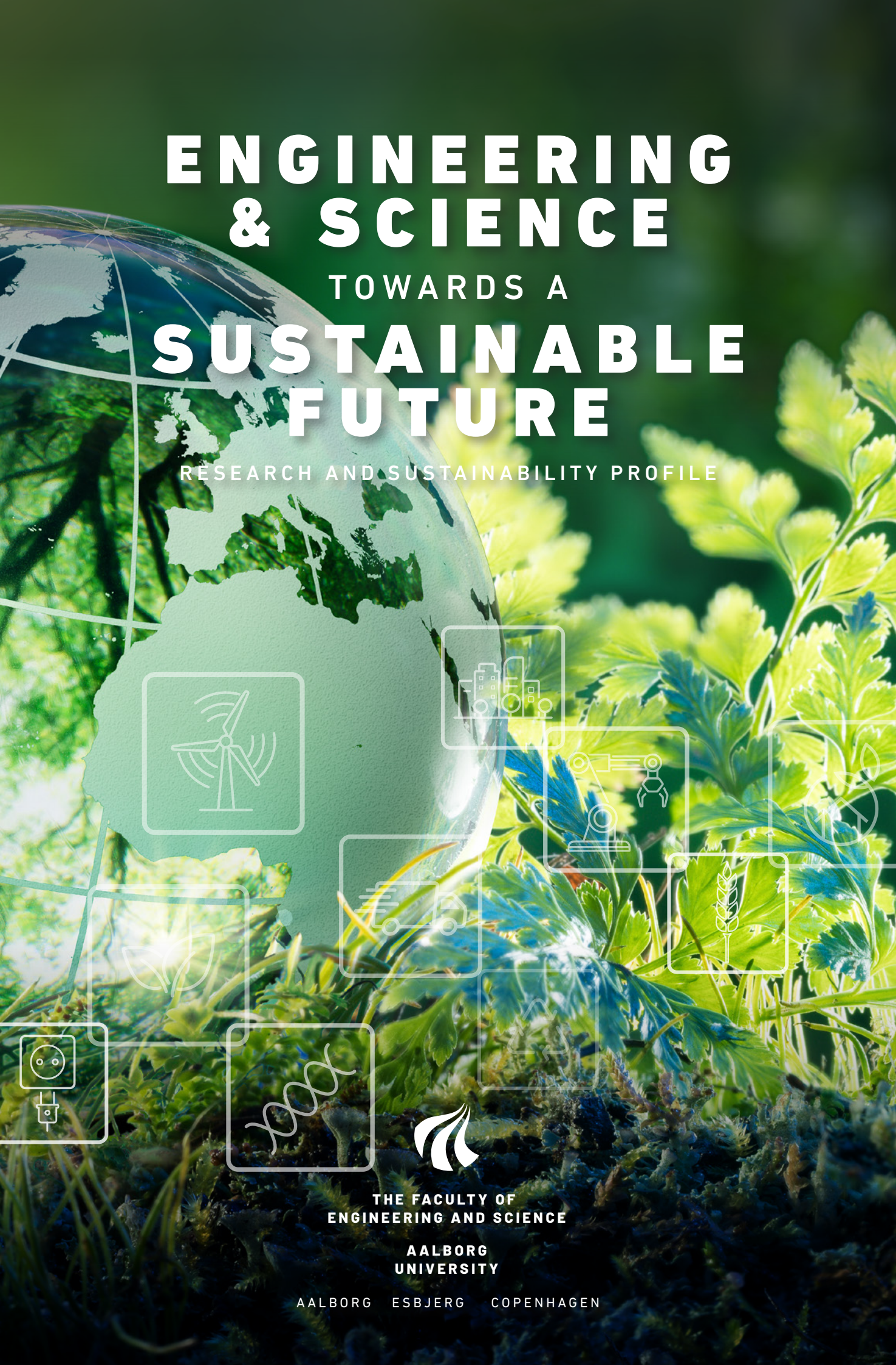
ENGINEERING & SCIENCE

TOWARDS A SUSTAINABLE FUTURE

RESEARCH AND SUSTAINABILITY PROFILE



THE FACULTY OF
ENGINEERING AND SCIENCE

AALBORG
UNIVERSITY

AALBORG ESBJERG COPENHAGEN

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THE FACULTY OF ENGINEERING AND SCIENCE

The Faculty of Engineering and Science addresses global and local societal challenges through research, education, public sector service, and knowledge collaboration.

Our core activities are conducted within the faculty's five departments: the Department of the Built Environment, the Department of Energy Technology, the Department of Chemistry and Bioscience, the Department of Materials and Production, and the Department of Mathematical Sciences.

The departments provide knowledge that contributes to growth, prosperity and welfare and to solving the grand challenges of our society. We continuously seek to break new ground through research across disciplines and in close interaction between the fields of engineering and science.

Through high-level education and our project- and problem-based learning model (PBL model), we train our students for the labour market of the future. Our programme offerings meet society's need for know-how and expertise.

Collaboration is part of the Aalborg University DNA. The Faculty of Engineering and Science collaborates closely with research environments across knowledge institutions internationally, in Denmark and also across Aalborg University. Furthermore, we continuously establish new partnerships with industry, organisations and the public sector.

The Faculty of Engineering and Science is acknowledged internationally for our research within both engineering and science.[1] This is also the case for our engineering programmes, which are ranked among the best in the world.[2]

On a national level Aalborg University is preferred collaboration partner of the Danish Business World.[3]

1) U.S. News & World Report + Times Higher Education Impact ranking
2) MIT Ruth Graham-rapport + Times Higher Education Impact Ranking
3) Report from the Confederation of Danish Industry (2018): Danmark tilbage på vidensporet IV

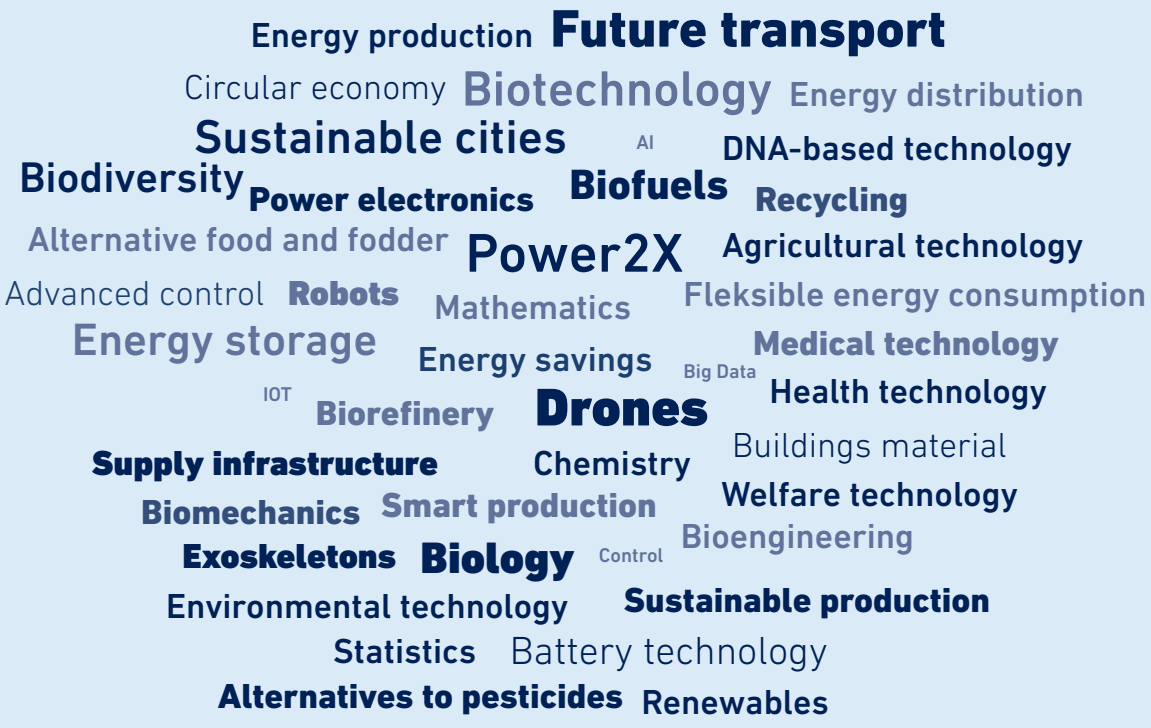
FACULTY RESEARCH AND SUSTAINABILITY PROFILE

At the Faculty of Engineering and Science, we conduct excellent research within the fields of engineering and science. Our research strategy aims to wisely combine our strengths in these two disciplines and as an inherent part of our approach, we integrate digital tools when it enhances the total impact of our research. This way, we strive to deliver valuable knowledge as an important contribution to developing sustainable solutions to society's challenges.

Nine areas of sustainability across the strongholds of the faculty have our specific focus. These areas significantly contribute to the sustainable development of society and address the local, national, and international sustainability agenda (e.g. the Danish Climate Law, the green research strategy of the Danish Government, the EU Horizon Europe Programme, and the UN Sustainable Development Goals).

For more information on our research within the nine sustainability areas, please have a look at the following pages. Visit our website engineering.aau.dk for more cases.

- Energy Production and Distribution
- Flexible and Efficient Energy Consumption
- Future Transport and Mobility
- Sustainable Cities, Buildings, and Components
- Environmental Technology, Nature, and Biodiversity
- Agricultural and Food Technology
- Sustainable Production
- Recycling and Circular Economy
- Medical, Health and Welfare Technology



FACULTY RESEARCH

SUSTAINABLE FOCUS AREAS

- Energy Production and Distribution
- Flexible and Efficient Energy Consumption
- Future Transport and Mobility
- Sustainable Cities, Buildings and Components
- Environmental Technology, Nature and Biodiversity
- Agricultural and Food Technology
- Sustainable Production
- Recycling and Circular Economy
- Medical, Health and Welfare Technology

CONTROL AI IOT BIG DATA

DIGITAL TOOLS

ENERGY PRODUCTION

CONSTRUCTION BIOENGINEERING

ENGINEERING

MATH PHYSICS CHEMISTRY BIOLOGY

SCIENCE

did you know

MORE THAN 40 PERCENT OF THE TOTAL DANISH ELECTRICITY PRODUCTION COMES FROM WIND TURBINES.

ENERGY PRODUCTION AND DISTRIBUTION

A significant expansion of renewable energy, storage, and sectoral integration must be developed to achieve the national carbon dioxide (CO_2) reduction targets. In particular, sectoral integration with Power-to-X requires expansion with sustained electricity and distribution. Developing and ensuring a sustainable and robust electricity system is a future core challenge.

RESEARCH AREAS:

- Renewable energy: wind, sun, waves, tide, geothermic and hybrid plants.
- Robust and reliable power distribution: conversion, storage and connection to heat, gas, and fuel.
- New efficient storage technologies.
- Management of systems with use of advanced control, AI, IoT, big data etc.

7 AFFORDABLE AND CLEAN ENERGY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

EFFICIENT AND RELIABLE INTEGRATION OF RENEWABLES IN THE GRID

The global society is demanding and producing more renewable energy, which is very positive from a sustainable perspective. However, many challenges follow the increase in renewables. One of them is to maintain a high level of stability in the electricity grid when large amounts of renewables are integrated and are all applying power electronic equipment for the interfacing. Another challenge is that, with increased instability, increased costs will occur due to downtime, failures, and maintenance. These costs are to be minimised to reduce the cost of renewable energy further. The research project 'REPEPS' addresses these challenges.

- Our ambition for the project is to create a new and better understanding of what is at stake when we integrate many new power electronic components and systems into the power grid. We aim to create a foundation for developing future power electronic components and systems that are reliable and efficiently use renewable energy without compromising the stability of the grid, says Frede Blaabjerg, professor at the Department of Energy Technology and leader of the research project.

The Villum Foundation supports the project through a Villum Investigator grant to Frede Blaabjerg.

did you know

CLOSE TO 70 PERCENT OF DENMARK'S ELECTRICITY CONSUMPTION IS BASED ON RENEWABLE ENERGY.

FLEXIBLE AND EFFICIENT ENERGY CONSUMPTION

Both the residential and industrial sectors are major energy consumers. Significant efficiencies and energy savings are needed through new materials, components, processes, and control in addition to the need for behaviour and user acceptance. The focus must also be on flexibility via energy storage, demand control etc.

RESEARCH AREAS:

- Energy savings and efficient systems and components in the consumer segment stages, including industry, buildings, and various devices.
- Flexible systems with demand adjusted to production.
- Control and application of digital solutions, such as AI, IoT, and big data.
- Renewable energy production in buildings and the integration of buildings in energy systems.
- Technology use, behaviour and everyday practices.

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

LOW-ENERGY HOUSING WITH INTELLIGENT CONTROL OF ENERGY USE

Housing accounts for a large proportion of the total Danish energy use, which is why stricter requirements for the energy efficiency of homes have been introduced. Through the EUDP project "Bolig 2020", our researchers have contributed to the development of a low-energy detached house that meets both energy requirements and provides a healthy indoor climate. In order to meet energy requirements, the house has its own solar panel system, and the researchers aim to develop solutions that can maximize the interaction between the building and our energy supply, including the use of power from the home's own photovoltaic system.

- Energy use in the home must be even more flexible, intelligent and efficient. Therefore, we need to improve control and automation of the house's energy system so the synergies between energy production, storage and use are utilised to their maximum. For example, the system – and not the consumer – should ensure that heating is turned off in periods with peak use of domestics hot water, that heat is stored in building constructions prior to cloudy periods and that the electric car doesn't charge between 5 pm and 10 pm as long as the car is fully charged the next morning. We must find intelligent solutions to manage this, says Rasmus Lund Jensen, associate professor at the Department of the Built Environment.

did you know

IN 2018 RENEWABLE ENERGY ACCOUNTED FOR 6.6 PERCENT OF ENERGY CONSUMPTION IN DANISH DOMESTIC TRANSPORT.

FUTURE TRANSPORT AND MOBILITY

To fulfil the ambition to decarbonise the transport sector within both heavy and light vehicles, the use of renewables and organic waste is crucial. To develop sustainable alternatives to fossil fuels, research in improved energy efficiency, energy storage, Power-to-X, biofuels, battery technology, drive train efficiency etc. is essential.

RESEARCH AREAS:

- Heavy transport: Power-to-X, sustainable biofuel and carbon capture.
- Light transport: electric cars, hybrid vehicles, fuel cells, range extender, charging infrastructure etc.
- Drones and robots for transportation, surveillance, and diagnosis in the areas of environment and energy.
- Energy savings by developing light constructions, new materials, and improved logistics and supply chains.
- AI for intelligent traffic control, green driving behaviour, and autonomy and driver support.
- Technology use, behaviour and everyday practices.

7 AFFORDABLE AND CLEAN ENERGY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

13 CLIMATE ACTION

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

LIQUID ELECTRICITY COULD PROVIDE A GREEN WAY FORWARD FOR HEAVY TRANSPORT

Heavy transport (ships, lorries, trains, and aircraft) accounts for more than half of the CO_2 emissions from the transport sector. Power-to-X technology can help solve this challenge. In collaboration with the industry, our researcheres have built an industrial-scale pilot plant that makes eMethanol from CO_2, and hydrogen produced using renewable electricity. The methanol could be used as a green fuel in ships and lorries where battery-powered engines are not an option.

- This technology allows us to make heavy transport greener partly because it is based on renewable energy and partly because it can be connected to biogas plants, for example, and uses CO_2 that would otherwise be discharged into the atmosphere, says Søren Knudsen Kær, professor at the Department of Energy Technology.

The EUDP project Power2Met has demonstrated that the technology is ready for full-scale deployment.

did you know

ALMOST 40 PERCENT OF THE DANISH CARBON DIOXIDE EMISSIONS ORIGINATES FROM BUILDINGS AND HOUSEHOLDS.

SUSTAINABLE CITIES, BUILDINGS AND COMPONENTS

Design, construction and management of buildings, cities and infrastructure play a key role in ensuring a greener and more sustainable society. Sustainable cities should promote economic growth and meet the basic needs of its inhabitants, while creating sustainable, affordable living conditions for all and making sure cities are inclusive, green and safe. The focus also includes minimizing required supply of materials, energy, water, and food, and drastically reducing environmental impact from waste, output of heat, air and water pollution.

RESEARCH AREAS:

- Sustainable materials, components, and processes in the construction industry and an improved indoor environment.
- Supply infrastructure in cities including sewers, rainwater etc.
- Social and economic sustainability, life cycle cost (LCC), life cycle analysis (LCA) for materials, and carbon footprint.
- Digitalisation and use of data to optimise the processes of the building sector in the design, construction, and operational phases.
- Understanding and use of technology, behaviour, and everyday practice.
- Buildings and urban planning that accomodate nature and green recreational areas in cities.

CASE

BUILDING LIFE CYCLE ASSESSMENT: TOOL CALCULATES CLIMATE IMPACT OF BUILDINGS

When assessing the environmental sustainability of buildings, the choice of materials and design principles is of great importance. Researchers at Aalborg University have developed the 'LCAbyg' tool, which can provide a comprehensive picture of a building's potential environmental effects and resource consumption throughout the building's life cycle. The sourcing of raw materials, production of building materials, consumption of energy and resources in operation and maintenance, and disposal and possible recycling of building parts and building materials are included in the calculations.

- The emerging climate crisis and lack of resources call for an increased focus on reducing the climate effects of construction and demand green solutions. Therefore, it is becoming increasingly topical for builders and contractors to map the sustainability of buildings, says Harpa Birgisdottir, senior researcher at the Department of the Built Environment.

The Danish Energy Agency and EUDP funded the project.

did You Know

THE GLOBAL POPULATION OF WILD SPECIES HAS FALLEN BY 60 PERCENT OVER THE LAST 40 YEARS. 1 MILLION SPECIES ARE AT RISK OF EXTINCTION.

ENVIRONMENTAL TECHNOLOGY, NATURE AND BIODIVERSITY

As a means to prevent biodiversity loss and reduce exploitation of natural resources, our research strengthens efforts to protect and restore ecosystems and reduce CO_2 emissions. Research efforts to monitor, report, prevent, and remedy pollution from the air, water, soil, and consumer products are focal.

RESEARCH AREAS:

- Alternatives to pesticides.
- Conservation of biodiversity in terrestrial, marine, and freshwater systems.
- Sustainable fisheries.
- Monitoring the environmental status and conserving biodiversity using new tools and smart solutions (including drones and eDNA).
- Securing the use of microbes to ensure a good environment and drinking water, sustainable development, resource recycling, and animal and human health.

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

STATISTICS DECIPHER THE BIODIVERSITY OF THE RAINFOREST

Throughout millions of years, the rainforest has had a high level of biodiversity. Using advanced statistical models, our mathematicians help biologists understand why the trees grow where they do and what determines the great diversity of the rainforest. By studying the spatial distribution of trees over time, mathematicians have derived new clues for understanding how life in the rainforest develops.

- With the models we have developed, we can consider all the different conditions that biologists know about and determine whether it makes sense in terms of where the trees are located. However, we can also observe whether there are other factors that biologists may have overlooked, or do not know about, explains Professor Rasmus Waagepetersen from the Department of Mathematical Sciences.

did you know

IN THE EU, FOOD PRODUCTION AND CONSUMPTION ACCOUNT FOR BETWEEN 22-31 PERCENT OF EU MEMBER STATES' TOTAL EMISSIONS OF CARBON DIOXIDE.

AGRICULTURAL AND FOOD TECHNOLOGY

Food production results in air, water, and soil pollution. It consumes excessive amounts of natural resources.

We engage in research that reduces the use and risk of chemical pesticides, fertilisers, and antibiotics. Green biorefining as well as agricultural technologies for stables, fodder and food production are focal research areas as we seek to address climate change, preserve biodiversity and ensure a sustainable production.

RESEARCH AREAS:

- Alternative protein sources, such as plant and insect-based foods and feed, and sea-based aquaculture.
- Green biorefining for sustainable production of feed and food protein, energy, and fertiliser.
- Genome-based breeding using molecular techniques, modelling, and predictive algorithms.
- Sustainable alternatives to pesticides, including the use of e.g. endosymbionts to control pests.
- New DNA-based identification methods for pathogen detection.
- Agricultural technology for stables, plant and food production with a focus on sustainability, animal welfare, autonomy, efficiency, etc.

2 ZERO HUNGER

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

14 LIFE BELOW WATER

15 LIFE ON LAND

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

GRASS PROTEIN – A CLIMATE-FRIENDLY ALTERNATIVE TO SOY WITH EXPORT POTENTIAL

Green leaves from grass contain protein that can be extracted by biorefining and used in animal feed and human food. Experts from Aalborg University are researching methods that may become an important solution in future feed and food production, as the industry and consumers are demanding climate-friendly alternatives to proteins from animals and South American soy production. However, the extraction of grass protein has more than just climate potential.

- The technology also has significant export potential due to high demand. Right now we are developing an integrated process to make it profitable to produce protein for feed and food on a large scale, says Associate Professor Mette Lübeck from the Department of Chemistry and Bioscience.

The project is supported by the GUDP, Ministry of Environment and Food of Denmark.

did you know

ACCORDING TO THE EU, IT TAKES 25 YEARS – A GENERATION – TO TRANSFORM AN INDUSTRIAL SECTOR AND ALL THE VALUE CHAINS.

SUSTAINABLE PRODUCTION

The political focus on environmental responsibility in production has been increasing in recent years. In addition, critical materials are being depleted worldwide. Therefore, it is essential to conduct research within new flexible and sustainable solutions for production that are economically viable, improved work environment, meet future legislation, and maintain our current materials in circulation.

RESEARCH AREAS:

- Smart production using drones, robots, exoskeletons etc.
- Sustainable processes, materials, and construction to reduce the systemic footprint of production and the supply chain.
- Reducing resource consumption by developing and exploiting potentials from smart production (e.g. IoT, big data, AI, and robots).
- Reconfigurable production systems with modular units and the use of AI and big data developed in the context of human practice to ensure sustainable transformation.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

RAPID CHANGEOVERS MUST INCREASE THE COMPETITIVENESS OF INDUSTRY

Quick changeovers, reconfigurable solutions, and easy implementation are crucial for Danish industrial companies to become even more competitive in the global market. Aalborg University researchers are leading the REKON project, which aims to develop a method and a set of tools to reduce the time to market, equipment expenditure, and development time and costs, and to increase the recycling and utilisation rates.

- Production systems that can quickly be converted through modular solutions have great potential in many different types of companies. However, a gap exists between the maturity of the methods developed in the academic environment and the industry needs. With the project, we have the opportunity to mature the methods and test them in practice in a wide range of Danish production companies that function as our laboratories, says Associate Professor Thomas Ditlev Brunø from the Department of Materials and Production.

The project is supported by the Danish Industry Foundation and is a collaboration between Aalborg University, University of Southern Denmark, Jönköping University and the Danish Technological Institute.

did you know

ACCORDING TO THE EU, AT LEAST 50 PERCENT OF ALL PLASTIC WASTE MUST BE RECYCLED BY 2030.

RECYCLING AND CIRCULAR ECONOMY

Currently, the industry remains dependent on the throughput of new materials extracted, traded, and processed into goods and finally disposed of as waste or emissions. Only 12 percent of materials come from recycling. Our research targets the transition to a climate-neutral and circular economy. This is an opportunity to expand sustainable and job-intensive economic activities while reducing greenhouse gas emissions and the pressure on our environment.

RESEARCH AREAS:

- Recycling plastics, building materials, and components.
- Sustainable utilisation of residues and waste products.
- New sustainable and circular production solutions, such as take-back and life cycle data.
- Biotenside recovery processes and systems to replace synthetic surfactants in feed, food, personal care, and cleaning products.
- New methods for utilising waste and residual products.
- Recycling and requalification of end-of-life product potentials.
- Sustainable materials designed for recycling.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

14 LIFE BELOW WATER

15 LIFE ON LAND

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

NEW MODEL IS A GIANT LEAP FOR RECYCLED PLASTICS

Today, the greatest obstacle for plastic recycling is the lack of models and tests that can accurately describe the characteristics and quality of recycled plastics. A project led by Aalborg University with industrial partners Grundfos, LOGSTOR, AVL and Plastix will create new knowledge and provide a significant boost to plastic recycling.

- There is a huge potential for recycling significant quantities of plastics. Nevertheless, without knowing the specific properties of the recycled plastics, such as the durability and strength, companies cannot guarantee product quality and therefore will not use it, says Professor Jesper de Claville Christiansen from the Department of Materials and Production.

To develop a model that can predict the properties of recycled plastics, researchers must complete many experiments on how the plastic reacts to a particular chemical environment, temperature etc. By comparing these experiments in a mathematical model, researchers can develop a method by which short-term tests can determine long-term properties.

The project is supported by Innovation Fund Denmark.

did you know

ACCORDING TO THE EU THE PROPORTION OF PEOPLE AGED 80 AND OVER IS EXPECTED TO MORE THAN DOUBLE BY 2100.

MEDICAL, HEALTH AND WELFARE TECHNOLOGY

People worldwide are living longer. Today, for the first time in history, most people can expect to live into their sixties and beyond. Furthermore, the pace of population ageing is increasing dramatically. For both the individual and society, it is crucial to develop new, safer and more effective interventions to ensure the health of the ageing population. Our research is driven by the ambition of applying science to understand, prevent, and treat human diseases.

RESEARCH AREAS:

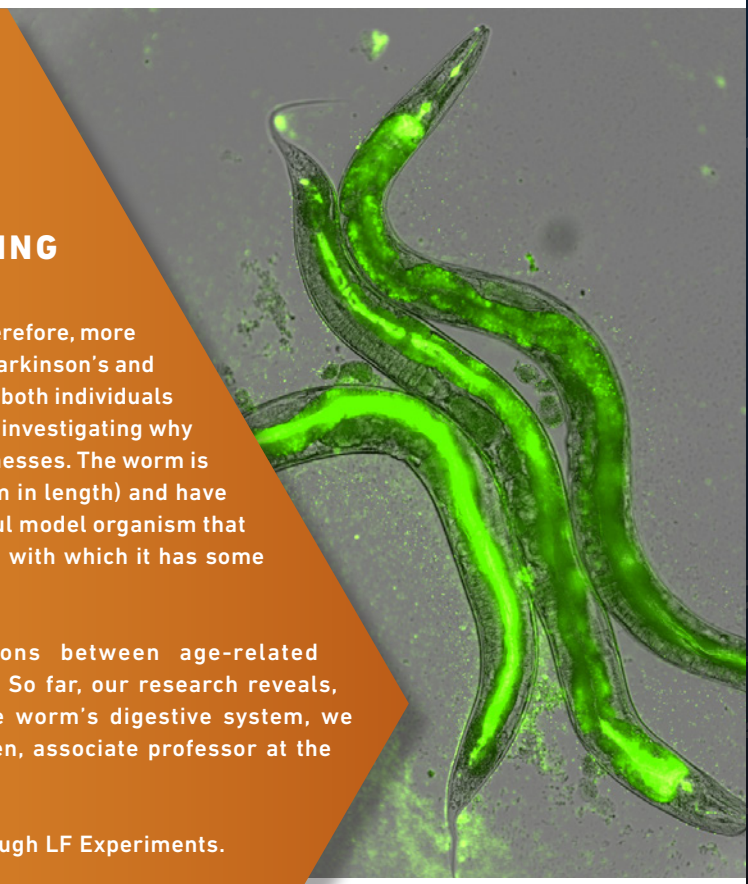
- Use of the growing information universe (big data) to develop new diagnostic treatments.
- New methods and animal and plant models (e.g. for determining genotype – phenotype correlation).
- AI-based links between genetics, protein structures, and functions.
- Innovative medical, health, and welfare technology engineering (e.g. exoskeletons, self-charging pacemakers, new drug delivery systems, micro-robots, biomechanics, etc.).

3 GOOD HEALTH AND WELL-BEING

FOR MORE CASES AND INFORMATION: ENGINEERING.AAU.DK

CASE

MICROSCOPIC WORM PROVIDES USEFUL KNOWLEDGE ABOUT AGEING



The world's population is increasingly becoming older, therefore, more people will suffer from age-related conditions, such as Parkinson's and Alzheimer's disease in the future, which is a problem for both individuals and society. Using a microscopic worm, researchers are investigating why we age and how we can prevent and treat age-related illnesses. The worm is called C. *elegans* and is extremely small (less than 1 mm in length) and have a lifespan of just 2 to 3 weeks. Nevertheless, it is a useful model organism that can provide great insight into the human nerve system, with which it has some similarities.

- Right now, we are researching the connections between age-related neurodegenerative illnesses and certain gut bacteria. So far, our research reveals, for example, that by adding probiotic bacteria to the worm's digestive system, we can significantly extend its lifespan, says Anders Olsen, associate professor at the Department of Chemistry and Bioscience.

The Lundbeck Foundation is supporting the project through LF Experiments.


LEARN MORE ABOUT
OUR RESEARCH AT
ENGINEERING.AAU.DK

DEPARTMENTS AT THE FACULTY OF ENGINEERING AND SCIENCE

Research, education, public sector service, and knowledge collaboration at the faculty are conducted in five departments.

We have competitive state-of-the-art laboratories, that provide the foundation for our researchers to perform world-class research.

We collaborate with national and international partners in academia, industry, and public sectors and with authorities.

DEPARTMENT OF CHEMISTRY AND BIOSCIENCE

- Biotechnology
- Biology
- Environmental Science
- Chemistry
- Chemical Engineering

www.bio.aau.dk

DEPARTMENT OF THE BUILT ENVIRONMENT

- Cities, Housing and Infrastructure, Urban Infrastructure and Environment
- Energy Efficiency, Indoor Environment and Sustainability
- Structural, Marine and Transportation Engineering,
- Building Physics, Building Informatics and Construction Management

www.build.aau.dk

DEPARTMENT OF ENERGY TECHNOLOGY

- Energy Production, Distribution and Control
- Power-to-X and Sector Coupling
- Sustainable Energy Technologies
- Efficient and Reliable Energy Systems

www.et.aau.dk

DEPARTMENT OF MATERIALS AND PRODUCTION

- Materials Science
- Physics
- Mechanical Engineering
- Production Systems and Technology
- Industrial Production and Management

www.mp.aau.dk

DEPARTMENT OF MATHEMATICAL SCIENCES

- Mathematical Analysis
- Mathematical Modeling and Visualization
- Geometry and Statistics
- Mathematical Economics

www.math.aau.dk

WORLD-CLASS
FOR THE LABOUR MARKET OF TH

At the Faculty of Engineering and Science, we train students for the labour market of the future. We are continuously ensuring that our programme offerings meet the needs for graduates in the surrounding community.

Broad ranges of our education inherently address the global challenges of our time, and the majority of our programmes aim to educate graduates who will contribute to the development of a more sustainable future.

STUDENTS COLLABORATE TO SOLVE REAL PROBLEMS

The trademark of Aalborg University education is the problem-based project work, or 'the Aalborg Model for Problem-Based Learning (PBL)'. It is highly recognised both nationally and internationally. Throughout their studies, students combine high academic qualifications with collaborative competences as they work closely with a group of fellow students to analyse and solve real-life challenges. Often these projects are conducted in conjunction with businesses and organisations that face a specific challenge. New knowledge and creative solutions are high valued outcomes.

PROGRAMMES

E FUTURE

CROSS-DISCIPLINARY AND SUSTAINABLE STUDENT PROJECTS

Students at the faculty not only have the opportunity to work together on projects with fellow students. They also have the chance to work across disciplines within the AAU Mega Projects and/or the leadENG Projects.

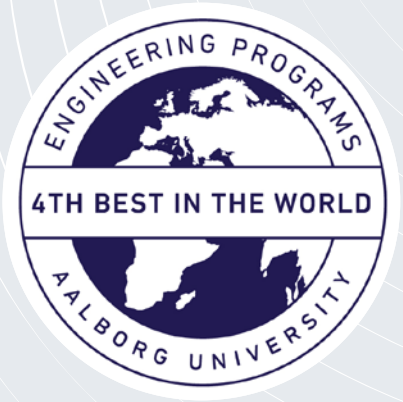
The AAU Mega Projects are based on interdisciplinary projects ranging across the entire university, involving numerous students working together to find sustainable solutions to solve the grand challenges of society.

While the AAU Mega Projects are done in collaboration across the entire university, the Faculty of Engineering and Science complements the interdisciplinary approach with student projects across the faculty domain. We call these projects 'leadENG Projects'.

The leadENG Projects complement the research and innovation strategy of the Faculty of Engineering and Science and are based on the nine sustainable focus areas described on pages 4 to 14.

The aim of both AAU Mega Projects and the leadENG Projects is to increase the students' understanding of their disciplinary field and how it can be brought into play in related subject areas to address society's grand challenges.

INTERNATIONALLY RECOGNISED PROGRAMMES



Aalborg University's engineering programmes are internationally recognised. The top US university, MIT, has placed Aalborg University's engineering programmes as fourth best in the world - surpassed only by three American universities.

In the Times Higher Education Impact Ranking, Aalborg University is ranked as the world's best university for the UN's Sustainable Development Goal 4: Quality Education.

SUSTAINABLE SOLUTIONS OF THE FUTURE

CALL FOR COLLABORATION

The grand challenges of society call for innovative and sustainable solutions solved in close collaboration between knowledge institutions, industry and authorities. Working in partnerships with our surroundings is the cornerstone of our approach.

AAU SCIENCE AND INNOVATION HUB

The AAU Science and Innovation Hub is to become a state-of-the-art centre providing the optimum physical environment for interdisciplinary research – not the least as a place for researchers and companies to collaborate on solving societal challenges relating to sustainability, climate change, IT security, and demographic changes.

The ambition of the new building is to bring together students, researchers, entrepreneurs, companies and investors, collaborating to create solutions to the global challenges. The Science and Innovation Hub will mark itself as a hub and showcase for interdisciplinary research, innovation, entrepreneurship, talent and business development at AAU.

The AAU Science and Innovation Hub is planned to be completed in 2022.

STATE-OF-THE-ART FACILITIES

We offer our expertise and provide state-of-the-art laboratories in which companies may conduct experiments and test their new methods, products, and innovative ideas. Please contact us, we are open for collaboration.

INDUSTRY COLLABORATION

"At LOGSTOR we strive for complete circular economy and we have the ambition to be able to recycle several thousand tons of plastic material every year. Our products made from recycled plastics must be able to function flawlessly and distribute green district heating for at least 50 years in the future. That is precisely why our collaboration with Aalborg University is essential, so that we can develop and document a homogeneous high quality of recycled materials."

Kristian Haldrup Overgaard,
EVP, Head of Innovation,
LOGSTOR

INNOVATION AND ENTREPRENEURSHIP

"Collaborating with Aalborg University has and has had a huge impact on REintegrate. Through the collaboration, we have access to the most talented minds in our field, and we have the opportunity to test our Power-to-X solutions in university laboratories on a scale that brings the technology as close to reality as possible. This has enabled us to scale our business rapidly."

Lars Udby,
CEO of REintegrate,
a spinout from AAU

TRIPLE HELIX COLLABORATION

"The need for innovative and sustainable solutions applies to all sectors of society, not least in the construction sector, which today stands for a significant imprint on the overall climate accounts. Here, innovation and research into new, applicable solutions are essential. Our good collaboration with AAU contributes effectively to these solutions, often in innovative partnerships that also involve authorities and municipalities."

Martin Manthorpe,
Director of Strategy, Business Development and Public Affairs,
NCC Building Denmark

INTERNATIONAL COLLABORATION

"For several years, our researchers have been visiting the world-leading power electronics research environment at Aalborg University. Through this collaborative research, Fuji Electric has gained valuable technological assets to improve our business and furthermore, our employees are promoting their way of thinking and doing research."

Akio Toba,
General Manager,
Fuji Electric

FACULTY OF ENGINEERING A

Dean's
Mogens Rysholt Poulsen DEAN
Olav Geil PRO-DEAN FOR EDUCATION

Departments	Heads of Department
Department of The Built Environment	**Lars Pico Geerdsen** HEAD OF DEPARTMENT
Department of Materials and Production	**Kjeld Pedersen** HEAD OF DEPARTMENT
Department of Chemistry and Bioscience	**Michael Toft Overgaard** HEAD OF DEPARTMENT
Department of Mathematical Sciences	**Søren Højsgaard** HEAD OF DEPARTMENT
Department of Energy Technology	**Lasse Rosendahl** HEAD OF DEPARTMENT

KEY FIGURES FOR THE FACULTY OF ENGINEERING AND SCIENCE

- 5 departments
- 3,600 students
- 270 PhD students
- 830 FTEs
- DKK 923 mill. (budgeted revenue 2020)

RANKINGS AND DISTINCTIONS

U.S. News & World Report

- Best European Engineering University and 6th best in the world[1]
- World's 3rd best university within the field of Electrical and Electronic Engineering.[2]

Times Higher Education Impact Ranking

- World's best university in SDG #4 "Quality Education"
- World's no. 10 university in SDG #7 "Affordable and Clean Energy"

ND SCIENCE (ENGINEERING)

Office

Thorkild Ærø
PRO-DEAN FOR PUBLIC SECTOR CONSULTANCY

John K. Pedersen
PRO-DEAN FOR RESEARCH AND INNOVATION

Doctoral School

John K. Pedersen
HEAD OF DOCTORAL SCHOOL

First Year of Studies

Henrik Brohus
DIRECTOR

Admissions Course (AK)

Henrik Brohus
DIRECTOR

MIT: The Global State of the Art in Engineering

- AAU has Europe's best engineering programmes and the fourth best in the world According to MIT and 50 global thought leaders[3]

Confederation of Danish Industry:

- AAU is preferred collaboration partner of the Danish Business World.[4]

[1] U.S. News & World Report, Best Global Universities, 2021
[2] U.S. News & World Report, Best Global Universities, 2021
[3] Massachusetts Institute of Technology (MIT). The Global State of the Art in Engineering (Graham, Ruth 2018)
[4] Report from the Confederation of Danish Industry (2018): Danmark tilbage på vidensporet IV

FOR FURTHER INFORMATION VISIT

ENGINEERING.AAU.DK

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