

# Science *with* Arctic Attitude

University of Oulu  
Strategy 2016–2020







# Pushing the boundaries of the known for a more sustainable, healthy and intelligent world

**Environmental change**, the growing global population and rising wealth place ever greater demands on the sustainable use of our planet's resources. Urbanization is challenging infrastructure and public services, both in expanding cities and in depopulating rural areas. Human life expectancy is increasing due to advancing healthcare and better living conditions. Digitalization continues to make the world more connected and is altering the way we communicate, learn, work and consume services. All these developments affect our way of life, our communities and our cultures. We need new, research-based knowledge and well-educated people, able to navigate in a changing world.

At the University of Oulu we promote learning and carry out research that pushes the boundaries of the known. We use our full potential to contribute to solving some of the greatest global challenges, including sustainable resource use, responsible business, human wellbeing and lifelong health, intelligent systems and services development, and harnessing environmental risks.

The University's impact is based on excellence, high ambition and productivity in all our activities. We are equally as proud of the scientific breakthroughs, new technology and world-class innovation developed at the University of Oulu, as we are of the impact that our 50 000 alumni have as well-educated citizens around the world.

Our strategy is to enhance our significance in international research and secure our role alongside the world leaders in our focus areas. We are building a strong, distinctive scientific profile and plan to further develop our education programs and innovation activities as integral parts of a high impact university. Our high ambition level and open-minded and collaborative culture create a unique environment for the members of our community to grow and develop their expertise. Our two campuses provide exceptional possibilities for multidisciplinary research and education complemented by a welcoming atmosphere.

The research done at the University of Oulu benefits people living at all latitudes. However, our heritage as one of the Northernmost multidisciplinary universities in the world is invaluable now, when mankind's new growth frontier is to the North. The demanding conditions of the far north have always forced people to be inventive and resourceful. Many innovations that have changed the world have their roots here. We call this: **"Science with Arctic attitude"**.



# We make a significant contribution to solving global challenges in five focus areas

Our researchers contribute to solving global challenges by combining multidisciplinary approaches, high level research and fruitful collaborations in the following five focus areas:

## Creating sustainability through materials and systems

We take a multidisciplinary approach to creating sustainability through the responsible and smart use of natural resources. We connect expertise to produce intelligent solutions. These range from fundamental materials science, to the production and use of superior materials and (bio)catalytic systems, concepts of bio and circular economies, cleantech, and ICT and open data solutions.

## Molecular and environmental basis for lifelong health

We generate greater understanding of the factors that affect health during life and how this knowledge can be translated into the benefit of lifelong health. We explore human life from fetal development to old age, including molecular and physiological properties, and environmental, social and psychosocial factors. In addition, we promote learning into the possibilities of combining ICT with health and service research to create new innovations in connected health.

## Digital solutions in sensing and interactions

We explore how digitalization can work for everyone, including sensing and ubiquitous wireless sensor systems, wireless communication, and other novel services and systems. The research targets future information infrastructures and integrates aspects of technology adoption by complex human groups, communities and societies.

## Earth and near-space system and environmental change

We seek to understand how the Sun affects near-Earth space and the Earth's atmospheric regions. This research is carried out in Oulu and at the Sodankylä Geophysical Observatory. This focus area also covers the Earth's changing environment from the point of view of e.g. geology, and ecology and genetics, in Arctic and boreal systems.

## Understanding humans in change

We explore the complex dynamics of global, digital, environmental and economic change on current human interaction and on communities and cultures over time. Our research identifies and explains the reasons, processes and practices involved in these changes, shows how humans adapt to them, and predicts the effects they will have on humanity in the future.



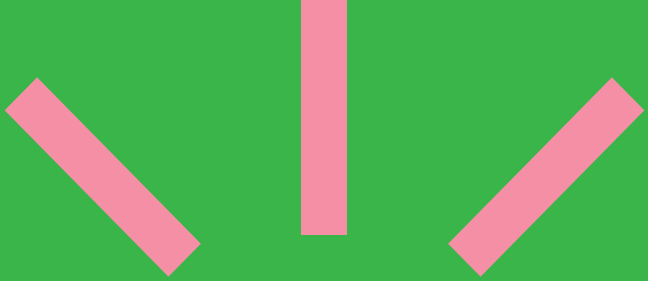
# Sustainable growth in the North — Expertise in Arctic conditions, environment, technology and culture

**There is growing interest** towards minerals, energy resources, boreal forest and fresh water in the Arctic. The effects of global warming are dramatic in the Arctic region and new logistics routes are opening up. The sustainable use of natural resources is crucial as the Arctic is one of the purest and best-preserved natural environments in the world. The Arctic region is also home to millions of people, including indigenous peoples with unique cultures and traditional, nature-based livelihoods.

Finland aims to lead the way in the sustainable development of the Arctic region. We will open up new emerging economic opportunities, while taking into account the limitations imposed by the vulnerable natural environment and the rights of local communities. Research at the University of Oulu supports the Arctic agenda with expertise in many fields, including sustainable use of natural resources, for example: sustainable mining and production technologies; aeronomy and atmospheric chemistry; technologies suitable for extreme conditions, Arctic logistics and distance spanning; health in Northern environments; and Saami Linguistics and Saami Cultural Studies.

These endeavors depend on strong partnerships. We work in close cooperation with other universities and research institutes focusing on Arctic issues.





Committed  
top talent,  
supported by  
high-quality  
infrastructure,  
enables  
important  
breakthroughs

**We aim to** build research environments with critical mass, high ambition and strong international networks. Many of our research units represent the international cutting edge in their fields. The University of Oulu has unique multidisciplinary strengths and our researchers strive to recognize and develop new openings of international significance.

Our competitive research group structure includes researchers at different career stages, ranging from students through post-doctoral researchers to senior scientists. We support our talented researchers as they grow into stellar scientists. We will also use the tenure track procedure to recruit new principal investigators to strengthen our strategic research programs. The recruitment process enforces excellence as a selection criterion and fosters competitiveness in academic careers that, in turn, facilitates the commitment of talented researchers to our university.

We build and operate research infrastructures that allow our scientists to achieve breakthroughs. Emphasis is placed on pooling infrastructures into state-of-the-art service platforms. Several of our infrastructures have the capacity to serve demanding national and international customers. Cooperative alliances with our partners also include joint research infrastructures. Moreover, we coordinate several research infrastructures in the Finnish Research Infrastructure Roadmap and are responsible for Finnish coordination of some European infrastructures.

The University of Oulu emphasizes ethical principles in all research activities. We follow the principles of open access research, and enabling open access of research publications and research materials, including planning for promoting usability and making materials available to the scientific community.





# A unique environment for students from different disciplines to enjoy learning

Our **educational mission** is to provide higher education based on research, and to educate youth to serve society and humanity. The overall aim is to further improve the quantitative and qualitative results and impact of education. Our approach is to develop education as an integral part of our scientific activity towards the following strategic aims:





### High-quality degree programs attract engaged students

Education at the University of Oulu relies on an international research base, produces academic competence relevant for future working life, and takes advantage of the strengths and networks of the multidisciplinary university. Our degree programs are inspiring, student-centered and encourage each student to achieve his/her full academic potential. Our programs attract students who value the competence they are acquiring. We constantly review our degree program portfolio in order to ensure high quality with clearly set learning outcomes.

### Smooth studying processes

Our degree programs enable a smooth studying process with clear goals and a high success rate at all levels. The number of students passing at least 55 ECTS annually remains the highest in Finland. We encourage our students to take an active role in creating the learning process. The assessment of students reflects this approach. Customer-oriented, efficient student services and learning support tools enable the student to concentrate fully on the joy of learning.

### Modern, digitalized learning environments and pedagogic development

Our pedagogically skillful staff rely on the latest research knowledge in teaching to create an inspiring studying atmosphere. Support activities and facilities match the needs of a diverse student population. Learning environments are continuously developed utilizing the potential of digital learning and independent study on a 24/7 campus.

### International studying experience

Our organizational culture promotes internationalization. Our degree programs include well-structured placement opportunities that support exchange studies or training periods abroad. International Master's programs are more thoroughly integrated with other Master's programs, and thus give more options for international careers to all graduates. Tuition fees for students outside the EU and EEA countries will be transparent and the grant system will be built to be encouraging.

### Structures supporting cooperation with working life

We educate competent experts capable of creating successful, lifelong careers in the dynamic work market. The development of degree programs is competency-based and the results of systematic career path follow-ups are used in curriculum revision. Contacts with working life are developed through the Open University, lifelong learning, working life practice coordination and specialization education. The advantages of a multidisciplinary university are promoted for minor studies selection.

### Systematic doctoral education

Doctoral training is coordinated by a university-wide graduate school. It offers transferable skills courses, and field-specific training in doctoral programs that embrace research excellence. Personal study plans, combined with skilled supervision, enable graduation in four years and aid doctorate students to demonstrate clear research impact during their thesis projects.





# Strategic partnerships enable better results

**We are proud** of our extensive partnership network with universities and other research institutions around the world. These collaborations span student exchange and teaching in joint research programs, sharing of infrastructures, and technology development.

We increase the impact of our research via a systematic approach to developing international networks with selected universities, supported by branch offices and liaison officers.

University profiling and the national division of tasks form an important principle in focusing and developing our research and educational activities. Education at the edges of our areas of excellence will be increasingly organized in collaboration with our partner universities. Partnering enables us to focus on further developing our own strengths, improving efficiency and offering a larger selection of studies to our students.

We are developing joint study paths with our partner Universities of Applied Science (UAS) to enable more flexibility for UAS students to continue their studies at the University of Oulu, or allow our students the possibility of including UAS courses as part of their degree.







# Fostering research-based innovation and start-up culture

**The University of Oulu** advances economic wellbeing by educating competent, skilled and adaptable professionals, who are able to drive innovation by applying the latest technological and scientific knowledge in real-life challenges. We drive innovation by providing an environment that encourages novel, multi-disciplinary solutions, and by fostering collaboration with industries. Entrepreneurship programs are integrated into our curricula. The University fuels the Oulu region as the most progressive innovation environment in Finland.

## **Fostering a culture of innovation and curiosity**

We provide an open, supportive environment that encourages inspiration and innovation. We encourage fruitful dialogue between students and staff, an internal start-up attitude, and opportunities to test ideas and get instant feedback. We aim to combine academic expertise and entrepreneurial spirit, both in education and in research.

## **Establishing agile and responsive collaboration models and processes**

Go-to-market is seen as a crucial area of improvement in Finland. Universities and technology research organizations have focused on scientific discoveries, whereas support to commercialize these has not been systematic. We are dedicated to improving the interface between external stakeholders, companies and communities, and thereby building a bridge from discoveries to applications and impact for society.

## **Ensuring fit-for-purpose guidance and metrics for innovative structures and processes**

Joint target setting, measures, and guidance from external stakeholders will be used to ensure the right research focus and the utilization of innovations. Procedures will be established to evaluate the impact of the university within the innovation ecosystem and the return on investment for innovation activities. In order to be the most rewarding partner, innovation policies, processes and guidelines should be easy to apply to our daily work.





Our two campuses  
provide exceptional  
possibilities for  
multidisciplinary  
research and  
education  
complemented by  
a welcoming  
atmosphere.





# An attractive, dynamic environment with remarkable results

**To attract** top academic talent from all over the world, the University of Oulu aims to be the best place to do research in its focus areas – and we let the world know about it. Pro-active human resources planning guides recruitment for all jobs.

Leadership is based on a balanced development of professional expertise, efficiency and wellbeing at all levels. All our employees and working communities are encouraged to re-think and continuously improve their own work. Each employee is ultimately responsible for her/his skills, their ability to change, and their own contribution to the building of a successful environment.

In all of its operations, the University strives for excellent quality, high impact, performance and attractiveness. A strong financial foundation is needed for sustainable operations. Allocation of resources will be consistent, transparent and performance-driven. Quality, impact and productivity are measured using the indicators set by the Ministry of Education and Culture in the allocation of core funding from the government. Peer review processes will be used to identify top talent and ideas in research. Attractiveness will be measured by how we succeed in student admissions, talent recruitment and partnering.



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