



AALBORG UNIVERSITY
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Aalborg University Sustainability Report 2021

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AALBORG
UNIVERSITY



THE GLOBAL GOALS
For Sustainable Development

2021 Sustainability Report

Sustainability at Aalborg University

The 17 interlinked Sustainable Development Goals serve as guidance for how the world's most urgent and critical challenges can be tackled. The challenges are complex and will require action from all societal actors. Knowledge institutions like Aalborg University play a crucial role in this effort, as both research and teaching have an impact in society that goes beyond the organization, while internal procedures document that AAU also 'walks the talk'.

Sustainability is an integral part of Aalborg University's activities, which is also visible in the new 2022-2026 strategy, and the policy on balanced and sustainable development created in 2020. A testament to the ongoing work with sustainability and the Sustainable Development Goals is the fact that AAU ranks 6th overall among over 1200 universities across 98 countries in the [Times Higher Education Impact Ranking](#) focused on SDG performance in 2021. More specifically, AAU ranks 1st on SDG 4 - Quality Education and 2nd on SDG 6 - Clean Water and Sanitation.

Not every sustainable effort fits in a ranking methodology and some stories need to be told rather than quantified. This sustainability report seeks to present examples of how Aalborg University, in various ways, contributes to each of the 17 SDGs. The stories involve contributions from all faculties and services at the university, showcasing the wide range of AAU's sustainability efforts.

Reading guide

This report is an overview of selected sustainability activities at Aalborg University, and thus is not an exhaustive review of every aspect of AAU's sustainability-related activities. For each of the five faculties at AAU, Campus Service and AAU Innovation, the report presents the overall sustainability profile. Following this are selected examples of AAU's contribution to Covid-19 research. The remainder of report presents examples of AAU activities in research, teaching, engagement and operations for each of the 17 Sustainable Development Goals.

Aalborg University in brief

Aalborg University (AAU) was founded in 1974 in response to regional challenges and needs related to education, growth, and employment. From its inception, external collaboration and problem-based learning (PBL) defined AAU and these core elements remain to this day where AAU nationally is the preferred collaborative partner of businesses in relation to size, and the problem-based learning model is internationally recognized as The Aalborg Model. This development is evident in all aspects of university operations, meaning that the positive societal impact of AAU has moved way beyond the regional starting point in 1974.

Today, AAU provides knowledge for the world and is engaged in a number of international partnerships and collaborations. Aalborg University has three campuses in Denmark: Aalborg, Esbjerg and Copenhagen. Almost 20,000 students are enrolled at Aalborg University; 12 percent are international students from all parts of the world. The university employs 2,300 academic staff and 1,300 administrative and technical staff, and the university is one of the largest employers in the North Denmark Region.

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THE Impact SDG overall Ranking - AAU rank



THE Impact Ranking - 2021



- ENGAGEMENT
- TEACHING
- RESEARCH
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FOREWORD BY THE RECTOR AND PRO-RECTOR

The world needs knowledge

We are all affected by the world's global dilemmas. The world's biggest challenges are impacting our daily lives more than ever.

2021 has been an eventful year. We are still living with the Covid-19 pandemic and its impact on our society and our lives. The pandemic has clearly shown us that we are linked together globally and that we have a joint responsibility to address the problems that affect us all. The Covid-19 pandemic is as much a communication and social emergency as a health crisis, and it has highlighted that interdisciplinary expertise is needed more than ever.

Meanwhile, 2021 was also the year that the world's countries reached a global climate agreement at COP26 in Glasgow that keeps the Paris Agreement's goal of a maximum temperature increase of 1.5% alive.

Both the Covid-19 pandemic and the climate agreement at COP26 emphatically underline that the world needs universities that engage critically and constructively and take responsibility for our shared future by transforming complex challenges into sustainable change.

In 2021, employees at Aalborg University greatly contributed to both the fight against the pandemic and climate change. For example, researchers at the Department of Clinical Medicine have contributed basic knowledge on RNA technology that enabled the production of an effective vaccine against Covid-19, while researchers at the Department of Computer Science and the Department of Electronic Systems have contributed to the models underlying the Danish national authorities' decision on community restrictions during the pandemic.

In relation to fighting climate change, Aalborg University highly prioritises both research and cooperation activities with companies and other organisations that contribute to the green transition. We have multiple research communities that are highly specialised in climate and environmental challenges. As such, we have more than 400 researchers involved in energy research in one way or another.

This has led to the fact that 15% of the university's research articles are within the field of green research, which is significantly above the average for other universities. Aalborg University has a particular strength in research in green energy and green transport, where the university's researchers account for over a third of all Danish research articles.

Almost 90% of Aalborg University's researchers in the field of green research have collaborated with a company or a

public authority in recent years, and more than 60% of these collaborations have led to green innovation in the company. Aalborg University has always been a significant link between research, education, innovation and the regional business community and international partners. It is in the University's DNA to collaborate and contribute to sustainable solutions in the world around us, locally, nationally and internationally.

Today, it is our strategic ambition to create knowledge for the world. We have sharpened this ambition and made it even clearer in our new strategy: "Knowledge for the World 2022-2026". Aalborg University's vision is that we are internationally recognised as a mission-oriented university that contributes to sustainable development. Sustainability is a core part of all our activities.

We want to be a mission-oriented university, and for us this means that we are driven by a larger purpose that goes beyond our own organisation and contributes to the sustainable development of the world environmentally, socially and economically. At Aalborg University, we want to contribute to missions together with others, such as researchers, the business community, interest groups, international partners and public bodies, to find the best solutions and create knowledge for the world.

The 2021 Sustainability Report illustrates that the work to contribute to sustainable development is broadly anchored at Aalborg University. All faculties have contributed with efforts across education, research and knowledge collaboration. The report also shows that employees at Aalborg University contribute to sustainable development for all 17 SDGs and that their efforts create an impact at local, national and international level, and make a difference to all generations; both children, young people and the elderly.

The report contains examples of Aalborg University's sustainability activities and is therefore not an exhaustive list of the university's efforts and contributions to sustainable development.



Per Michael Johansen
Rector



Anne-Marie Kanstrup
Pro-Rector



Sustainability profiles

Faculty of Engineering and Science

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 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).

Technical Faculty of IT and Design

At the Technical Faculty of IT and Design, we create knowledge for the world at the highest levels. Our problem based learning and research are widely recognised both inside and outside Denmark, with distinctions that include being ranked Europe's best engineering university and the fourth best university in the world for engineering programmes. Our approach to creating knowledge for the world involves a very strong and dedicated focus on sustainability. Through our degree programmes, mission based research and close partnerships with stakeholders all over the world, we help create a sustainable future for generations to come. We often combine our efforts on sustainability with our other major focus area: digitalisation – making digital marks both by increasing digital competences in all our programmes and by offering Danish companies a customised, research-based digital boost thus - by means of digitalisation - shortening the overall way to sustainability.

Faculty of Medicine

At the Faculty of Medicine, health is taught, researched and considered a joint effort. An effort done in close collaboration with the surrounding community. One of the distinctive features of the faculty is our focus on digital health, which includes developing sustainable health solutions. Our health solutions are based on intelligent utilisation of health data, optimisation of diagnostics and opportunities to treat and rehabilitate at a distance and by using digital technology.

Faculty of Humanities

The Faculty of Humanities' research environments contribute to solutions to societal challenges based on human conditions, culture, interaction and customs. Based on the PBL model, solutions are developed in close interaction with the outside world – solutions that create value for collaborators and society as a whole. Sustainability and the green transition are central societal challenges and are thus integrated parts of research at the Faculty of Humanities. In relation to sustainability and green transition, the strengths lie within quality education; health and well-being; responsible consumption and sustainable cities and local communities. The research environments work and create solutions across disciplines, and the contributions thus also relate to areas of research outside the classic subject areas of the humanities.

Faculty of Social Sciences

The Faculty of Social Sciences contributes to sustainable development by translating the major societal challenges into thematic research and education priorities. Our strategic partnerships between subject disciplines and sectors are a key premise for our work in finding sustainable solutions in the social, cultural, economic, political, legal and historical fields. In order to ensure strategic clarity and focus, the Faculty has formulated a number of principles for our efforts to meet the global UN Sustainable Development Goals. The department's global goal ambassadors support these efforts by counselling students and staff in translating the 17 global goals into a local context to ensure the greatest possible societal impact of our research, education and knowledge collaborations.

AAU is a university with ambitions that extend far beyond its walls, to the heart of the most pressing global and local trouble spots

AAU Strategy: Knowledge for the world 2022-2026

AAU Innovation

At AAU Innovation we support the utilization of research, new knowledge, inventions and entrepreneurship. Our support ranges from collaboration agreements, funding support and Ph.D adm. to commercialization, student entrepreneurship and collaboration with stakeholders, private companies and public sector. We take part in regional, national, and international collaborations, such as national clusters, and international innovative collaboration networks; CESEAR and ECIU. We are engaged in partnerships to provide a strong set-up for the approach to the Sustainable Development Goal; e.g. collaboration with the municipality, regional office, regional hospital and health tech partners to support good health and well-being or regional partnerships on sustainability. In 2022 our new Science and Innovation hub will be ready for use. It will be a place to meet and work together; for researcher and students and together with society, stakeholder, companies, and public partners.

Campus Service

Overall, Campus Service (CAS) supports the university's main purpose – to create world-class research, education and knowledge sharing – by ensuring the best possible physical conditions. Sustainability has been an integral part of AAU operations and activities for several years. This include our strategic work on reducing energy and water consumption and our increased focus on sustainability in the areas of construction, procurement and the outdoor environment at AAU. The SDG framework has increasingly gained ground in the operations of AAU the last couple of years and is considered an excellent framework for communicating and decision-making. Our Sustainable Campus Forum supports our sustainability journey at Campus Service with both student and staff representatives that generate ideas for more sustainable operations; the forum aims to inspire and initiate new green activities at AAU.



Covid-19 research at AAU

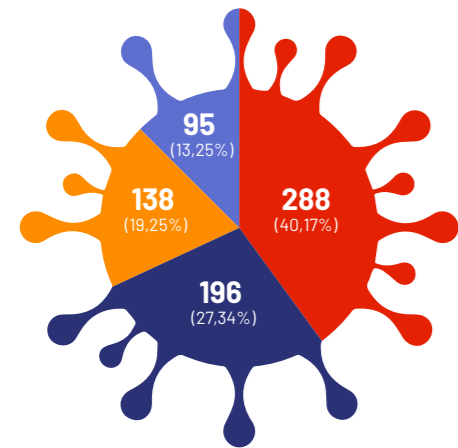
Examples of Covid-19 research at Aalborg University. See more [here](#).

BEO-COVID: Decision making tool based on evaluation and optimisation of models in UPPAAL

At the Department of Computer Science and the Department of Electronic Systems, the project [BEO-COVID](#) has been completed. Tools to simulate highly complex lockdown and re-opening scenarios during the Covid-19 epidemic were developed and refined and have proven superior to existing models, for example with regard to sudden changes and uncertainties. The project was implemented in conjunction with SSI (Serum Institute of Denmark) which has now included the Department of Computer Science in its model expert group.

Estimation, simulation and regulation for optimal interventions against Covid-19

At the Department of Electronic Systems, a [project](#) to develop a tool for the estimation, simulation and regulation of optimal interventions against Covid-19 has been completed. The tool is based on advanced mathematical modelling and serves to limit the prevalence of Covid-19 in order to avoid exceeding critical capacity in the health care system. The tool will enable authorities to select the optimal combination of interventions and their duration as well as how to establish a gradual and controlled reopening of society.



Covid-19 research publications

- Health Sciences
- Social Sciences
- Technical and Natural Sciences
- Humanities

Coronavirus monitoring in wastewater

Wastewater contains various pathogens, such as coronavirus, that are excreted with human faeces, and analyses of their content can be used for general surveillance of the infection level in the human population. Per Halkjær Nielsen, Professor in Department of Chemistry and Bioscience and Head of the Centre for Microbial Communities, is one of the world-leading researchers on the microbiology of wastewater treatment systems, and he was among the first to propose the use of [sewerage as a tool for revealing coronavirus outbreaks](#), as both a general surveillance and early warning tool in Denmark and across the world.

AAU researchers play crucial role in Covid-19 sequencing

Professor Mads Albertsen and his team at the Department of Chemistry and Bioscience [played a crucial role in tracking down new mutations of the coronavirus](#) – not just in Denmark, but on a global scale. The group quickly saw the potential of using their world-class laboratory and sequencing methods for fast, efficient genetic sequencing of the virus that causes Covid-19 which allowed them to trace and monitor the pandemic faster than any previous outbreak. Denmark now has one of the world's most comprehensive [surveillance systems for monitoring new SARS-CoV-2 variants](#).

Mental health and working communities during the Covid-19 pandemic

[This project](#) examines how the coronavirus pandemic has affected working communities, well-being and problem solving. The findings highlight the importance of caring, supportive and appreciative leadership, and suggest that organisational practices be adjusted to support the development of leadership competences to balance the various and sometimes opposite needs in times of crisis. The project is a collaboration between the National Research Centre for the Working Environment and the Department of Communication and Psychology.

Research in RNA medicine paved the way for a coronavirus vaccine and future treatments

Thanks to RNA medicine technology, the world's leading health care researchers have succeeded in developing a COVID-19 vaccine. One of the world's leading researchers within the field of RNA medicine is Professor Sakari Kauppinen, who heads the Centre for RNA Medicine at the Department of Clinical Medicine. He explains that RNA medicine can be compared to computer programming: The technology is about programming exactly the code that tells the body which protein to produce. Tailor-made programmable medicine that Sakari Kauppinen expects will treat diseases such as ALS, Alzheimer's, Parkinson's, epilepsy and Huntington's disease.



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Professor Mads Albertsen and his team at the Department of Chemistry and Bioscience have played a crucial role in tracking down new mutations of the virus – not just in Denmark, but on a global scale (Photo: Department of Chemistry and Bioscience)



Waste pickers working at one of the new sorting facilities after the closure of the dumpsite in Brasilia, Brazil, during a visit by AAU students (Photo: Giajenthiran Velmurugan)



Redesigned study programmes to a PBL approach and integrating entrepreneurship, innovation, and environmental, social, and economic sustainability into curriculum contents

Africa is endowed with a huge proportion of natural resources, including many dynamic young people who find themselves un- or underemployed, regardless of the extent of their education. Higher education institutions (HEI) on the continent face challenges such as weak links to the wider socio-economic context, textbook-based curricula that do not address local socio-economic problems and needs, and outdated pedagogical methods.

The research project at the Department of Planning is designed to reform Higher Education (HE) study programmes to ensure curricula that are highly relevant to the contemporary economic and social needs of Africa, equipping graduates with skills and competences for employability and self-employment. The project runs from 2017 to 2022.



AAU students keep waste pickers from food insecurity

As part of the strategic ERASMUS+ partnership EPIC (Improving Employability through Internationalisation and Collaboration), researchers and students in the Department of Electronic Systems take part in international collaborative projects, such as the [Global Student SDG Challenge](#). Students have collaborated on solving food insecurity in Brazil.

Waste pickers from the world's largest dumpsite, located in Brasilia, lost their livelihood when the dumpsite closed in 2018. The waste pickers then started to work at a triage centre, which unfortunately resulted in reduced income. One of the main challenges of this situation is food security for the families involved.

As part of the ERASMUS+ project, students at Aalborg University developed a [mobile education platform](#) to teach the waste pickers how to make the most of their income in order to meet their – and their families' – basic needs.

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Students in the MA programme in Culture, Communication and Globalisation at a workshop on storytelling for sustainability (Photo: Dorte Larsen)



Access2innovation

Access2Innovation is a spinout from Aalborg University and is the leading Danish network for innovative, sustainable, commercial solutions to African emerging markets.

Since 2007, A2I has resulted in more than 80 partnerships between companies, NGOs, investors, knowledge institutions and authorities, offering financing and expertise in innovation and business development in Denmark and Africa.

Researchers in the [Department of Planning](#) hold the chair and manage the secretariat, network and ongoing engagement with the university. Aalborg University is involved in various projects in the network, such as:

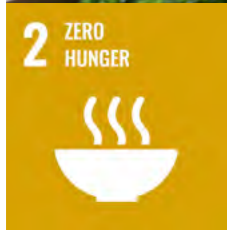
- [OneStopShop](#) targets the public health hazard of insufficient sanitation facilities by providing a sustainable low-cost all-in-one sanitation solution for the urban poor.
- [Modular cooling](#) seeks to develop and establish sustainable cooling systems in agricultural value chains where 40-50 percent of products are currently lost. The solution aims to reduce food loss and improve rural farmers income and livelihood.

- [Drinking water refilling station](#) ensure the urban poor access to safe, clean and affordable water.
- [Solar Cookers for Nights](#) develops solar driven affordable cook stoves for the rural poor. The need for this kind of solution is exacerbated by the scarcity of firewood due to deforestation in certain parts of Africa.

End poverty in all its forms everywhere

Marketplace in front of the first OneStopShop in Kasese, Uganda (Photo: Jakob Brodersen, Brodersen Kommunikation)





Community garden on Aalborg University's east campus (Photo: Emilie Bach Pedersen)



Intelligent use of health data can help people with inflammatory bowel disease

Millions of people worldwide suffer from abdominal pain and bleeding resulting from persistent inflammatory conditions in the gastrointestinal tract, also called inflammatory bowel disease.

The Danish National Research Foundation granted DKK 68.5 million to the [new research centre](#) Centre for Molecular Prediction of Inflammatory Bowel Disease (PREDICT) at the Department of Clinical Medicine. The centre's researchers will combine blood and tissue samples from national biobanks with data from the unique Danish health registries in order to understand how these diseases occur and progress. This knowledge is the prerequisite for being able to prevent these diseases, develop new medicine and tailor treatment to the individual patient.



Help for people at risk of malnutrition

Mette Holst, Professor of Applied Nutrition in the Department of Clinical Medicine, is conducting [research](#) on how health professionals can ensure that children with spasticity are not malnourished. In collaboration with a group of our medical students, Mette Holst has also investigated how chewing and swallowing difficulties can be identified so that patients with this problem can be helped quickly. Chewing and swallowing difficulties can have major consequences for patients, such as aspiration, which can result in pneumonia and multiple hospital readmissions.



AquaCombine: Circular industry for food and bio-products

Salicornia europaea is a halophyte plant that can grow on saline lands without requiring fresh water. The woody residue part of *Salicornia* has been investigated as a source of pharma- and nutraceutical products due to its high content of phytochemicals such as hydroxycinnamic acids (HCA).

Researchers at AAU Energy are leading the project [AquaCombine](#) which aims to demonstrate combined aquaculture and halophyte farming (farming of saline tolerant plants) using the principles of circular economy where waste is recovered and utilised in the system to create both internal value and new products, effectively eliminating the waste. This will create a new circular industry with co-production of food, pharma, and bioenergy.



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Climate sin or climate sound

The Master's thesis [Climate Sin or Climate Sound](#) at the Department of Communication and Psychology won the [Mærkk Award](#) in 2020. The thesis examines the overlap of health and climate change considerations appearing in communication regarding food, and how the overlap is articulated. The food pyramid mirrors changes in food culture which is dependent on context, culturally shaped reality and the social frame of reference. The thesis concludes that the dual consideration is mutually influential; meaning that food that is beneficial to individual health also helps mitigate climate change. Therefore, a communication appeal to the health of the individual can have an advantageous impact on collective societal problems such as climate change and public health.



Youth, kitchen duty and the development of food culture in continuation school

[This research project](#) at the Department of Culture and Learning deals with young people's relationship to food and cooking. In addition, it concerns continuation school pupils' experiences with and benefits from participating in The Food Culture's development project Kitchen Duty in Continuation School. The Kitchen Duty is a development project run by The Food Culture in collaboration with the Continuation School Association with funding from Nordea-fonden.

The aim of the project is to provide continuation school pupils with greater knowledge on food and meals, mastery of essential kitchen skills and the desire to spend more time in the kitchen. The focus is on pedagogical skills development of kitchen staff in continuation schools to equip them to be culinary supervisors for continuation school pupils. Around 60 continuation schools have been involved in the project.



New tender to increase sustainability in canteens

In 2020, the Aalborg University canteens phased out all plastic cutlery and service with the aim of minimizing plastic waste at the university. At AAU our canteen operation is selected based on a four-year tender. The next canteen tender is in 2022; therefore preparations for new demands for canteen operation are being discussed. [Sustainability is a major focus in the new tender](#) where demands concerning palm oil and ecology will be discussed.

The involvement of students and staff is a priority at AAU; for example, all students and staff have been asked to fill out a questionnaire regarding their demands and desires for the new canteen operator. The current canteen operator focuses on climate impact, actively using various measures to minimise food waste and reduce the consumption of plastic.



Vegetables at a local market (Photo: Lars Horn, Baghuset)

End hunger, achieve food security and improved nutrition and promote sustainable agriculture



Grandparent network

The aim of [this network](#) anchored at the AAU Business School is to advance research by exploring the being and doing of grandparenting and grandchilding in the Western world in a cross-cultural perspective. The network argues that including grandparents in the study of intergenerational roles and relationships offers a valuable lens not only on consumption at later stages of the life course, but also on evolving family identity bundles, including the negotiation of practices, routines, relationships and norms within social networks.

Grandparents' role in feeding grandchildren has been overlooked and this networking project also studies food and snacking culture in intergenerational relationships. As good times between grandparents and grandchildren often involve treats, this may lead to tensions and deviations from parents' feeding strategies for their children.



3 GOOD HEALTH AND WELL-BEING

Students working in laboratory at Aalborg University Esbjerg (Photo: Nils Krogh)

New honorary doctorate recipient wants to create a better life for amputees

Today, it is possible to get a hand prosthesis after an amputation, but the prosthesis cannot be optimally controlled and often requires the user to constantly keep track of what the hand is doing. But Professor Ranu Jung, [honorary doctorate recipient](#) at the Faculty of Medicine, in collaboration with her research team has developed the first wireless and implantable neural interface to control a hand prosthesis, restoring both motor function and sensory feedback after an amputation. This means that not only can you move the prosthesis but you can also feel where it is and naturally follow what “the prosthesis is doing”. After obtaining FDA approval, the research team is the first in the world to successfully complete tests on humans, a crucial step in neural engineering.

AAU entrepreneurial team addressing the excessive use of painkillers

Based on existing evidence-based research, the AAU entrepreneurial team [REDO - Neurosystems](#) at the Department of Health Science and Technology is developing a pain-relieving treatment for patients with chronic pain in muscles and joints. The team has [developed a technology](#) that can teach patients to respond less to the pain they experience. The technology can visualise patients’ pain-related brain activity on a screen in real time. Seeing how the actual experience of pain affects brain activity makes it easier for patients to work with their thoughts on what hurts and does not hurt.

Knowledge of chronic pain can lead to better use of health care resources

According to estimates, a fifth of the world’s population will be affected by chronic pain, such as the pain caused by osteoarthritis. Persistent pain is a global problem that leads to deteriorating quality of life for millions of people and costs society dearly. And problems with osteoarthritis are only going to increase as the general population ages and becomes more sedentary and obese. Today, many treatments and interventions unfortunately prove to be ineffective for patients and are thus useless and costly. But there is hope! [Pain research](#) at the Department of Health Science and Technology provides knowledge about the osteoarthritis patient’s pain mechanisms so that doctors and researchers in the future can predict which type of treatment may – or may not – have a pain-relieving effect for the individual patient.

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Synaesthesia – the Roles of Association Learning and of Differential Brain Development

In our day-to-day lives, very few people think that our friends, family or the corner grocer could have significantly different sensory experiences of the world than us. Nevertheless, approximately four percent of the population has a certain type of sensory experience called synaesthesia. For people with synaesthesia, stimuli in one modality also trigger sensory experiences of a different quality; for example, letters or days of the week can be experienced as having different colours. [This project](#) at the Department of Communication and Psychology examines these unconventional sensory experiences and how they arise in order to better understand the diverse solutions the brain employs. Increasing our knowledge of these processes may help develop better tools for learning, as well as a better understanding of developmental disorders of the brain.

Student wins the Health Hub Innovation Award with an idea for an app for adults with ADHD

A student in Interactive Digital Media at the Department of Communication and Psychology won the [Health Hub Innovation Award](#), a competition that recognises the good healthcare idea and supports the potential for innovation among all AAU students. Daniel Viholm won with the idea for a mobile app that uses persuasive design to help adults with ADHD create structure and an overview in their everyday life. Persuasive design is about influencing the user to change behaviour or perform certain actions in a way that makes the user aware of the changed behaviour. In addition, the app also teaches people with ADHD about their own diagnosis and addresses the anxiety that often accompanies ADHD.



Daniel Viholm, graduate of Interactive Digital Media, who won the Health Hub Innovation Award in 2021, stands in front of the Wall of Fame for all AAU start-ups and spin-offs on health innovation (Photo: Health HUB)

Architecture and quality of life: how architecture can affect the body and the psyche through the stress system

As people spend approximately 80 percent of their life indoors, architecture and buildings can have a substantial impact on people’s health, wellbeing and stress levels. [This project](#) at the Department of Architecture, Design and Media Technology investigates how architecture affects memory, learning, pain, decision making and the development of chronic stress, using measurements of stress hormones. The project aims to develop a practical tool to test computer models of buildings at the project stage, prior to building, i.e. when modelling office environments that can minimise stress or help decision makers make better decisions. The project uses virtual reality technology, stress tests and questionnaires to investigate how the physical environment affects people. And this practice is possible to integrate in existing architecture modelling programmes.

Ensure healthy lives and promote well-being for all at all ages

Study on social consequences of childhood cancer wins research award

Line Thoft Carlsen, PhD, has won the [FORSA Research Award 2021](#) (Association for Research in Social Work). Thoft Carlsen currently works at the Danish Cancer Society as project manager and received the award for her AAU PhD thesis entitled [Social Consequences of Childhood Cancer](#) from the Department of Sociology and Social Work. The award is given for bridging the gap between the medical field and social work, thus shedding light on the social challenges families affected by childhood cancer can experience – at diagnosis, during treatment and for many years after completion of treatment in some cases. FORSA also based this award on the way Thoft Carlsen took into account the families’ perspective and thus provided different insight and understanding of the consequences of childhood cancer.



Students working at Aalborg University City Campus (Photo: Emilie Bach Pedersen)



Institute for Advanced Study in Problem Based Learning

On 1 January 2022, Aalborg University opens a new interdisciplinary teaching and research unit in problem-based learning (PBL): [the Institute for Advanced Study in Problem Based Learning](#) that consolidates the university's unique research on PBL across the main areas.

Problem-based Learning is the core of the university's pedagogic method, and the PBL model provides the foundation for AAU to enable students to learn through addressing authentic problems and has become nationally and internationally recognised.

The new Institute for Advanced Study in PBL aims to strengthen and advance problem-based learning to a level where the university continues to be leading nationally and internationally in pedagogical practice and research on PBL. With the university's leading researchers in problem-based learning and with the opportunity to use the university's educational environments as a laboratory for pedagogical experiments, the university will be able to develop and support new cutting-edge competences in its study programmes and future graduates. These could include special didactic considerations regarding digitalisation or integration of STEM into the study programmes.

The institute will include the [UNESCO Chair in Problem Based Learning](#) that was established in 2007 and is renowned for its accomplishments in supporting the development of Problem Based and Project Based Learning in Engineering Education. It also includes the [AAU Learning Lab](#) that focuses on ensuring ex-

cellence in higher education teaching and learning through courses, workshops and seminars for AAU staff to develop competencies, skills and pedagogical knowledge.



Game-Based Learning in the 21st Century

The purpose of [GBL21](#) is to develop students' abilities to empathise with others, generate ideas, and to develop modelling and process management skills. These four design competencies are examples of 21st Century Skills that are of great importance for children's opportunities to actively participate in society over the life course.

[The project](#) investigates how design of both analog and digital gaming tools can help create more meaningful, challenging, and engaging teaching. The project is a collaboration between researchers in the Department of Communication and Psychology at Aalborg University, Aarhus University, the National Centre for Reading, University College Copenhagen and VIA University College as well as the companies CLIO Online, Build A World, and KMD/Uvdata.

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Children and young people in the local area are trained to prevent sports injuries

Sports researchers in the Department of Health Science and Technology have launched the concept [research for everyone](#) (in Danish: 'forskning i øjenhøjde'), a free offer for children and young people who want to learn more about physical training, training load and injuries – specifically knee injuries and pain. The participants' movements are measured and their knees examined; they also have the opportunity to participate in a research project where researchers examine and test the knee under different training loads. The offer thus contributes both to increased prevention of knee injuries and empirically to research in the field.



AAU PLAY

The streaming universe [AAU Play](#) is the newest addition to AAU's range of offerings to the upper-secondary school sector. AAU Play was born out of a desire from the upper-secondary schools for teaching materials that can be used "on demand".

On AAU Play, teachers can access short video lectures of about 10 minutes in length; each lecture is accompanied by assignments that expand on the topic. The lectures are given by AAU researchers and the topics range widely – each video is relevant for one or more school subjects.

With AAU Play, we offer the upper-secondary school sector teaching materials on the latest research not found in every textbook.



Quality in Day Care and School (KIDS 0-18)

The research groups Capacity Building and Evaluation (CaBE) and Centre for Education Policy Research (CfU) at the Department of Culture and Learning conduct practice-based research in education, pedagogy and evaluation with a special emphasis on quality in day care and schools.

Research is conducted in collaboration with practice, which ensures immediate implementation of research results and societal impact. Currently, CfU is working on a [Sapere Aude project](#) on tests and inclusion in conjunction with partners in Denmark, Argentina, England, Israel and China. The platform [KIDS 0-18](#) supports the bridging of research and practice by disseminating research results, conferences, news and other activities to partners and stakeholders and it thus informs research and facilitates testing of research results in local contexts.



leadENG student projects

Students at the Faculty of Engineering and Science have the opportunity to collaborate with students from other programmes across the faculty. We call these interdisciplinary student projects [leadENG Projects](#).

The leadENG Projects complement the sustainability profile of the Faculty of Engineering and Science and are based on nine sustainable focus areas. The aim of the leadENG Projects is to increase students' understanding of their own disciplinary field and how it can be used in related subject areas – all this while addressing society's grand challenges.

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all



Seminar rooms in the spirit of PBL

In 2020, a new innovative interior design of [AAU seminar rooms](#) was developed in the spirit of the PBL methodology, transitioning the traditional long rows of bench and table setting to a group-oriented interior design. The design process involved students and teachers.

The PBL seminar rooms provide teachers a flexible way of teaching when shifting from seminar to group work and back again. The PBL seminar room enables students to work in groups after seminars. The dynamic function of the room saves square meters, thus providing complete functionality for teaching, group work etc.



Teaching at Aalborg University Copenhagen Campus (Photo: Nils Krogh)



Anna Lyhne Jensen, Assistant Professor showcases how aerodynamics and wind turbines function at Girls' Day In Science 2021 at Aalborg University (Photo: Caroline Egeberg Jochumsen)

5

GENDER
EQUALITY

Gender equality and interest in STEM

[LabSTEM North](#) is an action research project with the purpose of facilitating motivation and interest in STEM (Science, Technology, Engineering and Mathematics) and STEM careers. This is done through an integrative and problem-based learning approach to STEM teaching across the entire educational system (K-12 and onwards), with a focus on transitions and STEM learning trajectories.

[The project](#) facilitates co-creation of problem-based STEM teaching through an online teacher community supported by workshops and digital resources, for example on diversity, gender equality (since girls are often very underrepresented in STEM), PBL and digital literacy in science education. The project runs from 2021 to 2024, and researchers in the Department of Planning at Aalborg University collaborate with a large group of partners from across the educational system.



Girls' Day in Science

To encourage women to pursue degrees in STEM (Science, Technology, Engineering and Mathematics), AAU hosts an annual [Girls' Day in Science](#) where female researchers and students present their work and host workshops.

[This year](#) all three AAU campuses took part and more than 350 high school students were introduced to STEM subjects and female role models from AAU. In addition, the girls got a taste of the Aalborg model and insight into what it is like to be a student at AAU, and hopefully inspiration to pursue a career in STEM.



The Danish Political Gender Equality Regime: Continuity and Change

The aim of [this project](#) at the Department of Politics and Society is to provide an in-depth characterisation of the Danish political gender equality regime, and identify key actors, dynamics and discourses that have been critical for the development of women's representation and for policy development in the areas of sexual harassment, equal pay and parental leave. The project identifies and analyses landmark formative moments in the political history of Danish gender relations, and analyses gender differences in political attitudes and voting behaviour. The focus is on developments since the woman's right to vote, with special emphasis on the period after World War II. The project is financed by THE VELUX FOUNDATIONS.



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Gender pay equality

In their Master's thesis [Provoking Conversation about Unequal Pay in a Work Environment Through Design](#), two students in the Department of Computer Science explore how a critical design can empower women and provoke conversation on unequal pay in a work environment through a Research through Design approach.

Based on a series of workshops, they developed four different prototypes of cups that through their unusual design and various statements alternating in a display on the cup (e.g. "Apparently, I deserve less money than my male colleagues.") can provoke discussions and create awareness about pay inequality. A field study tested the cups at an IT department of a large company in Denmark, and the findings will contribute to the research on women's empowerment in the field of HCI (Human-Computer Interaction).



DITECH: Diversity and Inclusion in TECH

[DITECH](#) (Diversity and Inclusion in TECH) is a project involving four departments at the Technical Faculty for IT and Design aimed at creating greater diversity among IT students and increasing well-being among all students at the faculty.

Diversity and inclusion are essential factors in addressing the increasing shortage of IT specialists, boosting innovation and creativity, and ensuring that IT solutions are developed by people of different mindsets.

Activities include collaboration with all stakeholders to make communication for recruitment inclusive, sharing of best practices, development of solutions creating the best framework for successful on-boarding, and creating solutions to increase the well-being of students and move towards an inclusive and healthy student environment.



Tripful

The award-winning entrepreneur Beata Dobsa, a graduate of the AAU Business School, got the idea for [the innovative app, Tripful](#), during a trip in South-east Asia. It all started during an internship in 2018. She wanted to travel around in South Asia and she preferred to have a traveling partner. After countless attempts to find a partner for the trip on the existing online forums, she gave up. Romantic offers were no problem, but the hunt for a platonic traveling partner was not a success. An idea became clear: A travel app for women was missing. The Tripful App was born. It enables women to find appropriate travel partners.

Achieve gender equality and empower all women and girls



Gender equality at Aalborg University

A key area for AAU's [Committee for Equality and Diversity](#) is ensuring gender equality at the university. The committee has been tasked with implementing [AAU's strategic action plan on equality and diversity](#), which has resulted in several efforts aimed at improving gender equality on both a practical and a more structural level.

An example of this work is that the committee inspired four faculties and seven institutes to actively work with the strategic focus area [More women in management](#) in response to a current gender imbalance in professorships and management positions in the respective departments. The focus area led to the production of the podcast series [Scientists Are Also Women](#) aimed at inspiring young women to pursue a career in academia.

Additionally, the focus area prompted the creation of [a policy and goalsetting](#) for gender composition in upper management, which is continuously monitored and re-evaluated.





6 CLEAN WATER AND SANITATION

Water laboratory at Aalborg University



Smart Water Infrastructure (SWIFT)

SWIFT is an interdisciplinary research project at the Department of Culture and Learning that deals with optimisation and safety of water infrastructures. The project develops methods that engage technical and human sciences to address major challenges concerning optimisation of water systems through digital and smart technologies. Close to 40 countries in the world face “extremely high” levels of water stress. It is believed that a part of this water stress is imposed by water losses due to suboptimal operation of the systems. The Techno Anthropology Research Group uses ethnographic research to examine the potentials and pitfalls of the digitalisation of water.



Resource recovery from wastewater

Wastewater treatment is the largest biotechnological industry in the world and of great importance for human health and protection of the environment. It is currently in the process of being transformed from treatment to recovery of nutrients and bioenergy, besides providing clean water. Microorganisms are the workhorses of the processes and [Center for Microbial Communities](#) is world leading in the study of these microbes to ensure stable and optimal performance which includes recovery of phosphate, minimising release of greenhouse gas, reduction of oxygen demand and the use of chemicals, and optimisation of biogas production. Per Halkjær Nielsen, Professor in the Department of Chemistry and Bioscience, is heading the activities and has recently been awarded “Vandmiljøprisen” by the Danish Water Sector and the Arden-Lockett award by the International Water Association (IWA).



Center for Membrane Technology (CMT)

The [Centre for Membrane Technology \(CMT\)](#) provides a unique platform for research and knowledge sharing and supports research on membrane separation. The organisation includes researchers in several departments at Aalborg University: the Department of Chemistry and Bioscience, Department of Electronic Systems, Department of the Built Environment (BUILD), and AAU Energy. The centre emphasises collaboration across disciplines to find innovative and sustainable solutions for water treatment and resource recovery. The membrane product development and solutions are created in collaboration with other leading universities and companies worldwide. The mission of the centre is to generate synergy in membrane research by bringing together expertise on membrane development, control and monitoring; process design; and scale up in one platform. In November 2021, the [Euromembrane](#) conference was hosted in Copenhagen, in conjunction with Lund University, Sweden.

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Smart Water Lab

The one-of-a-kind [Smart Water Infrastructures Lab](#) at the Department of Electronic Systems is a modular test facility that can be configured to emulate water distribution networks, waste water collection or district heating systems. This laboratory aims to address problems in water cycle management, focusing on how control technology can contribute to solutions. The laboratory provides opportunities for testing the robustness of various control solutions and innovative infrastructure solutions, and for verifying whether innovative ideas will work in practice.



AAU trains the future water and environmental engineers

As the population of the world increases and people gather in large cities, the need for proper water supply and water drainage grows each day. The [MSc in Water and Environmental Engineering](#) at the Department of the Built Environment prepares future engineers to handle these challenges. During this interdisciplinary programme, students deal with the pollution of soil, groundwater, drinking water, wastewater, streams, lakes and fjords, and how these systems are connected and affect each other. For example, how a lack of oxygen in fjords can be caused by human exploitation of the soil in the surrounding area and how floods can be caused by climate change. These types of interconnected environmental analyses make this study programme unique.



In the SWIFT project, pumps for wastewater management require continuous scrutiny and maintenance. Remote sensing technology collects and transmits real-time data from the utility networks, aiming to lower the risk of wastewater pump clogging (Photo: Jonas Falzarano Jessen)



A hidden water tank under the soccer field on the east campus provides water for all outdoor plants

In the [outdoor environment on the east campus](#), a large drainage system is integrated under an AAU soccer field. The drainage system gathers the rainwater in a 19 cubic meter collection basin. The grounds-keeping team pumps the water from the basin into a transportable irrigation system which provides water for all AAU flowerbeds and outdoor areas on the east campus..

Ensure availability and sustainable management of water and sanitation for all



Sensor taps in restrooms (Photo: Lars Horn, Baghuset)



A sustainable toilet visit at AAU

At AAU we use a [flush saving system](#) on our toilets to ensure that we use only half as much water per toilet visit compared to the previous system. Moreover, most taps have non-contact operation with a sensor that turns the water on and off, which saves water as the tap only flows when being used. Hand drying is done with sustainable paper towels manufactured to save approximately one-third the paper compared to traditional paper towels.



7 AFFORDABLE AND CLEAN ENERGY

Photovoltaic system and wind turbines at Madeira (Photo: Hannah Mareike Marcinkowski)



Aalborg University energy research significantly contributes to the green transition

Aalborg University has made significant contributions to advancing the global green transition of the energy sector. The department [AAU Energy](#) is fully dedicated to research, innovation and education in the broad field of energy. In addition, the research group [Sustainable Energy Planning](#) takes an interdisciplinary approach to the design and implementation of future sustainable energy systems.

Energy researchers at Aalborg University are recognised as pioneers in the field, with several researchers ranked in the annual [Clarivate Highly Cited Researchers](#).

In 2021, [Professor Frede Blaabjerg](#) received the prestigious international [EAWES Scientific Award](#) in acknowledgement of his leading-edge research in power electronics for wind energy. Further, [Professor Josep M. Guerrero](#) received the [IEEE Bimal Bose Award for Industrial Electronics Applications in Energy Systems](#), for his groundbreaking contributions to renewable energy based microgrids.



Energy Cluster Denmark

AAU is heavily involved in collaborations with Energy Cluster Denmark, Denmark's cluster organisation for the energy system. Strategic research partnerships with small and medium-sized companies, global companies and public organisations lead to beyond-state-of-the-art energy solutions for the transition towards climate-neutrality and a fossil-free society. AAU researchers co-create with ECD members in domains such as energy production, storage, efficiency, and system integration. Furthermore, AAU is a board member in ECD. [See the ECD project portfolio here.](#)



Efficient and reliable integration of renewables in the grid

The global society is demanding and producing more and more renewable energy, which in a sustainability perspective is a very favourable trend. However, with the increase in renewables come many challenges. One is maintaining 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. Secondly, increased instability will lead to increased costs due to downtime, failures, and maintenance.

The research project [REPEPS](#) at AAU Energy led by Villum Investigator Professor Frede Blaabjerg addresses these challenges. The ambition is to clarify what is at stake when integrating numerous new power electronic components and ensuring the foundation for future development of reliable and efficient power electronic components without compromising the stability of the grid.



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Improving battery technology to support the green transition

Electric vehicles (cars, buses etc.) are seen as one of the key technologies in the green transition. Battery technology has come a long way, but large-scale acceptance is challenged by several unsolved problems that limit applications of modern batteries.

Cross-disciplinary research at AAU Energy and the Department of Materials and Production addresses these challenges. For example, our researchers explore the degradation of batteries caused by fast charging and other ageing mechanisms. The aim is to improve materials and charging algorithms for batteries.

Furthermore, [Villum Investigator Remus Teodorescu](#) investigates smart batteries and how the life and reliability of batteries can be improved by using artificial intelligence and machine learning. The new type of batteries will have an impact on electric cars, making them a more attractive option.



IDA climate response 2045

Denmark can meet the government's climate objectives. Professors Henrik Lund, Brian Vad Mathiesen and colleagues in the [Sustainable Energy Planning group](#) at the Department of Planning have collaborated with the engineering trade union IDA in order to compose [IDA's climate response 2045](#).

The climate response is a concrete solution for how Denmark can reach our 2030 goals and become climate neutral by 2045. In addition, we will be able to use the green conversion to create jobs and stimulate industrial development. Among other things, the report focuses on: energy efficiency improvement in industry and buildings, planning for increased electricity consumption due to the reduction of fossil fuels, the need for increased wind power, further development of biomass, and the need for electrically fuelled public transport and delivery vans.



Partner in Center Denmark

The Technical Faculty of IT and Design is an active partner in [Center Denmark](#) that provides digital infrastructure, supporting players in the energy sector to develop new data-driven solutions – solutions that take advantage of opportunities in sector coupling and accelerate the green transition. The Center Denmark partnership, where the vice dean for energy is a board member, is based on a shared vision of accelerating the green transition to 100 percent renewable energy in Denmark via digitalisation and sector coupling. Through sector coupling, the center will exploit digital opportunities across and at all levels of the energy sector, thus making the sector's energy deliveries more flexible.



Bachelor's Programme in Energy

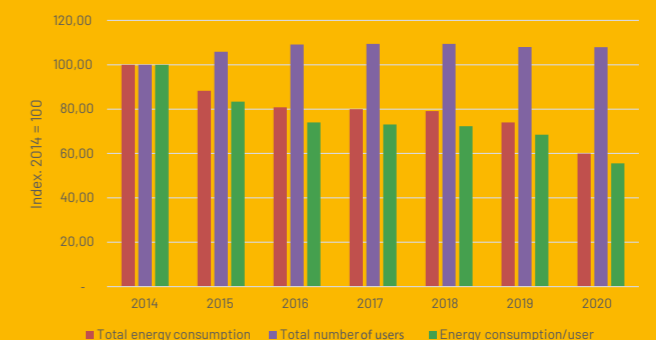
Energy sources of the future must be part of the solution to the grand societal challenges: Energy is a foundation for human conditions of life. Sustainability is an integral part of the [Bachelor's programme in Energy](#) at AAU Energy that includes sustainable and climate-neutral energy production and development of economically sustainable energy solutions. It contains elements in the thermal, electrical, control and mechatronic areas. Starting in the fifth semester, the study programme is divided into three specialisations. The students work on fundamental energy technology issues and development of sustainable energy systems. The students acquire competences in planning, production, distribution and consumption of electrical, thermal or mechanical energy, and control of energy technology systems.

Ensure access to affordable, reliable, sustainable and modern energy for all

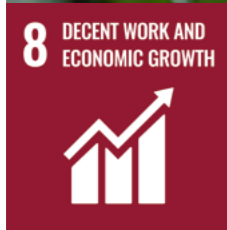


Energy consumption at Aalborg University

As of 2019-2020, AAU has reduced its total consumption of energy by 19 percent. The pandemic has impacted the reduction of energy, but as AAU's energy consumption has slowly been declining since 2014, it is plausible that AAU's total energy consumption would have been declining anyway, as [AAU prioritises sustainable management in the consumption of energy.](#)



Energy consumption at Aalborg University 2014-2020



Staff at AAU Communication at work (Photo: Emilie Bach Pedersen)



Digital upskilling in the workplace and higher education

At a societal level, Covid-19 has accelerated digital learning from an emerging trend into a megatrend, resulting in a “new normal” with more working and learning from home. [UnFoLD](#), anchored at the Department of Planning, aims to develop a digital platform for scalable and efficient upskilling in the workplace and higher education, focusing on three overall objectives: 1) Digitise Experiential and Collaborative Learning (ECL), including PBL, megaprojects, hackathons and case competitions that otherwise rely heavily on f2f interaction and are limited in scalability; 2) Develop algorithms to offer automated qualitative feedback; and 3) Develop framework and algorithms to offer measurability of educational impact (i.e. track and assess skills and competences and suggest new learning trajectories) and document corporations’ return on investment (ROI).



New research centre promotes sustainability and digital transformation

[The TECH Research Center for Sustainability and Digital Transformation](#) represents different departments and excellent researchers across the university. By creating an interdisciplinary centre, the researchers are taking an important step towards a sustainable future. The overall purpose of the centre is to provide a common framework where sustainability and digital transformation go hand in hand, and the platform is used to create innovation, collaborations and networks to support visions of a sustainable and digitally based society.



Organisational development at Centre for Deafblindness and Hearing Impairment

The research group [Processes and Learning in Organisations](#) at the Department of Culture and Learning has worked with organisational development in a large special institution, Centre for Deafblindness and Hearing Impairment, in the North Denmark Region. The role of the researchers was to facilitate an organisational change process aimed at learning and knowledge development. The process was necessary in order to offer people with deafblindness and hearing impairment the best possible conditions for mastering their lives. Action research involves employees and managers in the process and thus helps strengthen the social connectedness of the organisation. Employees and management took ownership of the change process, which supported them in reflecting on their own practices. The research has been conducted through three connected projects: [The Knowledgeable and Reflective Practitioner](#), [The Reflective Knowledge Leader](#), and [Learning in Praxis](#).



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Where does the green economy grow? The Geography of Nordic Sustainability Transitions

The aim of [this project](#) at the AAU Business School is to gain a better understanding of how transitions towards green growth unfold in different Nordic regions, and whether and how their respective development paths are conditioned by their pre-existing industrial, institutional and governance contexts. There is no one-size-fits-all approach to greening the growth path of an economy as this depends on place-based policy and institutional settings, level of development, resource endowments and particular environmental pressure points. The project addresses the place-based, context-dependent nature of the shift to green growth in the Nordic countries by asking the question: Where does the green economy grow? In addressing this question, the researchers foreground the importance of innovation, new industry formation, and radical industry transformation.



Partnership for research on social and health care educational programmes

Demographic changes and political initiatives will lead to demands for more elderly care professionals. At the same time, work in the elderly care sector is becoming more complex. This increases the need for ongoing competence building and educational programmes suited to future needs. Today, elderly care education (provided by social and health care vocational colleges) is not a distinct research field, and research-based knowledge is limited. The Department of Communication and Psychology and the Department of Culture and Learning at Aalborg University, SOSU Østjylland and Randers Social and Healthcare College have therefore created a [partnership for research in elderly care education](#). The partnership has published together and hosted the first national conference.

Charlotte Wegener, Associate Professor, Department of Communication and Psychology speaks at the first Danish conference on social and health care education as a research area (Photo: Line Mandrup Hansen, SOSU Østjylland)



Working environment for young people working in the new digital labour markets

Two research projects at the Department of Culture and Learning map the work environment for young people working on new digital work platforms and social media platforms. Digitally mediated labour is growing among young people who work as fashion bloggers, Instagrammers or YouTubers, etc., with online or offline platform work via/on digital work platforms. [The RADAR 1 project](#) showed that young people’s work environment is challenged, and that this is often exacerbated as the work is generally unregulated and individualised. [The RADAR 2 project](#) builds on results from RADAR 1. In research partnering with practitioners, a questionnaire and a media campaign will be developed. The aim is to find and communicate solutions consisting of preventive measures aimed directly at young people.

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



AI Denmark worked with Syncsence to make their VR sensors as intelligent as possible. Syncsence produces digital rehabilitation technology for physical and cognitive VR training of society's most vulnerable groups (Photo: Syncsence and AI Denmark).



AI Denmark

The purpose of the [AI Denmark collaboration](#) is to enhance the ability of the Danish business community to work with artificial intelligence. Small and medium-sized businesses need help to accelerate leveraging of data and AI tools in their digital transformation process. Digitalisation and artificial intelligence must be practical and easy to understand.

AAU's contribution is knowledge in areas such as machine learning, organisational change, strategy and development of data-driven business models. [AAU is the leading Danish university when it comes to business collaboration](#). At the same time, the AAU Business School and AAU's centre [AI for the People](#) have a deep technological and business practice experience that covers the entire AI value chain from research and development of pilot projects to implementation and follow-up.



AAU engagement in local and regional industry

Aalborg University is an active partner in regional development and has a strategic development agreement with regional government on building infrastructure for the green transition and a particular focus on securing more students in the STEM area in order to train labour for local industry. Moreover, AAU serves on various local industry boards such as the Aalborg Business Council and the boards of clusters and business support organisations.



How do train passengers travel together appropriately?

In collective transport, passengers share limited physical space which leads to increased risk of contagion. [The project](#) led by the Department of Culture and Learning contributes to change towards more environmentally sustainable mobility by examining if and how this risk poses a barrier for mode change from the private, individual car to collective transport. To understand this potential barrier and explore the potentials for change, the project 1) studies how the risk is constituted and negotiated in the governing of proper passenger conduct as it unfolds through policies, information material, guidelines and nudging from 'above', as well as through passengers' own travelling practices and legitimisation strategies from 'below'; and 2) studies if and how worries about contagion play a role in the structural stories people utilise to rationalise their own transport practices.



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Take-back creates value for environment and economy

Circularity in the manufacturing industry is a focal point to meet society's demands for environmental responsibility. Furthermore, critical materials will become limited worldwide in the future. Therefore, there is a need for developing products which have more than a single life cycle.

Researchers in the Department of Materials and Production are collaborating with companies such as Grundfos and Danfoss to develop a business case that is both financially and environmentally sound. The focal point of the project is [take-back and recycling of own products](#) and to ensure an economically viable model for product take-back, which is crucial for developing an efficient logistics process that includes all aspects from the return of end-of-life products, to the analysis of their condition, and an automatic disassembly process.



Enhancing circularity of textiles

The textile industry is one of the most polluting and resource intensive industries in the world. Therefore, it is important to extend the life cycle of textiles. Doubling the life of textiles by reusing, remanufacturing or recycling will reduce the climate impact by 40-50 percent. Despite that fact, only a small part of the used textiles is separately collected and circulated, varying between 22 percent in Sweden to 46 percent in Denmark.

The two-year Nordic project [SATIN](#) was initiated to enhance the circularity of textiles. The [Centre for Logistics \(CELOG\)](#) at the Department of Materials and Production is a partner in the project. More specifically the project will develop collection solutions that achieve increased collection rates of used textiles and investigate the opportunities for using centralised resources in the Nordics to achieve economies of scale in sorting.



New method for measuring one of the strongest indicators of human health

[AAU research](#) at the Department of Health Science and Technology has developed a new method for measuring one of the strongest indicators of a person's health: the VO2max which measures the ability of the lungs and heart to supply oxygen to tissues and organs and eliminate carbon dioxide. The measurement method known as seismocardiography can be used to estimate aerobic capacities without any physical activity as well as measure the effect of pacemaker treatment – a measurement that has previously been very expensive and challenging to perform. Results of the research include the start-up company [Ventrifect](#) that produces the Seismofit device used for this measurement.



Energy labelling of software and software installations

[This project](#) identified parameters for establishing an energy labelling practice for software and software installations and described methods to measure the energy consumption of a specific piece of software. The project concluded that it would be of interest to establish a certified software development and operations methodology to provide programmers with coding options to minimise energy consumption. It was funded by the innovation network InfinIT and included three industrial partners Edora A/S, Digiplex Aps and InfraTeam Aps. The project was headed by Professor Bent Thomsen, Department of Computer Science, and implemented in collaboration with Roskilde University and the Technical University of Denmark.

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



AAU Science and Innovation Hub

The new [AAU Science and Innovation Hub](#) opens in 2022. A total of 8500 m2 provides the physical space to support cross disciplinary collaboration, innovation, entrepreneurial activities and collaboration with society. The new hub will be a beacon for collaboration, utilisation of knowledge in society and research at AAU. The work in the Science and Innovation Hub will be centered around entrepreneurship, collaboration, cross-disciplinary collaboration, with a special focus on green transformation and digitalisation. It will be open to the public, partners, stakeholders, students, and staff.



Topping-out ceremony, AAU Science and Innovation Hub, 2021 (Photo: Lars Horn, Baghuset)



Virtual reality among indigenous people in Namibia (Photo: Emilie Arendttrup)



Social robots increase the well-being of people with dementia

According to Birthe Dinesen, Professor of Welfare Technologies, robots that are equipped with artificial intelligence and respond to touch, speech and eye contact have a positive effect on nursing home residents with dementia.

The research takes place at the Department of Health Science and Technology and has examined residents' well-being, social interaction, facial expressions, body language and acceptance of the social robot as well as the physical and mental working environment of nursing staff. [The conclusion](#) is that the robots can help to create security for the staff and make dementia patients happier.



Virtual reality among indigenous people in Namibia

Today, it is easier than ever to use new technologies such as virtual reality. But these technologies are largely being developed by and for the Western world. This prevents many people from other cultures from taking full advantage of the technologies.

[This project](#) focused on studying hand gestures with indigenous people in a settlement in the Namibian desert, and included the local San community in developing virtual reality technologies that would be natural and include novice users. These field studies entailed exploration and co-creation where the focus was on finding natural hand gestures that would work in a virtual reality set-up of the settlement the indigenous people live in. This project was a partnership between the Department of Architecture, Design and Media Technology at Aalborg University and Namibia University of Science and Technology.



REDY Regional Dynamics and Disparities

Unequal regional development is attracting increasing interest in many countries, in research as well as policy circles. Contrary to a deterministic perception of unequal development, the project takes an open approach which focuses on the interplay between three driving forces: business development, settlement and institutional development.

[The project](#) aims at providing a deeper understanding of each of the driving forces, their interplay, and causal relations. The project is a collaboration between the AAU Business School, the Department of Politics and Society, and the Department of the Built Environment.



Equal treatment of patients in the health care system

The Danish Centre for Clinical Health Services Research (DACS) at the Faculty of Medicine conducts research on (undesirable) variation in the quality of health care services, its implications, and how this inequality can be eliminated.

DACS is a multidisciplinary research centre that specialises in the efficiency and quality of health care systems, especially with a view to which clinical interventions are the most effective and for which patients.



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Medical students bridge the gap to Greenland

[Medical students at AAU](#) spent five weeks at the hospital in Tasiilaq, East Greenland as part of their studies. The stay gave the students insight into a different way of running a hospital system than they have been used to. According to their own statements, this insight reminded them of how important the clinical eye and the clinical skills are, and how important it is for doctors to know their patients and their background. With the establishment of the AAU Arctic Medical Student Association, the students hope that their trip will help pave the way for Aalborg University to send more medical students to the hospitals in Greenland in the future.



Practitioners and researchers collaborate to improve methods for assessment of emotional and social skills

[This research project](#) at the Department of Communication and Psychology aims to test assessment tools examining emotional and social challenges of people in vulnerable positions including children, adolescents, adults and families. Practitioners need good assessment tools to explore psychological challenges and potentials in order to plan the best interventions. Unfortunately, there is a lack of evidence-based assessments looking at emotional, social and interaction skills, which is why researchers at Aalborg University and a large group of professionals at [LIVSVÆRK](#) are collaborating to test and improve a number of newly developed assessments that will benefit individuals in vulnerable positions and society as a whole.



How can sports communities have a positive impact on the well-being of refugees?

Better physical, mental and social well-being for children and young people with a refugee background. This is the aim of a project that includes the research group [Sport and Social Issues](#) at the Faculty of Medicine participate.

Volunteers from the Danish Refugee Council will bridge the gap between refugee families and local leisure communities and initiate activities with play, joy and movement.

The researchers will follow the project, contribute to learning along the way, and write the final evaluation of the potentials and challenges of promoting refugees' participation in leisure activities and their involvement in their own health promotion. The project is being conducted in 10 municipalities in Denmark from 2021 to 2023.



New strategy for equality and diversity

Aalborg University has systematically worked on promoting equality and diversity since 2017 where a [strategic action plan on the subject for 2017-2021](#) was implemented. [A new strategy for 2022-2026](#) has been adopted that will continue and expand on the previous efforts along with focusing on new areas.

One way the new strategy extends the previous is by broadening the scope of the previous efforts from only academic staff to include students and technical-administrative staff. In the new strategy, initiatives will be developed under two main focus areas: diversity and inclusion.

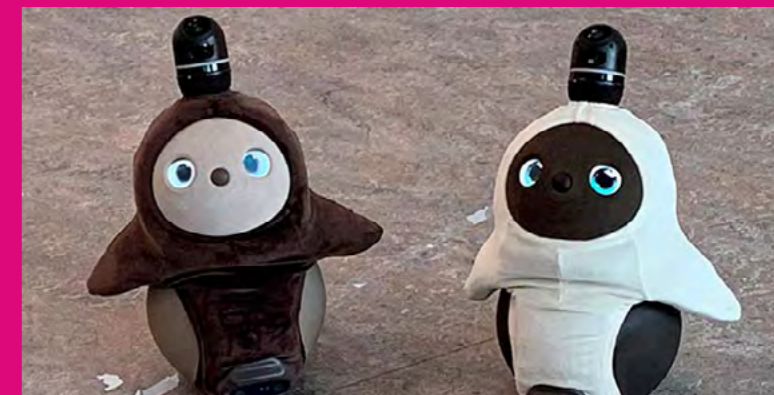
Reduce inequality within and among countries



'Equality alliance' to reduce social inequality in health

Citizens with lower educational levels, poorer finances or a weak or non-existent connection to the labour market have higher morbidity and mortality rates than the rest of the population.

In order to reduce this social inequality in health, researchers in Public Health Science at the Department of Health Science and Technology, have joined an [equality alliance](#) with the region, municipalities, hospitals and doctors in general practice. Bringing together the parties of the health care system is an initiative that aims to increase collaboration and sharpen the focus on easing the patient's journey through the health care system.



Social robots used in research at the Department of Health Science and Technology. The Japanese manufactured robots are called LOVOT, an abbreviation of love and robot (Photo: Birthe Dinesen)



11 SUSTAINABLE CITIES AND COMMUNITIES

AAU researchers contribute strategic research on the development of sustainable mobility solutions that are less resource-intensive and contribute to more liveable cities (Photo: Jon Ram Bruun-Pedersen)



Sustainable and Innovative Mobility Solutions

The project [Sustainable Innovative Mobility Solutions](#) (SIMS) at the Department of the Built Environment examines how new and more sustainable mobility solutions based on multi-modal, shared mobility can be designed. The aim is to develop mobility services – bundles of shared mobilities – that can form an attractive alternative to intensive car use and private car ownership in larger cities.

[In Nordhavn](#) in Copenhagen, a combined scheme of carsharing, bike sharing and ridesharing is offered to individuals and companies. The project studies the users’ experiences with the scheme through qualitative methods. SIMS contributes with strategic research to the future development of sustainable mobility solutions that are less resource-intensive and contribute to more liveable cities. The project is funded by Innovation Fund Denmark and involves 10 partners.



Locating Arctic Sustainable Online (LASSO)

[LASSO](#) is a project on digital mapping of sustainability in the Arctic. The Techno-Anthropology Lab at the Department of Culture and Learning in conjunction with Arctic Consensus – a central organisation between the Arctic, Denmark and the EU supported by the Danish Business Promotion Board – prepared an analysis of how different actors in the Arctic understand sustainability. This is part of a larger analysis that also involves the University of Southern Denmark and other actors. Results of the collaboration include a [dialogue meeting](#) on sustainability in the Arctic where the analysis was presented to relevant actors.



Urban Greening: Ultrasonics and AI for Sustainable Biodiversity in Cities

There is increasing evidence that not only many animal and insect species communicate with sound frequencies above the threshold of human hearing but so do plants. Equally, human everyday activity produces such ultrasound especially in busy city centres.

There is an increasing momentum to ‘green’ our cities by encouraging urban biodiversity yet little research on the impact of human ultrasound activity on such efforts. [This project](#), which is a collaboration of the Department of Communication and Psychology and the Department of Architecture, Design and Media Technology, will conduct a preliminary investigation of the Aalborg ultrasoundscape, developing new AI methods and machine listening datasets designed specifically for urban ultrasonic sources. In this way, we aim to contribute knowledge to the development of truly sustainable urban greening.



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Danish research paves the way for sustainable construction in Europe

Life Cycle Assessment (LCA) is an important part of assessing the environmental sustainability of buildings. Researchers in the Department of the Built Environment have developed the [LCAByg tool](#) that calculates the environmental profiles of buildings based on the choice of different materials and design principles. The tool already [played an important role](#) when a Danish national strategy for sustainable construction was developed and due to new LCA requirements, the tool will continue to be of great importance in the construction of new buildings. Not only does the tool play an important role in the Danish construction industry, it has also attracted international attention. The LCAByg tool is part of the European project “Embodied Carbon Benchmark” which aims to reach a gradual reduction of CO2 emissions in construction from now and until 2050.



Study programmes focusing on cities and sustainability

These study programmes enable students to find solutions for creating a sustainable future. During the [Bachelor’s programme](#), student projects focus on issues such as planning urban areas that are affordable and climate neutral, business and industry with minimal negative impact, and built and natural infrastructure that is holistic and resilient. In the [Master’s specialisation](#), students work on how to create stronger urban environments and qualities based on the notion that the city is more than the sum of its parts. This holistic, multidisciplinary and participatory approach puts people at the centre, and enables students to focus on creating benefits and life quality for all inhabitants and users. Further, AAU will welcome new students to a brand new programme in [Sustainable Construction Processes](#) as of September 2022. Thus, graduates of these programmes contribute to translating the SDGs into action in society, both during their studies and as professionals.



Sustainable commuting

In 2020, Campus Service did a pilot project on [sustainable commuting at the Aalborg campus](#) where staff members were motivated to take their bike to work as a part of a competition lasting one and a half months.

The competition was popular and the pilot project was a success. The plan is to upscale the concept to include all AAU staff in order to motivate people to more sustainable commuting. The concept was paused during the pandemic, but is planned to be restarted in 2022.

Make cities and human settlements inclusive, safe, resilient and sustainable



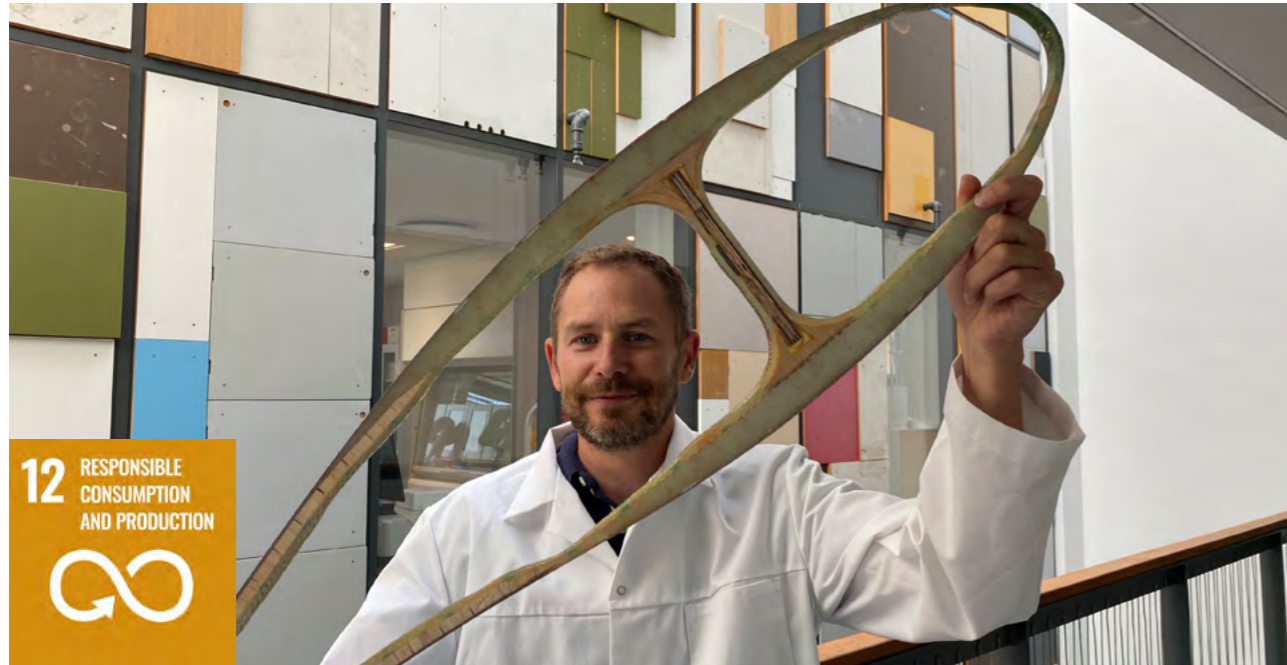
Better and greener transport with BRT+

Aalborg University collaborates with the municipality of Aalborg in order to provide better access to the campuses for students, staff and visitors. Roads on the east campus are undergoing new infrastructure development and are being prepared to accommodate the new [Bus Rapid Transit \(BRT+\)](#) bus, as the municipality of Aalborg decided to upgrade the overall infrastructure, such as between AAU and the airport.

The new infrastructure will provide students, staff and visitors with more dynamic transportation.

Outdoor campus environment at Aalborg University (Photo: Emilie Bach Pedersen)





12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Wind turbine blades are made from composite materials and are not easily recyclable. AAU researchers are investigating how to separate glass fibers from wind turbines in order to improve the recycling process



TECH for Circular Economy will help towards a sustainable future

At Aalborg University, a [new interdisciplinary center called TECH for Circular Economy \(TECH4CE\)](#) will strengthen the many different initiatives in sustainable and responsible consumption and production. TECH4CE will contribute to the progress already made in production businesses such as textile, plastics, electronics, and building, by analysing and developing strategies for these initiatives. Particular focus is on design of circular products and business models, logistics regarding materials and resources, traceability of products and their life cycle, standardising and certifying recycled products and materials, and documentation of environmental effect. TECT4CE consists of representatives from four different departments under the Technical Faculty of IT and Design.



Recycling of wind turbine blades

The life cycle of a wind turbine is estimated at 25-30 years. This means that many of the first generation of wind turbines have already been dismantled. While up to 90 percent of a wind turbine can be recycled, the problem of the blades remains. These are made from composite materials that were intended to last and they are not easily recyclable. [A group of researchers](#) at the Department of Chemistry and Bioscience decided to take up the challenge and investigate how to separate glass fibres from wind turbines in order to improve the recycling process. In future wind turbine production, the recycling element will become important, and research is currently also being done on how to more easily separate the components without compromising on strength.



UPLIFT - recycling of plastic packaging

Plastic pollution has become one of the most pressing environmental issues. [UPLIFT](#) will help put the European plastic packaging industry at the forefront of innovation and sustainability worldwide by keeping plastic waste in the loop and integrating more recyclable bio-based building blocks, instead of using virgin fossil-based monomers.

This will result in a reduction of plastic waste generation and greenhouse gas emissions associated with its production. Last but not least, the project will examine social aspects, exploring the potential synergies between policymakers, industry, consumers, and recyclers that are critical for changing the plastic economy.

UPLIFT is led by the Department of Chemistry and Bioscience and consists of fifteen partners from eight European countries.



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Efficient utilisation of buildings

Holistic campus planning and management is key to ensuring efficient utilisation of all buildings and outdoor areas. Densification of activities is used in order to achieve more efficient and economically balanced use of space, increase synergies between fields of research and study, as well as create better study, social and urban spaces.

[In 2021 AAU implemented activity based seating with shared office spaces.](#) The decrease in use of space has a positive effect on reducing resource and energy consumption.



Use of green carbon materials in constructions

A [research project](#) led by the Department of the Built Environment aims to prepare a professional report on the potential of using biogenic materials in construction. The focus is on the production and use of renewable materials. Renewable materials include biogenic materials that can be annual biomass such as flax, perennial biomass such as wood, or marine resources such as seashells, reeds and seaweed.

The green transformation of construction requires political decisions and long-term plans for the production of raw materials with qualities and in quantities corresponding to the needs of the construction industry. The project will shed light on the dilemmas related to the possibilities for the use of biogenic materials in construction and deals with the climatic aspects for the time horizons 2030, 2050 and 2100.



Climate change and global value chains in Bangladesh

[This project](#) at the AAU Business School investigates how the textile value chains connecting Europe and Bangladesh are being reconfigured in response to climate change, and the consequences for economic, social, and environmental upgrading in the textile industries of Bangladesh.

The main research objective is to generate insight into the actors pushing for decarbonisation and value chain resilience efforts in the textile industries of Europe and Bangladesh; the drivers behind their engagement; the scope of their practices, experimentation, and collaboration; and the consequences for economic, social, and environmental upgrading in Bangladesh.

Ensure sustainable consumption and production patterns



Waste sorting at AAU

In 2020-2021 a [new waste sorting system](#) was implemented to increase sorting of recyclable fractions like plastic, glass, bio-waste, metal, paper etc., all in accordance with the [national Climate Plan for a Green Waste Sector and Circular Economy](#).

Through this waste sorting system, AAU will be able to increase recycling, and overall ensure sustainable campus service. It is estimated that when sorting in the different waste fractions, all three campuses can send approximately 500 tonnes of waste (excluding lab-waste and residual waste) for recycling. Prior to the implementation of the new sorting scheme this waste was not being recycled.

When implementing the new waste sorting system, Campus Service encouraged students to write their student projects about the new waste sorting system in collaboration with Campus Service. The projects were also a part of the [Megaproject](#) concept.



An example of waste sorting at Aalborg University (Photo: Lill Heile Bertelsen Christensen)



Greenland Ice Sheet (Photo: Mikkel Juul-Andersen)



Climate changes in the Arctic

Greenland plays a unique and central role in the global climate system and it encompasses all existing climate gradients in the Arctic. It is therefore crucial for the entire globe to understand the changes that are happening in Greenland in order to be able to better predict the effect of global climate change.

In a new research collaboration, GIOS (Greenland Integrated Observatory System), researchers in the Department of Chemistry and Bioscience along with project partners have initiated a largescale collaborative effort aimed at measuring the quality and changes in air, ice, land and sea in the Arctic. The goal is to investigate the effects of climate change in the Arctic environment in order to understand climate change impact globally. [The project](#) is supported by the Ministry of Higher Education and Science.



Climate Risk Reporting by Pension Funds: International Evidence

[The project](#) at the AAU Business School examines climate risk reporting practices by pension schemes in Denmark and six other OECD countries. It is an empirical study of international variations of pension fund climate risk reporting, and an in-depth survey of how climate risk reporting practices by Danish pension funds have evolved to meet changing public policy and market challenges related to the green transition. This research is funded by the Independent Research Fund Denmark for DKK 2.3 million over a two-year period 2021-2022.



Climate hack: Mitigating climate change on a global scale

At the Department of Planning, Theresa Scavenius, Associate Professor has played the leading role in planning the climate conference, [Climate Hack - Water](#). This interdisciplinary conference is the first unique event for scholars and societal and business activists with a deep and profound interest in pushing climate action.

The initial step was to create a strong worldwide political agenda with a genuine interest in mitigating climate change on a global scale. The mission is to hack and disrupt the current climate discourse in order to design concrete pathway plans amplifying a comprehensive and coherent green transition of the carbon-based society and economy.

The CLIMATE HACK conferences will take up new perspectives such as water, health, wood and food in order to draw attention to the planning process of climate politics.



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AAU climate targets and accounting

In order to support Aalborg University's continued contribution to the green transition, three ambitious climate targets have been adopted:

1. Aalborg University has reduced its greenhouse gas emission by 70 percent in 2030 (1990 baseline)
2. Aalborg University is climate neutral no later than 2045
3. Aalborg University will contribute to national fulfillment of the 70 percent reduction in 2030 and climate neutrality in 2045 in the cheapest and best possible way, while striving to make it technologically, organisationally, and humanely possible to further enhance the ambition of these targets.

Disclaimer: These are unofficial translations of the targets. For officially adopted targets see Danish version [here](#).

To further qualify the targets and ensure continued monitoring and follow-up, a [model](#) for climate accounting covering scope 1-3 emissions from all university activities is underway that will serve as a baseline ensuring the most efficient measures. The model was developed as a part of a national collaboration on a common climate accounting methodology that AAU researchers had a leading role in creating. The model is expected to be used by all universities.



Commercialisation of sustainable fuels for aircraft and ships

[A consortium](#) of 17 partners from Denmark and other European countries received more than DKK 30 million from Innovation Fund Denmark to bring the production of sustainable fuels for aircraft and ships to the stage of commercialisation. Researchers at AAU Energy are actively involved in the consortium which covers the entire value chain. The project is titled "Low Carbon Fuels for Aviation and Marine Markets". The goal of the project is to provide technical data, business models and implementation scenarios for a range of value chains, ranging from input materials in the form of organic household waste and agricultural residues to the finished and ready-to-market fuels. The project includes quantified greenhouse gas reductions and sector coupling, particularly the exploitation of green hydrogen and circular exploitation of resources.



EU project - Horizon 2020 grant JUSTNORTH Arctic Environmental Justice

Sandra Cassotta, Associate Professor in the Department of Law, researches legal and governance responses to climate change impacts, particularly at the law-science and policy-making interfaces on different environmental media. She is currently Institutional Partner Leader of the EU project [JUSTNORTH Arctic Environmental Justice, Towards Just, Equitable and Sustainable Arctic Economies and Societies](#). Global climate change has launched intense speculation on Arctic resources, and significant practice and policy gaps in Arctic economic activities cause unsustainable development. The project aims to develop frameworks, indices and a negotiation tool for reconciling ethics and value systems. These will determine the viability of activities in the Arctic and clarify pathways to just, ethics-based decision-making principles.

Take urgent action to combat climate change and its impacts



AAU is an active member in a consortium of 17 partners from Denmark and other European countries bringing the production of sustainable fuels for aircraft and ships to commercialisation (Photo: Colourbox)



14 LIFE BELOW WATER

Plastic in the oceans is a growing problem for nature and human health. The research centre MarinePlastic led by AAU is addressing the problem of plastic pollution from multiple angles



DiveTracker monitors life below water

Students in the Department of Electronic Systems have developed an app for underwater communication – [DiveTracker](#) – a system that can be used for monitoring divers. However, by integrating other types of sensors, the technology can also be used to measure the ocean pollution or monitor life below water. For instance, a diver or fisherman will carry the DiveTracker device while doing activities in the ocean.

The technology will then measure the level of plastic pollution or oxygen and transmit the data to the device located above water. The data contributes to a better understanding of the ocean and marine life, and the challenges they face.

Similarly, fishermen can use the technology to estimate the quantity of marine life in different locations of the ocean so as to avoid areas with scarce quantities of fish.



Students tell the story of a 400 year old shark and sustainability around the Limfjord in the 1800s

Two groups studying history [presented their research results](#) in June 2021 to the International Council for the Exploration of the Sea (ICES) Expert Group on Historical Fisheries and Fisheries Data (WGHIST).

The student projects deal with Danish fishing of Greenland shark in Greenland during colonial times and the collapse of Northern Denmark's huge herring economy in the 1800s. The presentations by the students were well received by the international experts due in part to their relevance to climate change studies and sustainable fishery.



The Future of Arctic Coastal Ecosystems Identifying Transitions in Fjord Systems and Adjacent Coastal Areas (FACE-IT)

Managing the consequences of a warmer Arctic on the cryosphere, biodiversity and societies is a major challenge, requiring knowledge about how the social-ecological system operates currently and how it may operate in the future.

[FACE-IT](#) will provide the first large-scale systematic comparison of coastal areas under variable degrees of cryosphere loss aiming for a holistic understanding of the consequences for Arctic marine biodiversity and Arctic societies. [FACE-IT](#) is anchored at the Department of Culture and Learning, and has received funding from the European Union's Horizon 2020 research and innovation programme.



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MarinePlastic

The Danish research centre [MarinePlastic](#) will develop solutions to the problem of plastic pollution in the ocean.

Based at the Department of the Built Environment and funded by VELUX FONDEN, the centre joins Danish universities and disciplines to tackle one of the biggest environmental problems.

Plastic in the oceans is a growing problem for both nature and human health, and MarinePlastic will address the problem of plastic pollution from multiple angles. Research activities include gathering knowledge on the types, causes, extent, spread, degradation and environmental impact of plastic pollution.



The 21st Danish Marine Researcher Meeting

In January 2022, the Department of Chemistry and Bioscience will be hosting the [21st Danish Marine Researcher Meeting](#), helping to increase awareness about the sea which plays a central, positive role in human life. Damage to the ocean is far-reaching in its effects in terms of productivity, species diversity and resilience.

Today, the sea is under ever-greater pressure from economic growth and development. The mission of the Marine Researcher Meeting is to contribute to establishing a healthier and better marine environment, including sustainable use of marine resources.

The Danish Marine Researcher Meeting is held every second year and includes participants from universities, authorities, ministers, the business community, interest groups, the fishing industry, the Danish Society for Nature Conservation, members of parliament, etc.

Conserve and sustainably use the oceans, seas and marine resources for sustainable development



AAU east campus prepares for climate changes

Since 2020, an ongoing [lake and canal project](#) aims to improve the ecological quality of the water. Sustainable urban drainage (DA: Lokal Afledning af Regnvand, LAR) projects manage potential storm surge overflows and other water-related natural events. This includes the use of parking areas as dry detention basins.

AAU collaborates with the local community and authorities in the project planning, implementation and operations. The project entails an investment of EUR 3 million for AAU. Campus Service invites students to use the project as a living lab.

Environmental changes and Arctic coastal livelihoods. Fishermen in Qaqortoq, South Greenland (Photo: Lill Rastad Bjørst)





Lycaena phlaeas in Aalborg University's rewilding areas (Photo: Morten Johansen)



Wildlife conservation

[Wildlife conservation](#) refers to the practice of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions. At the Department of Chemistry and Bioscience, a group of researchers is highlighting the importance of genetics in maintaining viable populations, and studying a range of bird, mammal and insect species using methods such as modern sequencing technologies.

In addition, the group has undertaken a series of works aimed at improving animal welfare, focusing on animal behaviour. Their research has been disseminated in international peer review journals, as well as in popular media outlets (newspaper, television, radio and social media).



Bringing land use into the assessment of products, services and projects

In recent years, the consensus in Denmark and internationally is that land use is related to products, services and projects, but this notion is not well reflected in current assessment methods.

At the Department of Planning, several researchers at the [Danish Centre for Environmental Assessment](#) (DCEA), have therefore developed a comprehensive calculation model that takes all land use types into consideration and are implementing this in terms of both the novel assessment frameworks for products from the bio-economy and the assessment of projects and plans in a project like the [DREAMS project](#). This project run by researchers at DCEA includes specifically examining how we can systematically include land take in environmental assessment.



AAU and Zoo collaboration

In September 2019, AAU and Aalborg Zoo [extended their collaboration](#) to further leverage research and teaching in animal welfare and conservation of species. The agreement aligns perfectly with the AAU strategy "Knowledge for the World" and is an ideal example of how Aalborg University creates knowledge in collaboration with society. Part of the agreement allows biology students at the Faculty of Engineering and Science to be located in Aalborg Zoo, which strengthens and nuances their research projects. Besides working closely with researchers and personnel from AAU and Aalborg Zoo, the students get to practice their communication skills when presenting their results and findings to visitors at the zoo. A great way to improve knowledge sharing and make our research and results accessible and visible to the outside world.



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Environmental and animal ethics

At the Department of Culture and Learning, researchers at the [Centre for Applied Philosophy](#) conduct research on sustainability philosophy, environmental philosophy, animal philosophy and health philosophy in a broad sense. In the field of environmental and animal philosophy, the focus is particularly on the ethical issues related to the "non-human" – animals, environment and life-as-such.

Research is conducted on the actual practices of agricultural animal husbandry, rewilding, hunting and animal behaviour research.



A hum of biodiversity at AAU

In 2021, Campus Service set up hives and insect hotels to generate the best conditions for biodiversity (insects, bees etc.). These hives and insect hotels will further advance the rewilding initiative at Aalborg University to protect the natural resources surrounding the university.

All student and staff are welcome to book a beehive and produce their own AAU honey. The project is a response to a student request in 2020. To book a bee hive or to learn more about the initiative, please contact [Campus Service](#).



Rewilding on Aalborg University's east campus (Photo: Lill Heile Bertelsen Christensen)



Rewilding at Aalborg University

With the aim of increasing biodiversity through restoration, protection and establishment of wilderness and natural resources in city areas, AAU has joined the concept [Vild med Vilje](#) (rewilding). Campus Service is changing how green areas are managed by reducing resources spent on cutting and trimming grass and other plants. Since 2019, AAU has been surrounded by 75.000 m2 of wild nature, and new projects to further increase biodiversity are still being implemented.

In 2021, Campus Service decided to sow farmers' flower mix, as we reuse the former seeds in the soil, complemented by a colourful mix for students and staff to enjoy. Many have picked bouquets and it has been a rewilding success.

In addition, the plants that we sow are used for many years in a row, either in the same plant boxes or in new plant boxes [around campus](#).

We compost all green clippings and all branches from pruning at the municipality's storage site where they compost it in compost miles.

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss



Rewilding on Aalborg University's east campus (Photo: Morten Johansen)



Aalborg University Copenhagen Campus



Research Group on Global and Transnational Law

[The Research Group on Global and Transnational Law](#) at the Department of Law collaborates with national and international research communities and other stakeholders on research that promotes human rights. They focus, for example, on the management of migrants and refugees in the Mediterranean and the obligation of states to respect human rights in their legitimate exercise of migration control. The group also analyses whether or not the various legal disciplines interact in their practical execution, and whether cooperation between states, national and international institutions and other actors in each situation helps to promote legal security and human rights for the individual. The group also collaborates with the North Denmark Region on research on Human Rights Cities, which points towards actions for a rights-based and citizen-centred health care system.



Modelling and prevention of crime occurrence

Researchers at [Department of Mathematical Sciences](#) have developed a statistical methodology to analyse the spatial patterns of crime occurrences in big cities. With these models it is possible to study how occurrences of a specific type of crime are related to geographical variables describing socio-economic properties of neighbourhoods (income, educational level, type of residence etc.) as well as dependent on policing strategies. It also enables determining whether occurrences of different types of crimes are correlated. The new methodology hence makes it possible to study causes of crimes, highlight crime hot spots, and inform policing strategies.



Sustainable development goals inspire new elective course on children's rights

Three lecturers in the Department of Law have developed an interdisciplinary elective, [Children's Rights and Human Rights](#), that deals with children's human rights. Law students acquire basic knowledge about human rights, but the new course is interdisciplinary and involves a range of legal topics and areas of law. The interdisciplinary approach is reflected in the fact that the course is taught by three jurists, each with a different professional background. The subject is based on Denmark's obligations under international conventions, in particular the Convention on the Rights of the Child. This strengthens students' understanding of Denmark's and other countries' role in and promotion of international organisations, in particular the legal protection of children and the building of transparent institutions that promote the best interests of the child.



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National Expert DK - DG Environment and DG JUST projects

The EU Commission procures legal research-oriented studies that focus on national compliance with EU legislation. EU member states are represented by a national expert in such research-oriented studies enabling the EU Commission to build capacity and contribute to compliance with SDG 16.3.3. Access to EU-wide research capacity allows the EU Commission to monitor that sustainability oriented national organisations and administrations are established in various sector areas such as environment, energy, and consumerism. The Department of Law holds such national expertise/compliance study expertise and has participated in and evaluated Danish implementation and compliance with [species protection rules](#), [EU markets for electricity](#) and [possibilities for consumer participation in the green transition in 2020](#).



Aalborg University staff policies

To support a strong institutional framework, several [staff policies](#) are in place, including several policies in support of a good and safe working environment. These also include transparency regarding institutional processes, code of conduct for staff, and a new [whistleblower policy](#) in December 2021 to protect whistleblowers. Further, as AAU is a self-governing institution under public sector administration, the same fundamental values as the rest of the public sector apply; these values include openness, democracy, rule of law, objectivity, integrity and impartiality as well as the requirement of lawful administration. Staff members at Aalborg University must demonstrate good administrative practice both in terms of conduct and task performance.



Elected representation

Aalborg University elects student and staff representatives to the university's highest governing bodies: the University Board, Academic Councils, Department Councils and Study Boards. Each year, Aalborg University holds [elections](#) for students and staff to ensure elected representation in the governing bodies of the university.

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels



Wide and unique range of dialogue at UN peace-keeping operations conference

A uniquely broad group of politicians, researchers and practitioners from both U.N. military and civil society attended [this conference](#) on UN peacekeeping operations on 26 November 2021. Hosted by the Department of Politics and Society and the Danish UN Association, one of the purposes was to highlight and reflect on Denmark's contribution to the UN's peace work based on UN Sustainable Development Goal 16 "Peace, justice and strong institutions" and Goal 5 "Gender equality. Among the programme's [participants](#) were an ambassador and former Special Representative of the Secretary General, a former Major General and Force Commander in Western Sahara and a Lt. Gen. and commander of NATO training missions in Iraq.



Conference co-hosted by AAU: Denmark's future role in UN's peacekeeping operations (Photo: Casper Sakstrup)



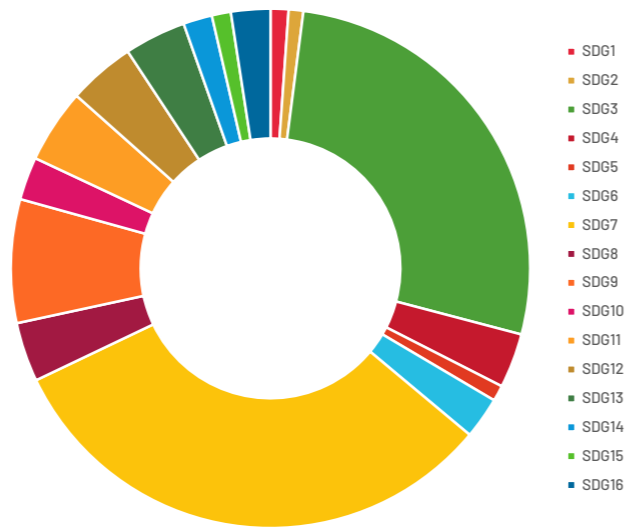
17 PARTNERSHIPS FOR THE GOALS

Jacob Ravn, CEO of Access2Innovation (A2I), with the AfricaLics PhD visiting fellows discussing the inspiring work of A2I (Photo: Ariadni Zormpa)



Knowledge for The World: AAU hosts African visiting PhD fellows

There are many ways of making sure knowledge translates into action and supporting sustainable development throughout the world. One of them is through collaboration with young researchers from African countries, for example the [AfricaLics Visiting Fellowship Programme](#), developed in collaboration with the [AfricaLics](#) secretariat in Nairobi and hosted by the Department of Politics and Society. The programme aims at supporting young African researchers – PhD students and postdocs – to produce high quality research that can help solve developmental challenges in their home countries. It is part of a larger effort by the AfricaLics network to foster the production and increased up-take of high quality research in Innovation and Development in Africa. Since 2015, a total of 21 fellows have participated.



AAU publications within SDG 1-16



General Engineering

Society and industry’s need for graduates with strong specialist skills and a broad view towards other disciplines will only increase. Therefore, Aalborg University has established [BSc in General Engineering](#), a new interdisciplinary PBL programme focused on realisation of the UN Sustainable Development Goals. In the first years of the programme, students will be introduced to different engineering subjects and to cross-disciplinary collaboration with fellow students. This gives them valuable competences to solve problems collaboratively and thus contribute to the SDGs. In the final year of the BSc programme, the students are able to choose specialisations from among various engineering topics.



AAU Arctic works with public as well as private actors on Arctic issues. Photo from Nuuk, Greenland (Photo: Lill Rastad Bjørst)



Aalborg University partnerships

Aalborg University actively engages in creating strong [partnerships](#) at the local, regional, national, and international scale. AAU’s role in partnerships aimed at solving highly diverse issues at differing scales range from [international cooperation](#) to collaboration between businesses and AAU [researchers](#) and [students](#) to renting or granting access to [AAU research facilities and equipment](#). It has been documented that AAU is a [national leader](#) when it comes to the volume of collaboration based on size of the university. These collaborative engagements have further been documented as creating [value](#) for external partners not only in business and researcher collaborations but also in student projects. Some of AAU’s strategic partnerships are presented below.



AAU Arctic – building knowledge, engagement and capacity through collaboration

In recent years, the Arctic has become the symbol of climate change. As a historic site of low tension and peaceful collaboration, the Arctic reminds us of how climate action and green transition is a shared responsibility and that partnerships are a precondition for engaging with these challenges. Research, teaching and collaboration are areas that everyone – regardless of nationality and background – would agree are relevant to meeting SDG 13. [AAU Arctic](#) was established in 2016 as a cross-faculty platform to coordinate, facilitate and communicate Arctic research and cooperation in conjunction with researchers and students as well as stakeholders and communities in Greenland, the North Atlantic and the broader Arctic region.



AAU contributes to green transition through an active partnership in Green Hub Denmark

[Green Hub Denmark \(GHD\)](#) is a strong public-private partnership working on green innovation, sustainable business models and large-scale testing to mitigate climate challenges. The hub connects business, consumers, research, the utility sector and authorities to enable them to co-create a world class platform for green growth and a green societal transition. AAU cooperates with Green Hub Denmark on several national mission-oriented initiatives such as the [Inno-Missions](#) and “Growth Team” North Denmark, and is an active partner in projects like [Sustainable Synergies](#), [GreenCem](#) and [DanWEC](#).



Collaboration with North Denmark Region

AAU and the North Denmark Region (RN) have joined forces in an [agreement](#) that sets out the overall framework for cooperation. This spans a wide range of areas such as Sustainability and Green Transition, STEM, Health Innovation, Management Development and the Future of General Practice with the involvement of researchers, management, administration, etc. RN and AAU share an ambition to contribute to a strong North Denmark, and both parties are key actors in driving regional development. Thus, the agreement illustrates how AAU collaborates with our surroundings to make an impact on society.

Strengthen the means of implementation and revitalize the global partnership for sustainable development



CESAER

CESAER is the strong and united voice of 53+ science and technology universities in Europe. AAU is involved as a board member, a chair of Task Force Learning and Teaching, and participates in several other task forces that provide opportunities to influence key bodies, participate in European funding programmes and advance understanding of science and technology in societies for a sustainable future. The Task Force Learning and Teaching is an example of institutions banding together to accelerate the needed change in engineering education for transformative learning and sustainable development of societies. See a description on [Task Forces - CESAER](#).



ECIU University – connecting for impact

Aalborg University is part of a highly prestigious [European University Alliance](#) that focuses on developing a European-wide ecosystem based on open and inclusive collaboration between societal stakeholders, researchers and learners. The aim is to provide European answers to future societal challenges and become a leading knowledge provider in SDG 11 in Europe. ECIU University creates a platform for solving multi-disciplinary challenges in innovative ways and provides lifelong, personalised learning and career opportunities, enabled by a co-creational university model.

About this report

This report summarises a selected range of activities that Aalborg University is engaged in to meet the UN Sustainable Development Goals.

This report constitutes only a small subset of the many initiatives Aalborg University has embarked on in our efforts to meet the UN Sustainable Development Goals. Additional information on how Aalborg University engages with the UN Sustainable Development Goals in research, teaching, collaborations and operations can be found on the [Aalborg University Sustainability website](#).

The activities presented in this report have been identified and selected through comprehensive consultations with key stakeholders from the Faculty of Medicine, the Technical Faculty of IT and Design, the Faculty of Engineering and Science, the Faculty of Humanities, the Faculty of Social Sciences, Campus Service, AAU Innovation, the Rector's Office, Study Services, HR, and AAU Communication.

Publication data used in this report for the first 16 Sustainable Development Goals was extracted from [SciVal](#) using the predefined Research Areas in SciVal for the respective SDGs. The methodology used by SciVal to define the SDG Research Areas is the [Elsevier 2021 SDG mapping](#)¹. The search was limited to publications from 2016-2021, and data was extracted on 15 December 2021.

Publication data for COVID-19 research (page 9) was extracted from the Aalborg University Research Database (Pure), using the search string ("COVID-19" OR "Coronavirus" OR "Coronakrisen" OR "2019-ncov" OR "sars-cov-2"). Data was extracted on 15 December 2021. More information can be found on the [website for COVID-19 research at Aalborg University](#).

¹Rivest, Maxime; Kashnitsky, Yury; Bédard-Vallée, Alexandre; Campbell, David; Khayat, Paul; Labrosse, Isabelle; Pinheiro, Henrique; Provençal, Simon; Roberge, Guillaume; James, Chris (2021), "Improving the Scopus and Aurora queries to identify research that supports the United Nations Sustainable Development Goals (SDGs) 2021", Mendeley Data, V4, doi: 10.17632/9sxdykm8s4.4

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