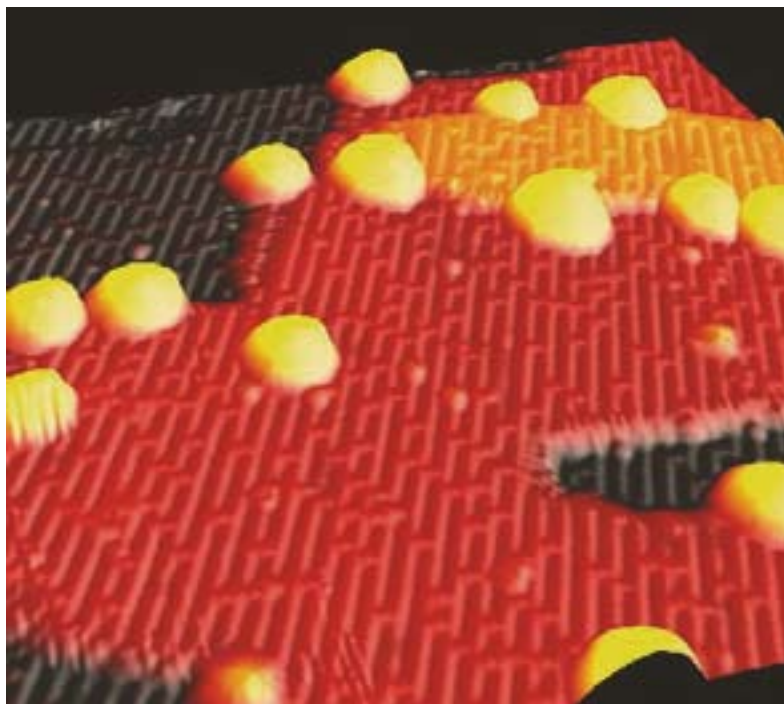
Finally, international research also requires a flair for what is happening in the international research arena. You may have an excellent research project, but if you fail to make it relevant, it will be difficult to obtain the necessary money and support. Professor Besenbacher has the ability to spot opportunities.

In January 2004, for example, he inaugurated iNANO – the interdisciplinary Nanoscience Centre – a brand new centre at the University of Aarhus.

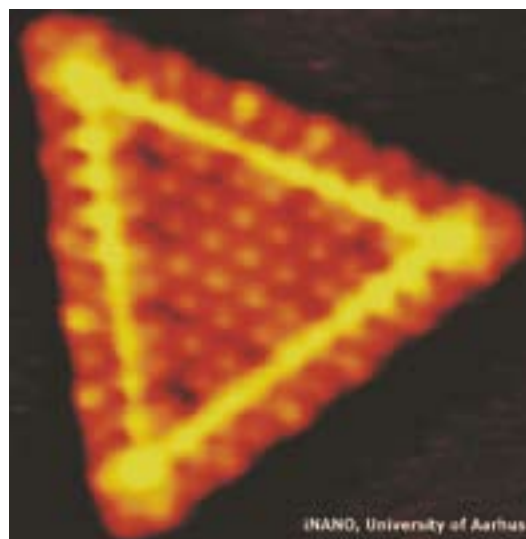
The research field is not new, but the word is. Ever since Bill Clinton launched a major American nanotechnology initiative in 2000, nano has been a buzzword in the research world, and Professor Besenbacher has taken it to heart.

The research councils gave iNANO DKK 25 million. In addition, iNANO has received similar amounts for a business-oriented graduate school. Today, about 40 researchers and 70 PhD students are associated with the iNANO centre, where Professor Besenbacher is the director.

The emission of sulphur into the atmosphere is a major environmental problem. The primary source of sulphur pollution is the burning of fossil fuels such as diesel and petrol. This figure shows a high-resolution STM picture of an MoS₂ nano-cluster that functions as a catalyst in the desulphurisation process in which the sulphur is removed from the fossil fuels. STM studies of MoS₂ nano-clusters at the University of Aarhus have led to the development of new desulphurisation catalysts in collaboration with Haldor Topsøe A/S.



STM picture of gold nano clusters on a titanium dioxide surface. When the size of the gold clusters approaches a few nanometres, the clusters become surprisingly chemically reactive, which can be used in a number of catalytic processes. In its macroscopic form, gold is the most precious metal with very little reactivity, but in the nano world, completely new and interesting catalytic phenomena occur, which is an excellent example that "small is different".





Søren Keiding

Inspiring others is important

Professor Søren Keiding has faced many challenges in his career, in both physics and chemistry. He has established femtosecond laser laboratories at the University of Southern Denmark and the University of Aarhus, and in 2003, he was appointed director of the new engineering degree at the Centre for Applied Sciences in Aarhus. He describes himself as a closet physicist and loves to launch new projects.

By Katrine Meyn

Professor Søren Keiding's career has been unusual in more than one respect. He has an MSc in chemistry, a PhD in physics and a post-doctoral degree in physics. He has also been an assistant professor of physics, an associate professor of chemistry and a professor of chemistry. He describes himself as a closet physicist and regards the world from a microscopic perspective. He is not interested in the thermodynamic properties of a bucket of water, but in the importance of the individual water molecule for the whole.

"My passionate interest is laser spectroscopy. This interest began when I was writing my Master's thesis in molecular laser spectroscopy in 1986 at the University of Aarhus. Both the professional and the social aspects appealed to me, and we worked in a very dynamic environment. The first time you see a real laser beam, you cannot help but be fascinated by its interesting appearance. At the same time, the laser is a very precise tool for examining the state of the molecules and can therefore answer some of the questions you ask as a researcher.

Molecular physics (the border area between chemistry and physics) turned out to provide a very precise picture of how the molecules are linked in the gaseous phase. We examined H₂, for example, and used the information we discovered to refine existing theories, i.e. we performed standard basic research. As far as I'm concerned, it's not always what has been and still is the actual purpose of the research that is useful, but what you learn in the process," says Professor Keiding.

In the course of his career, Professor Keiding has gained considerable experience. In

the United States, he worked with the femtosecond laser, a laser that emits light in 10⁻¹⁵ second glimpses. He was then given the opportunity to build a femtosecond laboratory from scratch. This happened at the University of Southern Denmark, which thus became the first university in Europe to have a laboratory of this kind. Professor Keiding then moved to the Department of Chemistry at the University of Aarhus, where he repeated the process. Another fresh start and an empty room awaited him when he was appointed associate professor at the department in 1994. He brought a good deal of equipment and several students with him from Odense. Carlsberg financed the purchase of a large, efficient femtosecond laser, and Professor Keiding began investigating chemical reactions in liquids. The research group steadily grew over the years and now comprises three full-time staff and nine PhD students.

Graduate engineer in Aarhus

Throughout his career, Professor Keiding has been involved in his work environment. He has been head of department and a member of the faculty council, and has sat on patents committees, boards, etc. He likes to see things from a broader perspective rather than working in isolation. He was therefore a logical choice as centre director for the new engineering degree at the University of Aarhus.

When it was decided that the University of Aarhus and the University College of Aarhus were to collaborate about engineering studies, the Centre for Applied Sciences was established to bridge the gap between these two organisations. Graduate engineers with a BSc (3 1/2 years) can now take another 2 years of advanced studies in Aarhus and become graduate engineers with an MSc.

At present, four degree programmes are available and more are in the pipeline. In future, students will be able to choose between medical technology, technical information technology, process technology and technical geology. New degree programmes in nano-

A technical geology student at work analysing microscopic amounts of geological material.





technology, bioprocesses and optoelectronics are being planned. Currently, 120 students are studying to become graduate engineers. Chemistry and biotechnology are not taught at the University College of Aarhus, and new technical Bachelor degree programmes are now being put into place to make sure the university produces engineers with these subjects.

“Nano is a wonderful concept that encourages interdisciplinary thinking. For many years, I have been perceived as a kind of pariah, in an amicable sense of the word, by both chemists and physicists. This is because they think I belong more to the ‘other’ group, and because there are so many traditions that are taken for granted. Nano is fantastic because it breaks down some of the barriers between disciplines. Using this science in other disciplines creates a more holistic approach and produces excellent results.

My job as a centre director is to make sure the two organisations collaborate smoothly. They have very different cultures, and it is important that they approach each other with full respect for their individual strengths. I hope that the number of graduate engineers will reach 100–150 a year in a few years. For that to happen, about half of the graduate engineers with a Bachelor’s degree will have to continue their studies. It’s important to maintain the job-focused aspect of the Bachelor’s degree in engineering to allow graduates the choice of finding a job in the industry after studying for 3 1/2 years.

On-the-job training is part of the studies to become a chemical engineer. We work with companies all over Jutland when it comes to providing our students with practical experience. The students still have to carry out numerous series expansions – i.e. have impeccable basic science skills – but they must remain aware all the time of how the work is carried out at Cheminova and Aarhus United or at coal-fired power plants, etc. It’s important that they learn where and how they will come to use chemistry.”



Biomedical engineering students work closely with the Institute of Experimental Clinical Research at Skejby Sygehus.

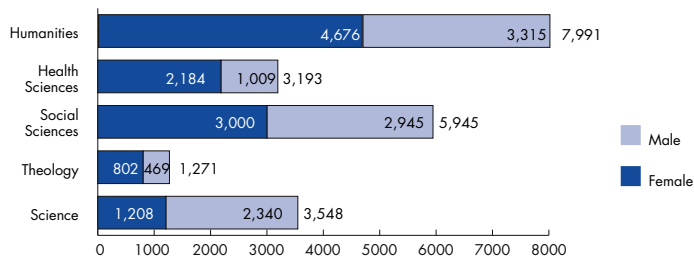
Science must be inspiring

“I rarely refuse when asked to talk about science. I see it as an obligation that comes with the job, and I think it’s important to take time to tell people about the benefits of our work. It’s also important to inspire others. I don’t subscribe to the idea that science is boring and incomprehensible. If you can give people an idea of what you’re doing, they can understand you.

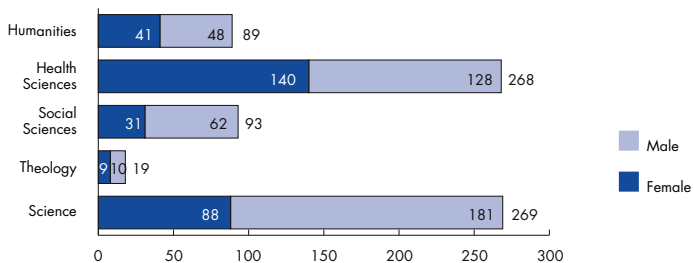
I’ve held many lectures on water, for instance. Water is fun and interesting, for in spite of our extensive knowledge in many areas, there’s still a lot we don’t understand about water. I explain some of the problems and why there’s a limit to our understanding. It appeals to people’s curiosity, because we are right at the edge of human understanding,” Professor Keiding concludes.

Key figures for 2003

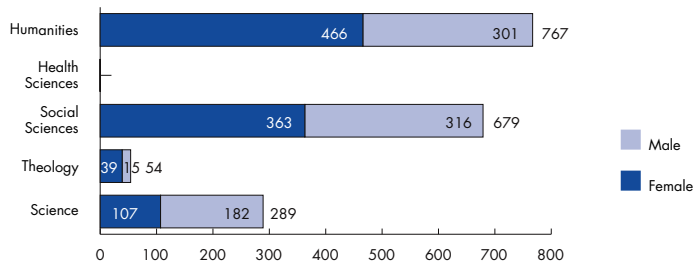
**Students:
21,948**



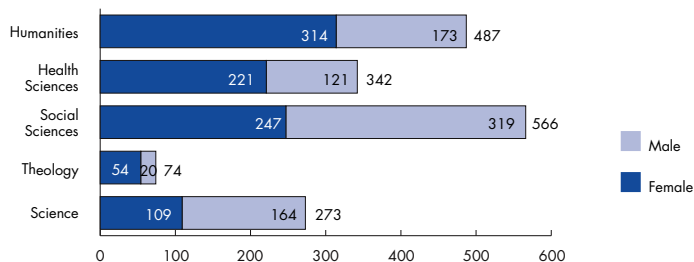
PhD students: 738



Bachelors: 1,789



Masters: 1,742



Average age

	Admitted	Bachelors	Masters
Humanities	23.2	27.0	29.9
Health Sciences	22.1	none	29.2
Social Science	22.5	25.8	28.8
Theology	25.5	28.8	33.3
Science	21.9	24.8	28.2
University Total	22.7	26.2	29.6

The average age of Bachelors is influenced by the fact that more Bachelor certificates are being issued to older Master students in connection with their admission to new master curricula.



The lakeside lecture theatres are located south of the two lakes in the University Park. There are five lecture theatres altogether, with seating for 75 to 450 students.

	Total	Ordinary funding	External funds
Humanities	396	292	46
Health Sciences	505	256	146
Social Sciences	290	195	34
Theology	63	43	14
Science	586	313	234
Administration	3	1	0
University Total	1,843	1,101	474

Academic staff
(full-time equivalent)

	Total	Ordinary funding	External funds
Humanities	133	126	7
Health Sciences	474	357	117
Social Sciences	109	87	22
Theology	22	20	2
Science	360	293	67
Administration	469	464	5
University Total	1,568	1,348	220

Technical and administrative staff
(full-time equivalent)



Groups of staff and age distribution

Group of staff Age group	Academic						Acad. part-time	Tech./ adm	Total
	Prof.	Assoc. prof.	Assist. prof.	PhD scholar	Others	Others			
20-29	0	1	45	259	158	563	66	504	1,133
30-39	11	140	204	136	184	675	142	446	1,263
40-49	45	309	23	14	60	451	114	467	1,032
50-59	101	313	3	1	34	452	106	548	1,106
60-70	66	138	0	0	6	210	34	114	358
Total	223	901	275	510	442	2,351	462	2,079	4,892

The table includes people employed by the University of Aarhus in October 2003 who were paid for more than 10 hours per month.

Groups of staff and gender distribution

Group of staff Gender	Academic						Acad. part-time	Tech./ adm	Total
	Prof.	Assoc. prof.	Assist. prof.	PhD scholar	Others	Others			
Male	208	730	175	323	209	1,645	295	699	2,639
Female	15	171	100	187	233	706	167	1,380	2,253
Proportion of women	7%	19%	36%	37%	53%	30%	36%	66%	46%

The table includes people employed by the University of Aarhus in October 2003 who were paid for more than 10 hours per month.

Publications

	Humanities	Health Sciences		Social Sciences	Theology	Science	Total
		Theory*	Clinical*				
Research publications	550	697	1,495	453	128	939	4,262
Of which articles in journals	258	596	1,290	204	49	781	3,178
Of which contributions to anthologies	227	72	124	205	56	102	786
Of which monographs	65	29	81	44	23	56	298
Reviews	101	48	56	53	43	24	325
Letters, comments, academic debate	31	33	37	9	10	3	123
Conference contributions, working papers	78	**	**	163	0	231	472
Translations, publications, contributions to encyclopaedias	38	***	***	5	7	***	50
Evaluation reports, research reports	34	3	15	22	0	38	112
Other research presentations	137	34	61	28	28	57	345
Total publications	969	815	1,664	733	216	1,292	5,689
Editorial work	119	18	35	39	39	36	283

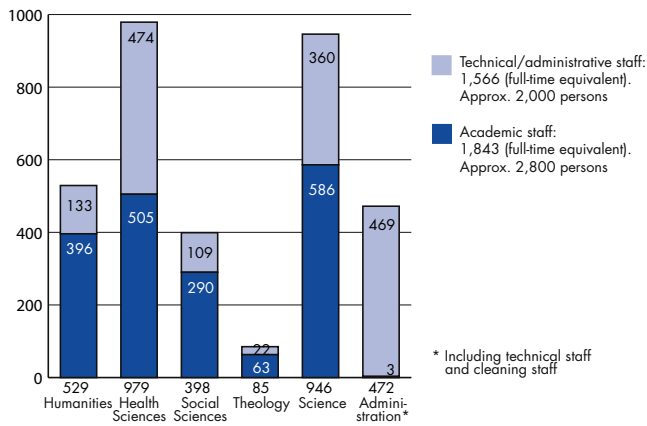
* Theory covers theoretical departments. Clinical covers clinical departments at the University Hospitals in Aarhus and Aalborg.

** The Faculty of Health Sciences does not report this category.

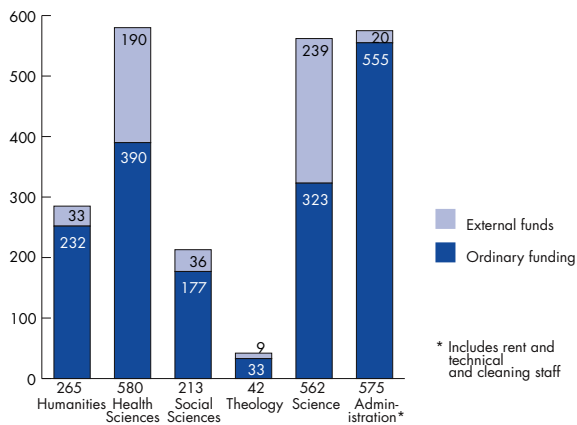
*** The Faculties of Health Sciences and Science do not report this category.



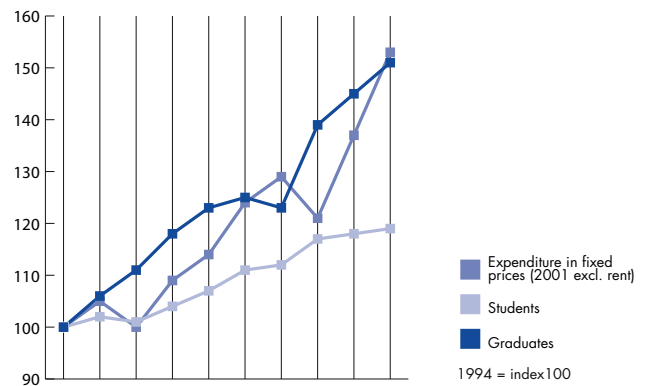
Total no. of staff: 3,409 (full-time equivalent)



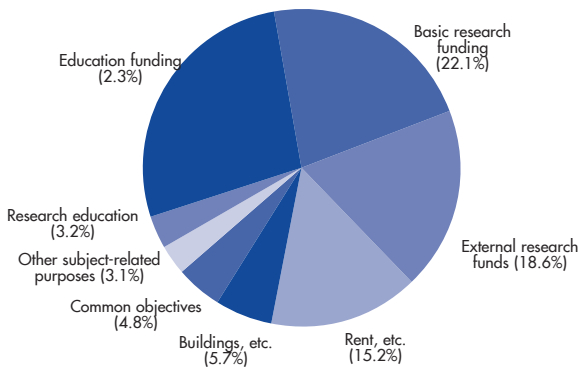
Turnover: DKK 2,236 million



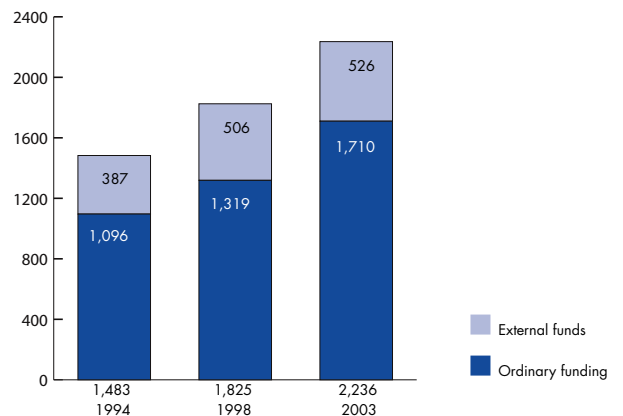
Ten years of progress



Funding



Developments in ordinary/external funding





The Faculty of Humanities

The faculty in 2003

In 2003, the faculty's new structure was put in place. The previous 23 departments were reduced to seven: the Institute of Anthropology, Archaeology and Linguistics; the Institute of Philosophy and History of Ideas; the Institute of History and Area Studies; the Scandinavian Institute; the Institute of Language, Literature and Culture; the Institute of Aesthetics Studies; and the Institute of Information and Media Studies.

The latter institute moved to the IT City Katrinebjerg in the course of the year, whereas the faculty secretariat and the technical department moved to the Nobel Park. The Museum of Ancient Art was reconstructed, and students studying subjects at Moesgaard could enjoy a new library and a new canteen.

The Centre for Cultural Research was converted to a centre for research support, and at the same time, the faculty decided to establish a Centre for Educational Development with effect from 2004.

As far as finances are concerned, the faculty had to revise the budget following a sudden and unexpected drop in value-added funding for the ordinary studies, which occurred when many students decided not to sit their examinations.

Studies

In the spring of 2003, the faculty and Mercuri Urval launched the joint *JobHum* project. The main purpose of this project is to make the students more job-conscious before, during and after their studies in order to facilitate the transition to the labour market through an increased awareness of their own skills. The project comprises courses for directors of studies and student counsellors based on the concept that the daily work to change student consciousness must take place in the context of the actual subjects through guidance, courses and professional events.

The faculty also launched a survey of the attitude, knowledge and requirements of the private business sector to humanities candi-

dates. The survey was carried out in collaboration with the sister faculty at the University of Southern Denmark, as well as Danish Commerce and Services and the Confederation of Danish Industries.

A new, uniform study structure and shared merit rules for the Bachelor's degree with effect from 2005 were the results of the continued collaboration between the deans at the different humanities faculties in Denmark.

The faculty reduced the intake to some of the most sought-after studies in the light of poor employment opportunities, but a situation still prevails in which some subjects have to turn applicants away while others have places available.

Several subjects have introduced mentor schemes to reduce the dropout rate, and the faculty is considering extending the concept to all subjects, if the outcome is positive.

There is an increasing demand for the faculty's continuing and further education courses. In 2003, two new Master's degree programmes were launched: a Master's degree in health anthropology in collaboration with the University of Copenhagen and a Master's degree in cultural environment and landscape analysis in collaboration with the Aarhus School of Architecture. The most popular studies were the Master's degree in Ethics and Values in Organisations and the Master's degree in Rhetorics and Communication. The faculty is thus now involved in six Master's degree programmes and more are in the pipeline.

Distance students as well as local students have been able to benefit from the faculty's investment in the FirstClass electronic education and administration tool. The faculty has started the ongoing educational training of lecturers, and an increasing part of the faculty's administrative work is now paperless.

Research

The University of Aarhus celebrated its 75th anniversary with events involving a large number of research fields by means of conferences, lectures, presentations and "Open



House" arrangements. In addition to the anniversary awards (see elsewhere), the faculty awarded six gold and silver medals in 2003 and conferred five doctorates and 17 PhD degrees. Nine additional PhD degrees were conferred in January 2004.

At the turn of the year, the faculty had 88 PhD students, and efforts continue to increase the number via joint financing.

Faculty researchers held and participated in a large number of international conferences and obtained financial support for many projects from research committees and funds. In addition, the faculty established the Aarhus Centre for Business History in collaboration with the Danish National Business Archives.

Communication

In 2003, the faculty held a conference on humanistic theory and IT, and in the light of the new University Act, the faculty employed a journalist to promote the dissemination of knowledge about research. As the first in Denmark, the faculty published a report on its researchers' dissemination of knowledge to the public, supplemented by a number of interviews with researchers on that topic. The Museum of Ancient Art is another important channel of communication. The museum has undergone major renovations and its organisation has also been strengthened thanks to support from the Aarhus University Research Foundation. In 2003, the museum hosted an exhibition of Greek coins on loan from the Numismatic Museum of Athens.

Researchers at the faculty were responsible for more than 1,600 communication activities during 2003.

Facts for 2003

Students

- New enrolments: 1,137
- Number of students: 7,991
- Number of PhD students: 89
- Number of Bachelors: 767
- Number of Masters: 487
- Number of PhDs: 17

Staff

- Professors: 23
- Associate professors: 186
- Other academic staff: 58
- Teaching assistants: 57
- Technical and administrative staff: 133
- Number of doctorates: 5
- Number of research publications: 539
- Total number of publications: 931

Institutes (with effect from 2004)

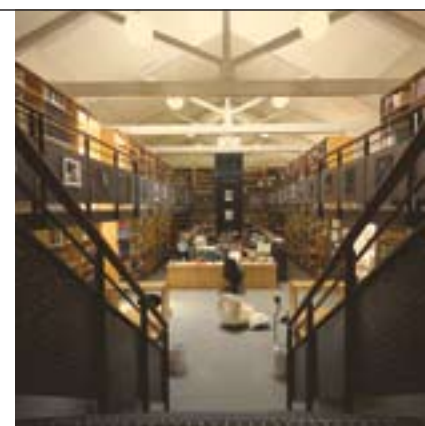
- Institute of Anthropology, Archaeology and Linguistics
- Institute of Philosophy and History of Ideas
- Institute of History and Area Studies
- Institute of Information and Media Studies
- Scandinavian Institute
- Institute of Language, Literature and Culture
- Institute of Aesthetics Studies

Research centres

- Danish National Research Foundation's Centre for Black Sea Studies
- Centre for Business History
- Centre for Advanced Visualisation and Interaction (CAVI)
- Danish Centre for Urban History

Degree subjects

- Portuguese/Brazilian Latin American Studies
- Dramaturgy
- English
- Ethnography and Social Anthropology
- Philosophy
- Finnish
- Prehistoric Archaeology
- French
- Greek
- History
- History of Ideas
- Indian Philology
- Information Studies
- Italian
- Japanese
- Chinese
- Classical Archaeology
- Classical Philology (Greek and Latin)



The library for the aesthetics subjects.

- Art History
- Latin
- Linguistics
- Comparative Literature
- Media Studies
- Medieval Archaeology
- Music Studies
- Scandinavian Language and Literature
- Russian
- Serbo-Croatian
- Spanish
- Czech
- German
- Hungarian
- Aesthetics and Culture

Degrees

8	PhD
7	mag.art
6	cand.mag.
5	
4	Bachelor
3	
2	
1	
	Years



The Faculty of Health Sciences

Studies

Medicine is the faculty's oldest degree programme, and with 365 enrolments, it is the one with the greatest number of students. The new academic regulations have now been fully implemented and have considerably strengthened the clinical elements of the degree programme. It now includes an early period of clinical training at a county hospital, as well as increased emphasis on developing the students' clinical skills. There is also increased emphasis on giving the students further insight into scientific philosophy and working processes, including a major independent assignment involving in-depth work in one of the degree programme's basic or clinical subjects.

The degree programme in Odontology has also undergone a number of changes in recent years aimed at giving the students more independence. In an effort to attract more students, the option of enrolling for a year of research was introduced this year.

In addition, the faculty has offered a number of two-year Master's degree programmes in recent years: a Master of Science in Health Science, which targets individuals with a medium-term tertiary health degree; a Master of Science in Biomedical Engineering, which was established in collaboration with the University College of Aarhus and has now become a permanent part of the Centre for Applied Sciences; and finally a Master of Science in Nursing, which was transferred to the faculty in 2001 from the School of Advanced Nursing Education.

In 1996, the faculty established a Master of Public Health degree. Surveys have shown that this degree has improved career opportunities for most graduates. In 2003, the faculty also established a Master's degree in Clinical Nursing and applied for approval of a Master's degree in Cardiovascular Technique.

The faculty's Unit for Medical Education has established close links with the Regional Council for Continuing Medical Education regarding the educational aspects of the de-

gree programme for specialist doctors. One of the results of this collaboration has been the appointment of 28 post-graduates as clinical associate professors at the faculty.

During the year, the faculty established formal agreements with a number of Danish Centres for Higher Education (CVU) and other medium-term centres of further education in the health sector to ensure their cooperation in research aspects of the degree programmes. The faculty has established a special working group to liaise with these centres. The work is particularly intensive in the nursing field, where a framework agreement has been entered into with the County of Aarhus.

Research

The *Status and Plans 2002–2006* strategy and development plan of the Faculty of Health Sciences describes the research areas in which the faculty has a strong national and international reputation. The plan also lists a number of the faculty's expectations to the areas it would like to strengthen during the coming years. One of the major challenges facing the faculty in the next few years is the change to a new generation of employees, and it is important for the faculty to secure the best possible staff in all categories. In particular, there will be a focus on recruiting doctors for the faculty's basic sector, and dentists for the School of Dentistry, where a number of market mechanisms have made a university career for people with these degrees less attractive.

The PhD programme has high priority. In 2003, the management for the PhD programme worked to improve the quality of the courses offered and to restructure the choice of courses. The faculty also entered into an agreement about yet another interdisciplinary graduate school in clinical intervention research.

The faculty also continues to stress the importance of offering particularly interested and motivated students a year in which to



carry out a research project under supervision. At the end of the year, the student presents a written report that is often published in an international journal, and sits an examination in medical research in the presence of an external examiner. This year, interest in the research year has increased, and the number of enrolments has more than doubled.

Collaboration with the County of Aarhus regarding the Aarhus University Hospital has been extended, and with effect from 1 January 2003, this also includes the County of North Jutland, since Aalborg Hospital and Aalborg Psychiatric Hospital have become part of the Aarhus University Hospital. A new agreement relating to Aarhus University Hospital was prepared in the course of the year, combining all existing agreements pertaining to the collaboration.

Communication

This year, the faculty once more published a report in collaboration with the County of Aarhus. The report describes the different faculty departments and the clinical departments of the Aarhus University Hospital, and provides an overview of the results of health science research in Aarhus in 2003. In addition, the faculty and the county jointly publish the *AUH – Forskning og Klinik* (AAUH – Research and Clinical Practice) magazine, which describes new advances in health science research of importance to the university hospital's clinical practice.

Faculty staff frequently attend lectures and debates about health and disease at a large number of events held in different associations and organisations.

Facts for 2003

Students

New enrolments: 500
 Number of students: 3,193
 Number of PhD students: 268
 Number of Masters: 342
 Number of PhDs: 59

Staff

Professors: 45
 Associate professors: 130
 Other academic staff: 169
 Teaching assistants: 103
 Technical and administrative staff: 474
 Number of doctorates: 10
 Number of research publications: 2,142
 Total number of publications: 2,417

Institutes

Institute of General Medical Practice
 Institute of Anatomy
 Institute of Physiology and Biophysics
 Institute of Biostatistics
 Institute of Clinical Medicine
 Institute of Epidemiology and Social Medicine
 Institute of Pharmacology
 Institute of Human Genetics
 Institute of Medical Biochemistry
 Institute of Medical Microbiology and Immunology
 Institute of Environmental and Occupational Medicine
 Institute of Forensic Medicine
 Institute of Science in Nursing
 School of Dentistry

Research centres

Danish Epidemiology Science Centre
 Centre for Functionally Integrated Neuroscience
 Centre for Human Genome Research
 Centre for Clinical Pharmacology
 Centre for Molecular Biology and Biotechnology
 Water and Salt Research Centre
 Danish Centre for Molecular Gerontology
 Danish Allergy Research Centre
 Centre for Arctic Environmental Medicine
 Nanoscience and Tissue Engineering

Degree subjects

Medicine
 Odontology
 Master of Science in Biomedical Engineering
 Master of Science in Health Science
 Master of Science in Nursing

The Victor Albeck building is the former Fødselsanstalten i Jylland (Jutland midwifery institution).

It now houses an ultra-modern health science library and an equally modern education centre.

Medicine degrees

9	PhD
8	
7	cand.med.
6	
5	
4	
3	
2	
1	
Years	

Odontology degrees

8	PhD
7	
6	cand.odont.
5	
4	
3	
2	
1	
Years	



The Faculty of Social Sciences

The faculty in 2003

In December, the Faculty of Social Sciences processed the first two of a total of four evaluations of research and education conducted at the faculty's departments. One of the reasons for these surveys is to create the best possible foundation for the development of an evaluation and quality assurance model that can be used in the future as part of the faculty's compliance with the requirements for regular evaluations as set out in the University Act.

At the end of the year, the Department of Psychology moved into newly built facilities in the Nobel Park, which means that the department is now housed in modern premises after having had "temporary residence" at Risskov for many years. The move of the Department of Psychology marks the final step in the constant shift from building to building, which has affected all the faculty's departments in recent years.

Degree programmes

In 2004, the number of enrolments in the faculty's degree programmes was satisfactory, as in previous years. This also applies to the new Master's degree programme in Social Integration, with the first courses starting in the autumn of 2003.

The canteen for the social science subjects.



Moves to strengthen both the counselling of inactive students and career guidance services were carried out in 2003. In addition, the faculty has employed an associate professor in university education to develop the faculty's range of courses, etc. on the subject of university education.

The new University Act of 2003 has been followed up by an education reform, and at the same time the act has allocated a number of new education-related tasks to the university deans. The social science deans in Denmark have consequently entered into an agreement regarding the transfer of credits upon change of degree programme and have submitted an application to the ministry for permission to establish a new social science degree programme – Master of Social Science (MSc) – to match the Master of Science degree (MSc) and the Master of Arts degree (MA).

A number of meetings were held with business partners in 2003 regarding the offer of continuing and further education courses, joint financing of research and PhD projects, etc. Concrete agreements have also been entered into regarding the financing of specific PhD studies.

Research

Social science research is traditionally planned and carried out by individual researchers, but a number of activities are carried out in cooperation with other parties either within the department or in other faculty units. One example is the five-year research project *The Danish Health Sector's Finances, Organisation and Legal Basis*, which led to the employment of three PhD students in 2003. This project and other initiatives at the various faculty departments and centres are examples of the kind of cooperation that can take place around this subject, both internally and with external partners in the health sector.

2003 was also the year in which the faculty could take stock of the *Magtudredningsprojekt* (the analysis of power project), which sparked a vast number of research projects and publi-



cations, and resulted in debates in both media and professional circles.

In 2003, the faculty decided to increase its emphasis on PhD studies. The number of PhD students will be increased, partly by promoting the faculty's job-oriented PhD studies, which have been very successful in the law degree programme and are now becoming available in the faculty's other PhD programmes. The finances necessary to achieve the goal of a greater number of PhD students will be provided through an allocation of faculty funds for the purpose and a considerable increase in external financing.

Research at the faculty's departments and centres resulted in a number of prestigious awards to academic staff members in 2003, including three awards in connection with the university's 75th anniversary. One of the close associates of the School of Economics and Management, Professor Clive Granger, was also awarded an honorary doctorate in connection with the jubilee, and received the Nobel Prize in Economics later in the year.

Communication

As part of the anniversary celebrations, the faculty participated in the "Open House" event in which interested citizens could make a tour of the university and get an impression of the many activities that take place. In addition, a large number of anniversary symposiums will be held in the course of 2003-2004.

In 2003, the faculty centres introduced some new activities, including Web-based descriptions of a number of registers that are relevant for researchers in both social science and health science, as well as access to these.

Facts for 2003

- Students
- New enrolments: 951
- Number of students: 5,945
- Number of PhD students: 93
- Number of Bachelors: 679
- Number of Masters: 566
- Number of PhDs: 16



Staff

- Professors: 47
- Associate professors: 78
- Other academic staff: 41
- Teaching assistants: 61
- Technical and administrative staff: 109
- Number of doctorates: 1
- Number of research publications: 454
- Total number of publications: 731

Departments

- School of Economics and Management
- School of Law
- Department of Political Science
- Department of Psychology

Research centres

- Centre for Alcohol and Drug Research
- National Centre for Register-based Research

Degree subjects

- Economics
- Master's degree in Business Administration
- Law
- Political Science and Social Science
- Psychology
- Combined studies programmes consisting of two subsidiary subjects in Psychology and Business Administration as a main subject

The completed Nobel Park with new buildings for the Department of Psychology in the middle.

Degrees

8	PhD
7	
6	<i>cand.jur. cand.oecon. cand.scient.pol. cand.psych.</i>
5	
4	Bachelor
3	
2	
1	
	Years



The Faculty of Theology



The foyer of the theological lecture theatre building also serves as a meeting place for the students.

The faculty in 2003

When the new University Act came into effect on 1 July 2003, the Faculty of Theology chose to use the option to organise a faculty without departments. With effect from 1 July, the Department of Biblical Studies, the Department of Church History and Practical Theology, the Department of Systematic Theology and the Department of the Study of Religion merged into one single organisation with new units providing the framework for the degree pro-

grammes, but without independent finances and administration. These structural changes have therefore been followed up by major administrative reorganisation.

The faculty's finances have been stabilised and the activity level boosted thanks to an increase in externally financed research activities from DKK 6 million to DKK 9 million. Changes to last year's cautious approach to appointments can therefore be introduced, and the faculty advertised a number of positions in 2003, including two professorships.

Degree programmes

The Claroline (classroom online) e-learning programme has been introduced in all courses, whereby ICT becomes a regular ingredient in the learning process. There was a small drop in the number of enrolments of new students, but the number of active full-time equivalents has been maintained. The increased focus on student and career guidance continued in 2003 and resulted in a number of business and labour market-related events, intensified guidance regarding exchange student programmes, as well as the introduction of opportunities for field projects and work experience.

The faculty's PhD programmes take place within the framework of the PhD School of Religion/Identity/Culture. This graduate school continues to give priority to PhD courses, student guidance and contact with outside parties regarding finance. A significant growth in interest in the graduate school's six-monthly exchange student grants has taken place, and the school has managed to secure additional finance for such grants.

A number of specially compiled theology courses have been offered as part of the agreement entered into with the Centre for Theology and Religious Education Løgumkloster in 2002. The teachers at the faculty also participate in a wide range of continuing and further education courses targeting clergymen and upper secondary school teachers, in particular.

The foyer seen from Nordre Ringgade (the northern ring road) stands out like a shining sculpture.





Research

The members of the faculty's academic staff continued to produce a considerable amount of research material in 2003. The number of research publications is consistently high: 129 publications, including more than twenty monographs.

The areas of special focus have been revised, resulting in strengthened collaboration. Internal rounds of applications determine which area will be awarded a preferential share of the faculty's own research funds in addition to funds from the Aarhus University Research Foundation and other external research funds.

"Jews, Christians and pagans in Antiquity – criticism and apologetics" is a focus area that aims at examining the exchange of points of view between different religious and cultural groups in Antiquity. The "Religious narrativity, cognition and culture" focus area examines recent perspectives within narrativity, cognition and culture research with a view to clarifying the importance of this research for a number of subjects in the study of religion, such as cosmology, philosophy of man, identity construction and rituals. The most recent focus area is called "Ethics, law and religion", in which ethics and law are interpreted as two closely related normative systems. The main topic of the focus area is therefore to determine how these two normative systems relate to the phenomenon of religion.

Communication

In 2003, the faculty published the first issue of a richly illustrated yearbook. This publication describes a number of the important events of the year in research and education in the form of articles, interviews and conference reports. It also contains some key figures for the faculty and a list of research articles published by staff members as well as other forms of communication. The yearbook is part of the faculty's increased focus on the communication and dissemination of knowledge

and is distributed to upper secondary schools, Danish clergymen and other individuals and organisations with which the faculty has a working relationship.

Facts for 2003

Students

New enrolments: 134
 Number of students: 1,271
 Number of PhD students: 19
 Number of Bachelors: 54
 Number of Masters: 74
 Number of PhDs: 5

Staff

Professors: 11
 Associate professors: 24
 Other academic staff: 11
 Teaching assistants: 5
 Technical and administrative staff: 22
 Number of doctorates: 1
 Number of research publications: 129
 Total number of publications: 214

Departments (with effect from 2004)

Department of Church History and Practical Theology
 Department of Biblical Studies
 Department of Systematic Theology
 Department of the Study of Religion

Research centres

Grundtvig Centre
 Centre for Bioethics

Degree subjects

Theology
 Study of Religion
 Semitic Philology



Degrees

8	PhD
7	
6	<i>cand.theol.</i>
5	
4	Bachelor
3	
2	
1	
Years	



The Faculty of Science

The faculty in 2003

The Faculty of Science has a reputation for a high level of research activity and an excellent international profile. In terms of education, the faculty has increased its intake of students for the degree programmes, but considerable effort is still being made to recruit and maintain a greater number of students than are currently enrolled. Sharing knowledge with the community is given top priority and is constantly undergoing development.

Studies

In 2003, the faculty implemented a comprehensive study reform. The purpose of this reform is to increase the number of students recruited for the degree programmes and the percentage who complete their studies, as well as making the studies more job-focused. One of the main reasons for the reform is the high demand for faculty graduates. In many subjects, this demand is greater than the supply.

In September 2003, the Minister of Science, Technology and Innovation gave the University of Aarhus approval in principle to educate graduate engineers with effect from summer 2004.

The PhD programme at the faculty differs from PhD studies at most other institutions in Denmark in that the students have been enrolled in a four-year PhD programme since 1991. On the basis of experience with almost a thousand students engaged in this type of degree programme, the faculty documented the results in autumn in a publication called *PhD degree programmes in science at the University of Aarhus – a good story*.

The main activity of the faculty in terms of continuing studies is a range of subjects under the so-called single-subject scheme. In 2003, 160 students were enrolled. They are taught and sit for examinations on the same terms as the full-time students at the faculty.

The faculty saw the completion of three Master's degree programmes in 2003: Cryptology, Geoscience (clinical) and Material Science. Within the framework of the IT

University West collaboration, the faculty also offers Master's degree and Bachelor's degree programmes in Software Design and Multimedia.

Together with the Education Department of the Municipality of Aarhus, the Steno Museum and the Aarhus Museum of Natural History, the faculty is working on the NAT-LYS project, which aims at strengthening science and technical education in Danish secondary schools.

Research

In 2003, the faculty's external research grants increased by 5% compared with 2002. The annual reports from the different departments testify to a continued high level of research activity. Research at the faculty normally takes place in the departments where researchers or research groups work on projects that, to a large degree, are financed by government research councils. A considerable number of projects are carried out jointly with government research institutions, other forms of government institutions, counties and private companies.

In recent years, research at the faculty has increasingly taken place at centres located at the departments. However, these centres often have links to other departments and faculties, or even different universities. In 2003, the faculty hosted six centres financed by the Danish National Research Foundation and a large number of centres financed by research councils, the EU, other public research funds, counties and municipalities, private companies and private trusts.

Communication

Many researchers at the faculty communicate actively in both printed and electronic media. In addition, the faculty publishes the *Aktuel Naturvidenskab* (Current Science) periodical in conjunction with the seven other Danish technical/science faculties and the Danish newspaper *Jyllands-Posten*. *Aktuel Naturvidenskab* provides news and background information

The greenhouses in the Botanic Garden come under the auspices of the Faculty of Science. They receive approximately 60,000 visitors a year.





from the world of science. The periodical targets readers with a broad interest in science and aims at drawing the attention of Danish society to science.

The faculty has organised a number of professional events for upper secondary school teachers. With these popular arrangements, the departments wish to strengthen the communication side of their front-line research. At the same time, the departments contribute to the continuing training of teachers and to strengthening contact between the traditional school system and institutions of further education.

In an attempt to increase the familiarity of both teachers and pupils with the university – and vice versa – the faculty has entered into a collaborative agreement with the County of Aarhus, where a number of upper secondary schoolteachers are being paid to work for the faculty on a part-time basis, disseminating knowledge aimed at the upper secondary school sector.

The faculty has a popular visitor service that provides easy access for upper secondary school teachers and pupils to university lectures and laboratories.

Facts for 2003

Students

New enrolments: 596
 Number of students: 3,548
 Number of PhD students: 269
 Number of Bachelors: 289
 Number of Masters: 273
 Number of PhDs: 75

Staff

Professors: 46
 Associate professors: 225
 Other academic staff: 144
 Teaching assistants: 39
 Technical and administrative staff: 360
 Number of doctorates: 3
 Number of research publications: 932
 Total number of publications: 1,280

Departments

Department of Biological Sciences
 Department of Computer Science
 Department of Physics and Astronomy
 Department of Earth Sciences
 Department of Chemistry
 Department of Mathematical Sciences
 Department of Molecular Biology
 Institute for Storage Ring Facilities – Aarhus (ISA)
 Steno Institute
 Centre for Sports Science
 Centre for Applied Sciences

Research centres

Interdisciplinary Nanoscience Centre at the University of Aarhus (iNANO)
 Danish Centre for Molecular Gerontology, Department of Molecular Biology
 Centre for Algebraic and Analytic Lie Theory
 mRNA Processing Centre
 Foundations of Cryptography and Security
 Evolution of the Stress Response and Stress Resistance
 Centre for Oxygen Microscopy
 Centre for Structural Biology

Research centres financed by the Danish National Research Foundation

Aarhus Centre for Advanced Physics (ACAP)
 Quantum Optics Centre (QuantOp)
 Centre for Mathematical Physics and Stochastics (MaPhySto)
 Centre for Atomic-scale Materials Physics – (CAMP)
 Centre for Catalysis
 Theoretical Astrophysics Centre (TAC)
 Basic Research in Computer Science (BRICS)

Other research centres and laboratories

Centre for Tropical Ecosystems Research (CenTER), Department of Biological Sciences
 Laboratory for Biomolecular NMR Spectroscopy, Department of Molecular Biology
 Centre for AMS ¹⁴C Dating, Department of Physics and Astronomy
 Danish Instrument Centre for Solid-state NMR Spectroscopy, Department of Chemistry

Degree subjects

Biology
 Computer Science
 Physics
 Geology
 Physical Education and Sport
 Chemistry
 Mathematics
 Mathematics–Economics
 Medical Chemistry
 Molecular Biology
 Nanotechnology

Degrees

8	PhD
7	
6	<i>cand.scient.</i>
5	
4	Bachelor
3	
2	
1	
	Years



Doctorates and PhDs awarded in 2003



Faculty of Humanities Dr.phil. degrees

Lektor, cand.mag. Anders Bøgh: *Sejren i kvindens hånd. Kampen om magten i Norden 1365-89.*

Lektor, ph.d. Steen Brock: *Niels Bohr's Philosophy of Quantum Physics in the Light of the Helmholtzian Tradition of Theoretical Physics.*

Lektor, lic.phil. Karsten Hvidtfeldt Nielsen: *Interpreting Spinoza's Arguments Toward a Formal Theory of Consistent Language Scepticism. Imitating Ethica.*

Lektor, ph.d. Carsten Porskrog Nielsen: *Rentegods og hovedgårdsdrift. Godsstrukturer og godssøkonomi i hertugdømmet Slesvig 1524-1770.*

Lektor, cand.mag. Stig Thøgersen: *A County of Culture: Twentieth-Century China Seen from the Village Schools of Zouping, Shandong.*

PhD degrees

Charlotte Boje Hilligsø Andersen: *Middelalderens militære aristokrati. Belyst ved en analyse af genstandsmateriale fra udvalgte danske borge og voldsteder.*

Anne-Sofie Dideriksen: *Das Erzählen von Geschichte(n) in der deutschen Prosa der 90er Jahre.*

Nanette Louise Hale: *Time-Space in the English Indian Novel. A Study of Chronotopicity in the Works of Paul Scott and Salman Rushdie.*

Jesper Hede: *Dante's Divina Commedia and the Problem of Its Thematic Coherence.*

Anders Damgren Højen: *Second-language Speech Perception and Production in Adult Learners before and after Short-term Immersion.*

Mads Holst Jensen: *Public Enemy or Vanguard of the Revolution? The Social Construction of the Chinese Liurang (Hooligan).*

Ulla Angkjær Jørgensen: *Den performende beskuer. Kunstanalyse med krop og køn.*

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Anne Trine Larsen: *En slags mandinder. En analyse af køn og arbejde i Danmark 1950-1989.*

Kristine Kjærsgaard Nielsen Midtgaard: *Småstatens offensive magt- og sikkerhedsstrategi. En analyse af FN-politikens status og rolle i dansk sikkerhedspolitik 1949-65.*

Ejnar Martin Mikkelsen: *Bebyggelsen i bronzealder og tidlig ældre jernalder i Østthly.*

Henrik Skov Nielsen: *Tertium datur – om litteraturen eller det ikke-værende.*

Lis Norup: *Udtrykkets furie. Dekadencens kunst og kultur.*

Anne Marie Olesen: *Erkendelse, praksis og verden. Et metafysisk opgør og dets implikationer for sandhedsbegrebet.*

Merete Bøge Pedersen: *Prostitution og Grundloven. Regulering af og debat om prostitution i Danmark i perioden ca. 1860-1906.*

Kim Su Rasmussen: *Maurice Blanchot. Fra nationalisme til neutralitet.*

Kjetil Sandvik: *Devising Multimedia. Teater som analyse- og designredskab for interaktive multimediefortællinger.*



Faculty of Health Sciences Dr.med. degrees

Medical Science

Overlæge Jeppe Hagstrup Christensen: *n-3 fatty acids and the risk of sudden cardiac death: Emphasis on heart rate variability.*

Adjunkt Kimmo Jensen, ph.d.: *Short-term plasticity at GABA-synapses in the central nervous system. A patch-clamp study of rodent neurons.*

Tan Jinquan, MD, ph.d.: *Human lymphocyte motility. A quantitative examination of lymphocyte chemotaxis and adhesion, and its regulation.*

Cand.med. Won Yong Kim, ph.d.: *Non-invasive estimation of left ventricular chamber size and volumetric flow by three-dimensional echocardiography.*

1. reservelæge Torben Møller-Pedersen, ph.d.: *On the structural origin of refractive instability and corneal haze after excimer laser keratectomy for myopia.*

1. reservelæge Jan Maxwell Nørgaard, ph.d.: *Cell biology of chemotherapy resistance in acute myeloid leukaemia.*

Lektor, Cand.scient, ph.d. Søren Paludan: *Virus-cell interactions between herpes simplex virus and leukocytes: Molecular mechanisms and impact on antiviral defense.*



Cand.polyt. Jesper Skovhus Thomsen, ph.d.: *Static histomorphometry and bone strength of the human spine and iliac crest – relation to age and sex.*

Cand.med. Peter Vestergaard, ph.d.: *Fracture risk secondary to disease.*

Overlæge Lotte Ørskov: *Aspects of hormonal regulation of glucose metabolism in healthy and type 1 diabetic subjects.*

PhD degrees

Odontology

Cand.polyt. Paolo Maria Cattaneo: *Orthodontic aspects of bone mechanics and bone remodeling.*

Cand.odont. Nestor Rodrigo Lopez Fernandez: *Periodontitis in adolescents. Studies among Chilean high school students.*

Nursing

Cand.cur. Susan Maybritt Rydahl Hansen: *Hospitalsindlagte patienters oplevede lidelser – i livet med uheldbrelig kræft.*

Medical Science

Cand.scient. Lars Dyrskjot Andersen: *Classification of bladder cancer by microarray expression profiling – towards a general clinical use of microarrays in cancer diagnostics*

Cand.med. Inge Scheel Andersen: *The extrinsic neural control of ano-rectal motility in the Göttingen Minipig.*

Cand.med. Isil Pinar Bor: *Microdeletions on the Y chromosome.*

Cand.med. Marius Berndt Carstensen: *Postprandial lipaemia and endothelial function in type 2 diabetic subjects. A comparison in type 2 diabetic male subjects with and without verified myocardial infarction.*

Qing Chai, MD: *The role of TGF- β 1 in ESRD in vivo.*

Cand.scient. Jane Hvarregaard Christensen: *Molecular cell pathology of autosomal dominant familial neurohypophyseal diabetes insipidus.*

Cand.scient. Johannes Dalgaard Clausen: *Mutational analysis of Ca²⁺ – and nucleotide-binding, catalytic function, and intramolecular communication of sarcoplasmic reticulum Ca²⁺ – ATPase.*

Cand.med. Asger Lau Dalmose: *The urine storage and voiding function modulated by electrical stimulation.*

Cand.med. Søren Rasmussen Deutch: *Elbow joint dislocation. An experimental study of joint pathokinematics.*

Cand.med. Christian Born Djurhuus: *Aspects of acute glucocorticosteroid and growth hormone actions in the regulation of human lipid metabolism.*

Cand.med. Liselotte M. Sabroe Ebbesen: *Hyperhomocysteinemia due to folate deficiency. Impact on haemostasis and vascular biology.*

Cand.med. Henrik Eckardt: *Growth factor enhancement of bone formation*

Cand.med. Christian Emil Faber: *Flextube reflectometry – a new method for determination of sites of upper airway narrowing during sleep.*

Cand.scient. Casper Møller Frederiksen: *Classification of Colorectal Cancer using microarrays.*

Christiaan M. Fulton, B.Sc.: *Sodium dependent bicarbonate cotransport (NBC). Characterization in rat kidney and testes and development of an electroneutral NBC knockout mouse.*

Cand.scient. Christian Gottrup: *Development of instance-based methods to predict tissue outcome in acute ischemic stroke based on specific patterns in MRI.*

Teodor P. Grantcharov, MD: *Virtual reality computer simulation- a valid method for assessment of technical skills in laparoscopic surgery.*

Cand.scient. Bettina Laborne Dencker Hansen: *Evaluation of strategies to ensure high concentrations of IL-2 locally in tumor tissue by retroviral gene transfer to tumor and tumor localizing cells.*

Cand.med. Karina Bækby Houborg: *Postoperative rehabilitation of elderly patients by physical training.*

Cand.med. Gitte M. Hvistendahl: *Pathophysiological aspects of nocturnal polyuria in healthy elderly volunteers: An explorative study of the pharmacokinetics and the effects of dDAVP on renal water and salt excretion.*

Cand.med. Thomas Bo Jensen: *Stimulation and substitution of bone allograft around noncemented implants.*

Cand.med. Steen Lund Jensen: *Elbow joint laxity after experimental excision of the radial head. The influence of associated collateral ligament injuries and the efficacy of radial head prosthetic replacement and ligament repair.*

Cand.med. Anni Ravnsbæk Jensen: *A Comparative Population Based Study on Breast Cancer Patients in Denmark and Sweden – Aspects of Early Diagnosis, Axillary Surgery and Registration.*

Cand.med. Elise Snitker Jensen: *Seasonal variation of meningococcal disease and factors associated with its outcome.*

Cand.scient. Mads Toustrup Jensen: *Structure-function relationship of the A-M3 sector of Na⁺, K⁺-ATPase studied by site-directed mutagenesis.*

Cand.scient. Claus Johansen: *In vitro and in vivo regulation of the transcription factors AP-1 and NF- κ B by 1 α ,25-dihydroxyvitamin D₃ and Calcipotriol.*

Cand.scient. Malene Munk Jørgensen: *An important factor in the protein quality control of the low density lipoprotein receptor.*

Cand.med. Anne Kaltoft: *Myocardial Perfusion Following Primary PCI for Acute Myocardial Infarction – Assessment with ^{99m}Tc-Sestamibi SPECT.*

Cand.med. Margit Staum Kaltoft: *Streptococcus pneumoniae in childhood.*

Cand.med., Marianne Knap, *Radical Cystectomy in Bladder Cancer. Indication, Prognosis and Morbidity. Analysis of a consecutive cohort of patients treated at Aarhus University Hospital 1992-98.*

Cand.med. Søren Kold: *Surgical technique's influence on femoral fracture risk and implant fixation. Compaction versus conventional bone removing techniques.*



Cand.med. Lene Kristensen: *Atrial fibrillation in patients with sick sinus syndrome. Clinical and electrocardiographic predictors of atrial fibrillation after pacemaker implantation.*

Cand.med. Trine Hyrup Mogensen: *Molecular mechanisms of NF- κ B activation during viral infections.*

Cand.scient Tina Mygind: *Chlamydia pneumoniae: PCR detection and cell-mediated immune response to infection.*

Cand.med. Dorthe Svenstrup Møller: *The accuracy of home blood pressure measurement in the diagnosis and monitoring of hypertension and hypertensive mechanisms in obstructive sleep apnea.*

Cand.med. Lene Svendstrup Nielsen: *Udbyttet af en dyspnøklinik for primærsektoren.*

Cand.med. Carsten Obel: *Epidemiological studies of stress during pregnancy and fetal brain development.*

Zhiwei Pan, MD: *Health effects of indoor air pollution: Experimental studies of biological mechanism and measuring methods for objective and subjective effects on the eyes and nose.*

Cand.med. Bodil Ginnerup Pedersen: *CT Colonography, a Danish Perspective.*

Cand.scient. Anette Høj Petersen: *Characterization of single-nucleotide polymorphisms (SNPs) and application in hybridization-based technologies for genotyping.*

Cand.med. Jens Aage Kølsen Petersen: *The Effect of Hypertonicity on Immune Function.*

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Cand.med. Susanne Wulff Svendsen: *Shoulder disorders and postural load factors.*

Cand.med. Jette Sønderkov: *Occupational styrene exposure and haematological diseases. A nested case-control study in the Danish reinforced plastics industry.*

Cand.scient. Helle Erbs Toldbod: *Studies on dendritic cell based vaccination in a murine model of malignant melanoma.*

Cand.med. Kristian Valbak: *Suitability for psychoanalytic psychotherapy.*

Stud. med. Mikala Wang: *The immunomodulatory actions of CTB and its use as an adjuvant for antigen-specific oral tolerance induction in autoimmune diabetes.*

Cand.scient. Majken Westergaard: *Transcriptional circuits in normal and diseased skin.*

Sheng Ping Wu, MD: *In vivo measurements of wall shear stresses in human arteries by MR phase velocity mapping.*

Xiuqing Zhang, M.Sc: *Towards an understanding of the pathogenic mechanisms in chromosome deletion syndromes.*

Cand.med. Niels Kristian Aagaard: *Muscle strength, muscle mass and contents of muscle magnesium, potassium and NaK-pumps in chronic alcoholics with and without alcoholic liver disease – Effects of magnesium supplementation – Relation to spironolactone treatment.*



Faculty of Social Sciences Dr.jur. degree

Lars Hedegaard Kristensen: *Studier i erhvervsfinansieringsret.*

PhD degrees

Mette Hastrup Andersen: *Skatteretlig genoptagelse i forvaltningsretlig belysning – med særlig henblik på en analyse af genoptagelse af skatteansættelsen.*

Carter Walter Bloch: *Aspects of Economic Policy in Emerging Markets.*

Ullan Böwadt: *En undersøgelse og diskussion af foreliggende empiri fra forskning i tilsyneladende parapsykologiske fænomener samt diskussioner af udvalgte teoretiske forklaringer.*

Per Bredholt Christensen: *Anerkendelse af stater – en undersøgelse af anerkendelsesaktens betydning for den retlige statstilblivelse med særligt henblik på nyere statspraksis.*

Annette Kjær Fuglsang: *The relationship between Acute Stress Disorder and Posttraumatic Stress Disorder in traffic accident victims.*

Bernhard Hansen: *Party Activism in Denmark. A Micro Level Approach to a Cross-sectional Analysis of the Correlates of Party Activism.*



Kristine Marie Jensen: *Baskets and Body-Parts: A Cross-cultural and Cross-linguistic investigation of Children's Development of Spatical Cognition and Language.*

Mette Kold Jensen: *Døden er ikke en fiasko her i livet.*

Allan Jones: *Investigation of the interactive effects of gender and anxiety on pain response using noxious thermal stimulation.*

Birgitte Jørgensen: *Retsvirkninger af omstødelse.*

Michael Knie-Andersen: *Customer Relationship Management in the Financial Sector.*

Peter Myhre Lildholdt: *Essays on Seasonality, Long Memory, and Volatility.*

Louise Vadheim Mortensen: *Ytringsfrihedens usikre grænser – en retssammenlignende undersøgelse af aktuelle ytringsfrihedsproblemer med særlig henblik på ærekrænkelse af offentlige personer.*

Monica Stougaard Nielsen: *Medierende strategier hos para- og tetraplegikere.*

Morten Ørregaard Nielsen: *Multivariate Fractional Integration and Cointegration.*

Thomas Olesen: *Long Distance Zapatismo. Globalization and the Construction of Solidarity.*

Morten Overgaard: *Theoretical and Empirical Studies of consciousness.*

Asbjørn Skjæveland: *A Government Formation in Denmark 1953-1998.*

Dorthe Kirkegaard Thomsen: *Studies on the associations between rumination, negative affect and health-related measures.*

Kristian Høyer Toft: *International Justice and Justificatory Models.*



Faculty of Theology Dr.theol. degrees

Lektor Per Ingesman: *Provisioner og processer. Den romerske Rota og dens behandling af danske sager i middelalderen.*

Lektor, cand.mag. Jeppe Sinding Jensen: *The Study of Religion in a New Key. Theoretical and philosophical soundings in the comparative and general study of religion.*

PhD degrees

Cand.mag. Lisbeth Bredholt Christensen: *Person and Religion. An Analysis of Aelius Aristides' Hieroi Logoi.*

Cand.theol. Erik Kelstrup: *Sandhedsbegrebet hos N.F.S. Grundtvig kritiseret ud fra sandhedsteorier i det 20'ende århundredes analytiske og hermeneutiske filosofi.*

Cand.theol. Carl Lomholt: *Din Fattiges Ret. En rets-teologisk undersøgelse af Pagtsbogen, Ex. 20,22-23,33 som udtryk for retsopfattelsen i Israels tidlige historie.*

Cand.theol. Hans Vium Mikkelsen: *Reconciled Humanity. A constructive Reading of Revelation and Atonement in Karl Barth's Church Dogmatics.*

Cand.theol. Jesper Tang Nielsen: *Korsets kognitive dimension. En studie i Johannesevangeliets forståelse af Jesu død.*

Cand.mag. Marianne Schleicher: *A Theology of Redemption.*



Faculty of Science Dr.scient. degrees

Ph.d. Michael M. Hansen: *Application of Molecular Markers in Population and Conservation Genetics, with special Emphasis on Fishes.*

Ph.d. Martin Holmstrup: *Strategies for cold and drought tolerance in permeable spil invertebrates.*

Ph.d. Lars Bojer Madsen: *Triply Excited States. Correlations in lithium and lithiumlike ions.*

PhD degrees

Mathematics

Thomas Johann Britz: *Relations, Matroids and Codes.*

Rune Eliassen: *KK-theory of amalgamated free products of C-algebras.*

Per Jensen: *Frobenius and complexes.*

Morten Skarsholm Risager: *Automorphic forms and modular symbols.*

Berit Naomi Skjærnaa: *Counting Points on Elliptic Curves over Finite Fields of Characteristic 2.*

Physics

Brian Julsgaard: *Entanglement and Quantum Interactions with Macroscopic Gas Samples.*

Barbara Angelika Kühnle: *Molecular self-assembly and chiral recognition: Biologically relevant molecules on metal surfaces.*

Thomas Risgaard Laustsen: *ENTANGLEMENT The Essence of Quantum Mechanics.*

Jorge M De Brito Almeida Sampaio: *Weak interaction processes in nuclei for core-collapse supernovae.*

Klaus Seiersen: *Electron Scattering on Positive and Negative Ions Studied in Heavy-Ion Storage Rings.*

Nikolaj Rothe Zangenberg: *Defect and diffusion studies in Si and SiGe.*

Anvendt Fysik

Anders Rønau: *A Closer Look at the TiO₂(110) Surface with STM.*

Chemistry

Peter Blakskjær: *Modification of Small Peptides Selective Side Chain Introduction onto Small Peptides and Synthesis of Peptide Mimetics via Intermolecular Radical Addition.*

Aase Sejr Gothelf: *Studies on the Synthesis and Reactivity of Chiral Metal Complexes.*

Nis Halland: *Catalytic Asymmetric Michael Reactions.*

Henrik Helligsø Jensen: *Azasugars. Their Synthesis, Glycosidase Inhibitory Activity, and Substituent Constants.*

Lars Poulsen: *Oxygen Diffusion and Oxygen Imaging in Glassy Polymers.*

Brian Schou Rasmussen: *Studies on Molecular Recognition.*

Ditte Riber: *Application of Ketyl- and Acyl-Type Radicals Generated by the One-Electron Reducing Agent. Samarium Diiodide Synthesis of the Hydrindane Ring System via a Diels-Alder Cycloaddition.*

Steen Saaby: *Catalytic Asymmetric Reactions of Imines – An Approach to Optically Active Nonproteinogenic alpha-Amino Acids.*

Molecular Biology

Trine Elkjær Larsen Crovato: *Posttranscriptional regulation of the glutamate receptor subunit 2.*

Charlotte Georgi Jakobsen: *Establishment of human and murine IgE and IgG combinatorial phage libraries & Vaccination for birch pollen allergy – comparison of the affinities of specific IgE, IgG1 and IgG4.*

Kim Bak Jensen: *Identification of Keratinocyte Specific Markers Using Phage Display Functional improvement of phage display derived antibodies.*

Mads Breum Larsen: *Function and regulation of the human serotonin transporter.*

Louise Vagner Laursen: *Characterization of the RecQ Helicase, Rqh1, and Topoisomerase III in Schizosaccharomyces pombe.*

Hanne Poulsen: *Studies on ADAR Interactions.*

Viktor Stepanov: *Preparation of tRNAs and tRNA-mimicking RNAs for X-ray diffraction studies.*

Karina Dalsgaard Sørensen: *Transcription control and pathogenic properties of murine leukemia viruses of the Akv Family.*

Lars Aagaard: *Interactions between Endogenous Retroviruses and Exogenous Murine Leukemia Virus.*

Computer Science

Mario Jose Caccamo: *A Formal Calculus for Categories.*

Federico Crazzolaro: *Language, Semantics, and Methods for Security Protocols.*

Christian Heide Damm: *Collaborative Software Development.*

Serge Oliver Fehr: *Secure Multi-Player Protocols: Fundamentals, Generality, and Efficiency.*

Thomas Mailund Jensen: *Sweeping the State Space.*

Mads Johan Jurik: *Extensions to the Paillier Cryptosystem with Applications to Cryptological Protocols.*

Maciej Andrzej Koprowski: *Cryptographic Protocols Based on Root Extracting.*

Giuseppe Milicia: *Applying Formal Methods to Programming Language Design and Implementation.*

Jesper Buus Nielsen: *On Protocol Security in the Cryptographic Model.*

Paulo Borges Oliva: *Proof Mining in Subsystems of Analysis.*

Marianne Graves Petersen: *Design for Learning in Use of Everyday Artefacts.*

Frank Darwin Valencia Posso: *Temporal Concurrent Constraint Programming.*

Claus Brabrand Rasmussen: *Domain Specific Languages for Interactive Web Services.*

Daniele Varacca: *Probability, Nondeterminism and Concurrency: Two Denotational Models for Probabilistic Computation.*

Mikkel Nygaard Ravn: *Domain Theory for Concurrency.*

Jiri Srba: *Decidability and Complexity Issues for Infinite-State Processes.*

Michael Svanholm Thomsen: *Malleable Software Development .*

Rasmus Kjær Ursem: *Models of Evolutionary Algorithms and Their Applications in System Identification and Control Optimization.*

Statistics and Mathematical Economics

Morten Riis: *Classical and Non-Classical Stochastic Recourse Programs with Applications in Telecommunications.*

Astronomy

Hans Bruntt: *Studies of Stellar Clusters: Steps Towards Asteroseismology & A Search for Giant Planets.*

History of Science and Technology

Terese Marianne Olga Nielsen: *Arguments for Realism in Mathematics: From Gödel to Indispensability.*

Biology

Susanne Lildal Amsinck: *Development and application of zooplankton-based paleoecological methods with special focus on Danish brackish lakes.*

Johnnie Bremholm Andersen: *Cardio-respiratory responses to reduced oxygen and increased metabolism in amphibians.*

Lars Arve Bach: *Individual-based models applied to spatial effects in evolutionary systems.*

Jens Bagger: *Ecology and ecophysiology of isotids.*

Somchai Bussarawit: *The Oyster Fauna of Thailand.*

Jonathan David Carl: *Assessment of habitat quality for juvenile flounder (*Platichthys flesus* L.).*

Yoko Luise Hayashi Dupont: *Ecology, evolution and conservation of plant-pollinator interactions on islands*

Mette Hesselholt Henne Hansen: *Manipulation and tolerance strategies in relation to host life history in a mosquito – microsporidia system.*

Mette Kirkegaard: *Regeneration of hair cells in the vestibular organs of mammals.*

Bjarne Knudsen: *Molecular Evolution and Biological Sequence Analysis.*

Ralf Michael Leimbeck: *Ecology and Diversity of Neotropical Araceae.*

Lone Liboriussen: *Production, regulation and ecophysiology of periphyton in shallow freshwater lakes.*

Marie Maar: *Distributions of zooplankton in relation to biological-physical factors.*

Rikke Louise Meyer: *Development and use of microscale biosensors for organic and inorganic ions Applications in microbial ecology.*

Mette Haubjerg Nicolaisen: *Implementation of Molecular Methods to Study Ammonia Oxidizing Bacteria in Complex Systems.*

Jesper Givskov Sørensen: *Physiological and evolutionary adaptation to environmental extremes in *Drosophila*: with particular emphasis on thermal stress and the role of Hsp70.*

Pernille Thorbek: *Spatio-temporal population dynamics of agrobiont linyphiid spiders.*

Peter Langborg Wejse: *Purification and characterisation of endo-beta-1,4-D-xylanases from a novel halophilic bacterium.*

Annemette Vestergaard Witt: *Light acclimation in freshwater macrophytes – with emphasis on photoinhibition..*

Geology

Anders Vest Christiansen: *Application of airborne TEM methods in Denmark and layered 2D inversion of resistivity data.*

Mads Andreas Faurshou Knudsen: *Palaeomagnetic investigations of 0-3 Ma volcanics from the Cape Verde archipelago, and modelling of magnetic distortion in rocks.*

Kasper Leth Lundgaard: *Magma chamber processes studied in two layered intrusions.*

Lone Ahlmann Mossin: *Dynamic processes in pedogeneses studied from soil and soil water analyses: 1. Podzolization processes in acidified soils under heather and spruce, Hjelms Hede, Denmark. 2. Transformation of ferrihydrite in the laboratory and in iron rich sediments in a mesic temperature regime, Salten Skov, Denmark.*

Tom Pfeiffer: *Two Catastrophic Volcanic Eruptions in the Mediterranean – Santorini 1645 B.C. and Vesuvius 79 A.D.*

Frank Rytter: *Modern foraminiferal assemblages and their application in palaeoceanographical reconstructions on the north Icelandic shelf and slope.*



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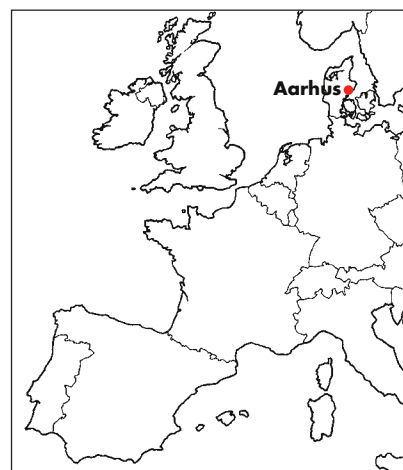
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Next to the Main Hall is the Solgård courtyard with its characteristic brick arches. The two-storeyed Museum of Ancient Art is located behind the wall, below the courtyard.



Illustrations:

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 Das Geheimarchiv des Vatikan, Belser Verlag, 1992: pp. 28 bottom, 29
 Mads Aarup-Jørgensen: p. 15 top right

The activities of the University of Aarhus in 2003 are described in the following publications: *The University of Aarhus 2003*, and *Facts and figures 2003*.

Printed publications are available upon request from the External Relations Office.

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