



TOGETHER WE CREATE
**KNOWLEDGE FOR
THE WORLD**

EDUCATION, RESEARCH AND
COOPERATION AT AAU

2023



AALBORG
UNIVERSITY



MUCH MORE THAN RESEARCH AND EDUCATION

Seeing a university as an institution that only conducts research and education today is too narrow and unambitious a view. As a university, it is our job to help create progress whilst solving society's major challenges.

Collaboration is one of our most important competencies in a complex, globalised and increasingly digital world. When we address significant challenges—be it climate, clean drinking water, gender equality, sustainable development, etc.—acting alone as a single institution or within a specific subject area is not enough.

Universities. Business. Government. Population. All actors in our society must work together and draw on knowledge from the humanities and natural, health and social sciences.

Only in this way can we complete the missions the world needs us to set in motion.

At Aalborg University, we embrace all disciplines and value collaboration inside and outside our buildings, creating much more than research and education. We forge solutions, progress and development for all societies and the entire world.

Welcome to Aalborg University.

Per Michael Johansen
Rector, AAU

INTERVIEW

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THOMAS
BJØRNHOLM

WORLD- CLASS KNOWLEDGE MEANS INFLUENCE

Knowledge equals influence. Suppose Denmark wants to play a significant role in the world. In that case, Danish universities must be in the global knowledge society's upper echelon, says Thomas Bjørnholm, CSO of VILLUM FONDEN, one of Denmark's largest private foundations.

- This position is not easy to achieve or maintain because we can never be sure what knowledge is needed in 10 years. Therefore, it's important to do broad research and, at the same time, ensure relationships are forged and knowledge is shared with the best researchers worldwide.

- In this regard, Aalborg University has much to be proud about. An excellent example is Frede Blaabjerg, who researches power electronics in areas including wind turbines and received the prestigious international Global Energy Prize in 2019. His research has been crucial to wind turbine industry development and brilliantly demonstrates how curiosity and the quest for new knowledge can help transform the world.

- Wind turbines also testify to the importance of world-class research. Products based on a high degree of knowledge are a major factor in the success of Danish companies in the global market. And when people in the rest of the world use

products or technologies developed in Denmark, new knowledge generates benefits far beyond the country's borders.

BLUE BOOK - THOMAS BJØRNHOLM

- MSc in Chemistry and Physics
- Professor, PhD in Materials Chemistry
- Presiding member of the Danish Academy of Technical Sciences
- CSO, VILLUM FONDEN

"IT'S IMPORTANT TO DO RESEARCH ACROSS A BROAD FRONT AND CONTINUALLY SHARE KNOWLEDGE WITH THE BEST RESEARCHERS IN THE WORLD. IN THIS REGARD, AAU HAS MUCH TO BE PROUD OF."

AAU INVESTS IN RESEARCH TALENTS

For many years, AAU has strategically focused on supporting promising young researchers. Since 2016, we have selected 27 research talents and have had them receive financial support to mature their research ideas, build CVs, create networks and develop their competencies as research leaders. Many subsequently participate in a mentoring program, where they share, amongst other things, knowledge about career-enhancing grants to new research talents.

FUTURE BATTERIES ARE MADE FROM MOULD

At Aalborg University, Esbjerg, Jens Muff and Jens Laurids Sørensen have triggered a power storage revolution. They are the first researchers in the world to build a sustainable battery out of biological material derived from mould.

Conventional battery production leaves a large carbon footprint. With biological batteries, laboratories can cultivate active fungi in sugar water rather than oil industry residuals or metals such as lithium, thus lowering carbon output significantly.

Additionally, biological battery disposal doesn't harm the environment. The battery liquid simply passes through a sewage treatment plant and burns the solid natural material.

The research is based on a DKK 15 million grant from the NOVO Nordisk Foundation to develop the battery and the entire concept further. So far, the researchers have produced a prototype. However, the long-term goal is to create a large battery capable of storing power from wind turbines and photovoltaic systems and releasing it into the electricity grid.



SENHJERNESKADECENTER NORD

AAU ROBOTS HELP PEOPLE WITH ACQUIRED BRAIN INJURY

Together with Aalborg University students and researchers, the Centre for Acquired Brain injury is easing everyday life for people with delayed brain injury resulting from a blot clot, traffic accident or tumour. Delayed brain injury can pose many everyday challenges, but with specially designed robots, sufferers can regain some control over their lives.

The advanced robots are personal in that a brain-damaged person is a co-designer of a robot to suit their requirements. The project's researchers, Antonia Krummheuer, Matthias Rehm and Kasper Rodil, have involved citizens throughout the entire process, from identifying needs over design and production to programming individual robots. The development of tailor-made aids combines insights from humanities with specially developed technical solutions.

AAU ANTENNA PLAYS AN IMPORTANT ROLE IN THE 5G NETWORK

Professor Gert Frølund has studied wireless signals since mobile phones were less common and far more expensive. Through many years of research at Aalborg University, he has incorporated his research results and innovative ideas into day-to-day products.

Gert Frølund is the father of built-in mobile phone antennas. These antennas have led to better design freedom and greater mobile phone communication. He also developed a method to measure mobile antenna efficiency with his Aalborg University colleagues. Today, this method is used as a standard test worldwide.

The small, tightly packed antennas are important to our 5G system in the mobile phones and base stations. 5G network's base stations consist of hundreds of small antennas, which ensure higher transfer rates, lower energy consumption and wider coverage



MISSIONS TO TACKLE THE WORLD'S BIGGEST CHALLENGES

When Neil Armstrong became the first human to step foot on the moon in 1969, it was the result of perhaps the world's largest and most complex research project. This project involved so many issues and actors, including public authorities, universities and private companies, that it far exceeded the definition of a project. Instead, we must characterise it as a mission, and that mission was to put man on the moon.

Today, the world faces several challenges larger than the moon landing: climate change, refugee flows, and looming food shortages.

We have to approach these challenges as missions like NASA did in the 1960s. The mission is to stop climate change. The mission is to ensure clean drinking water for all. The mission is to create a sustainable construction sector.

At Aalborg University, we decided to be a mission-driven university. We want to contribute to solving the major challenges through close collaborative efforts with knowledge institutions, authorities and, not least, the business community.

Through our missions, we will work across sectors, institutions and disciplines to create sustainable solutions and a better world.

AAU FACTS AND FIGURES



AAU has faculties that cover
all five main areas:

- Faculty of Engineering for IT and Design
- Faculty of Engineering and Science
- Faculty of Humanities and Social Sciences
- Faculty of Health and Medical Sciences

AAU has a total of
19.650 students:

- 16.600 in Aalborg
- 2.600 in København
- 450 in Esbjerg

AAU's interdisciplinary unit, **AAU Innovation**, aims to strengthen entrepreneurship and innovation and promote the university's knowledge collaboration with the outside world.

AAU has a total of
3,660 full-time employees:

- 2.330 faculty members
- 1.330 technical and administrative staff

AAU educates **annually:**

- 3.000 bachelors
- 3.400 candidates
- 220 PhDs

About 38 per cent of all master's theses at AAU are carried out in collaboration with external partners. On average, 61 per cent of AAU's graduates find employment in the private sector.

AAU annually enters between 500 and 600 cooperation agreements with public and private actors. **DI studies designate AAU as the Danish university best at collaborating with the business community.**

Approximately 15 per cent of the research at AAU is green research. **This is the second-highest proportion among the eight Danish universities.** AAU contributes mainly to sustainable energy and transport.

The Times Higher Education ranks AAU no. 219 on its 2019 worldwide list of universities. **Amongst younger universities (less than 50 years old), AAU is the best in Scandinavia.**

STEFFEN
LAUSTSEN

GRADUATES FROM AAU ENSURE HIGH QUALITY

For an international company such as the wind turbine manufacturer Siemens Gamesa, which boasts a 5,800-strong Danish workforce, independent-thinking and highly professional employees is a must. As head of the company's development department for new technology for blade design in Aalborg, Steffen Laustsen ensures a close relationship with Aalborg University. Among AAU's graduates, he knows that he can recruit the employees he needs.

- We see Aalborg University as a strategic partner in recruiting talent for our organisation. The AAU graduates are exceptionally professional; from day one on the job, they can put their knowledge into practice. These properties help ensure the high quality necessary in the tasks we solve in the technical development organisation, says Steffen Laustsen.

- AAU graduates can think independently and self-critically. In an organisation of our size, there are many projects and tasks in progress all the time. Therefore, our employees must identify which of the many problems require solutions. The AAU graduates are good at this.



BLUE BOOK - STEFFEN LAUSTSEN

- Graduate in Mechanical Engineering fra AAU in 2010.
- PhD in Mechanical Engineering 2014.
- Head of Siemens Gamesa's development department since 2016

Today responsible for the department responsible for the introduction of new technologies for blade designs. A large part of the department, together with Siemens Gamesa's production facilities, is located in Aalborg, which also manufactures the latest wind turbine blades. The 115-metre-long blades for a new offshore wind turbine at Østerild Test Centre.



THE AALBORG MODEL

PREPARES STUDENTS FOR WORKING LIFE

Aalborg University is unlike any other university. AAU stands out with its internationally recognised, unique model of problem-based learning combined with extensive external collaboration. The Aalborg Model is universal for all university departments and emphasises cooperation and practical project work.

The Aalborg Model prepares university students for tomorrow's labour market, making them independent and equipping them with the necessary skills to work effectively in teams. They are analytical and theoretical but, at the same time, practice and solution-oriented. These skills are in high demand throughout the business community.

The Aalborg Model offers students many opportunities to work with external partners on solving problems within a given field. These opportunities take place in solution camps or through project

exchanges. The former allows young people to help businesses or the public sector solve specific problems, whilst the latter connects private or public actors with students who are writing projects.

The outward-facing educational focus means that many AAU Master's theses are prepared in collaboration with a company or organisation and address real-world problems. AAU graduates are experienced in solving actual problems within any given field before entering the labour market.



PATIENT CONTACT SYLLBUS CREATES UNIQUE PHYSICIANS

Patient contact is an integral part of the medical programme at Aalborg University and allows students to put into practice what they learn in the classroom. The final exam, which one co-examiner called "the best in Denmark", is a consultation with an actual patient.

The Master's degree programme involves students taking four semesters in one of the region's hospitals or general practices. Their schedule replaces lectures with morning and afternoon conferences, outpatient clinics, ward attendance, and general operations. Students also work in the evenings and on weekends to become familiar with what doctors deal with outside regular working hours.

The students spend 72 weeks at various medical departments during their Master's studies. Compared to the rest of the country, Aalborg University's medical programme offers the most practical clinical experience.

STUDENT COLLABORATION CREATES DEVELOPMENT IN COMPANIES



During their studies, AAU's students contribute to creating development and innovation in organisations and the business community. For example, in the business administration program, students in the 5th semester are tasked with analysing a specific company based on the academic tools learned during their studies, including accounting analysis, market mapping, business models, etc.

Students collaborate with companies to identify challenges they're addressing and solving in a problem-oriented project.

The North Jutland coffee producer Bentax has participated in these student projects several times. The company is so excited about the collaboration that it has dedicated office workplaces for AAU students:

- We get a lot out of the students' analyses. They come with the latest knowledge and, at the same time, think differently than us who work in the company daily. Therefore, they can challenge us and provide new inspiration for improvements that we might not otherwise implement, says Bentax Director Søren Hansen.

AAU INNOVATE

THE BEST FRAMEWORK FOR THINKING BIG

Apple, Google, Hewlett-Packard and Amazon are today some of the world's largest brands, but even these global success stories had to start somewhere, and that place is a garage.

At Aalborg University, innovative students have the opportunity to emulate some of the world's largest companies. Since October 2022, it has been possible to borrow a so-called garage through AAU INNOVATE, an 8,500 square metre research, innovation and entrepreneurship hub which allows students to work intensively and

develop ideas in collaboration with researchers and companies — local and international.

The startups affiliated with AAU INNOVATE are the companies Fireobs, which develops passive alarm systems for detecting early-stage wildfires, and Join, which facilitates social matchmaking through a digital lobby system.

AAU INNOVATE's garages will be a hotbed for other new research-based companies in the future.



MIKKEL
HAARDER

AT AALBORG UNIVERSITY, INDUSTRY MEETS AN OPEN DOOR

The industry meeting researchers is a source of innovation and product development. Therefore, collaboration with universities is essential for Danish companies, says Mikkel Haarder, Deputy Director for Education, Research and Diversity at the Confederation of Danish Industry (DI):

- About half the products our members sell on the world market are so-called upmarket products that they must constantly develop to remain competitive. Companies mustn't lose their breath in the technological race.

- Collaborating with universities is important to maintaining our position in the world market. The interaction and dialogue between researchers and companies drive innovative processes and develop into business potential.

- At Aalborg University, we experience being met with an open door and a culture that invites collaboration. There is mutual respect, and researchers know that companies do not simply enter research projects to publish scientific articles.

- This is what is expressed when AAU repeatedly places itself at the top of our surveys of which Danish universities are best at accommodating the business community. The companies experience that collaboration is also important for AAU, and there is a common understanding of what the new knowledge should result in.

BLUE BOOK – MIKKEL HAARDER

- Master of Political Science from the University of Copenhagen 1999.
- Ex. Director of the Danish Evaluation Institute- EVA.
- Deputy Director for Education, Research and Diversity at the Confederation of Danish Industry (DI).

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