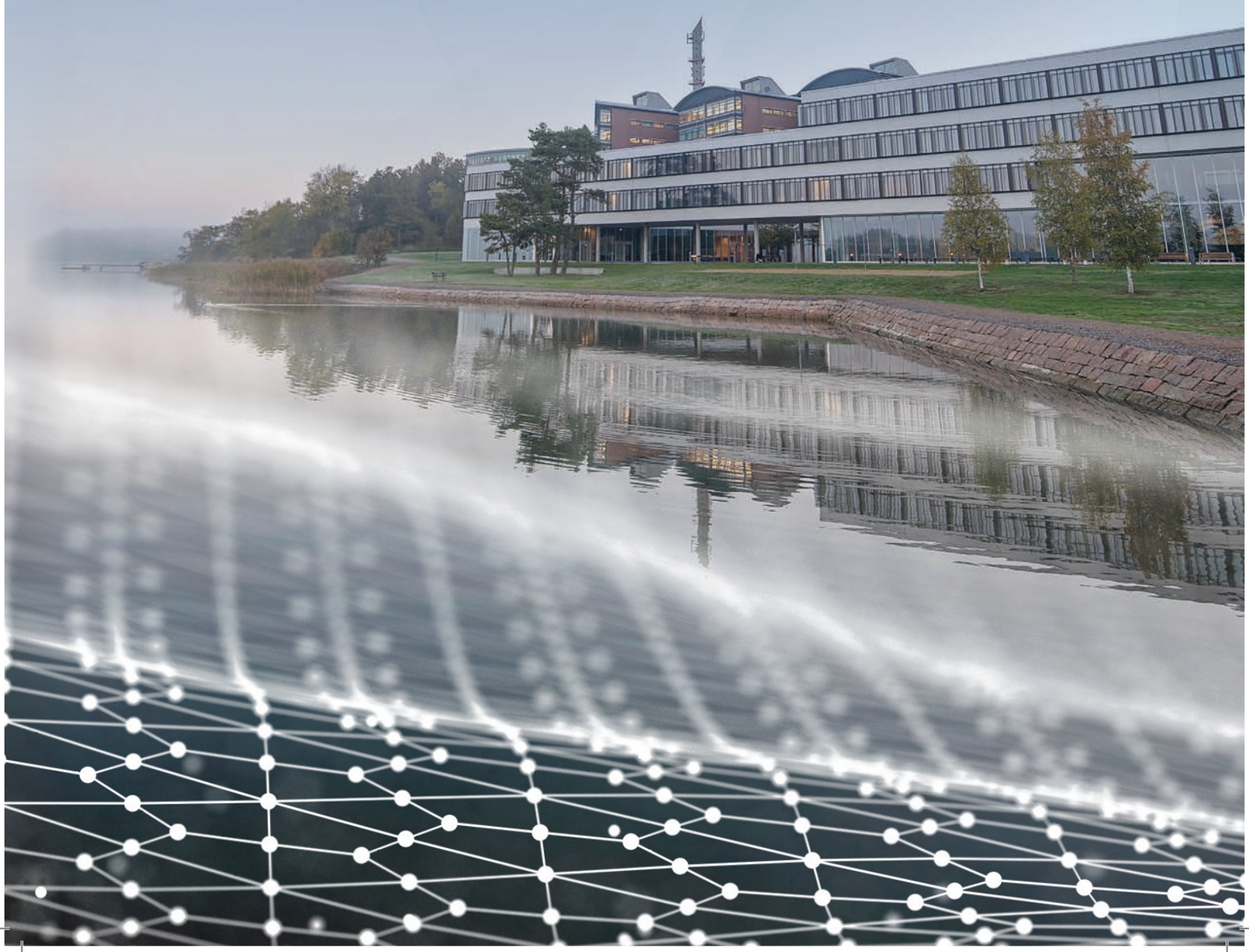
BLEKINGE TEKNISKA HÖGSKOLA · BTH ·

BLEKINGE INSTITUTE OF TECHNOLOGY

BTH

RESEARCH AT BTH

FOR SOCIETY'S CHALLENGES



RESEARCH AT BTH

BTH is a university where the research is applied, i.e. the purpose of the research is to seek new knowledge with a view to a definite application.

Research is conducted in the fields of engineering, IT, spatial planning, industrial economics, design and health sciences, all connected under the profile of applied IT, which researchers approach from different perspectives. BTH is among the world's most outstanding higher education institutions within software engineering and sustainable development.

Research is conducted in collaboration with both business and industry as well as society, and always with a clear focus – that the results will contribute to solving the challenges facing society.

RESEARCH FIELDS AT BTH

APPLIED SIGNAL PROCESSING

Applied signal processing is a very broad field which for instance includes systems engineering and mechatronics. Our research focus is on future innovations for sustainable development of human health, home and work environment, productivity or production costs.

COMPUTER SCIENCE AND ENGINEERING

The research focuses on two areas: data science and parallel computer systems. The research includes both practical and theoretical aspects of data processing and applications, as well as implementation of such systems.

INDUSTRIAL ECONOMICS AND MANAGEMENT

The research focuses on the interplay between technology, innovation and industrial dynamics. Key issues are entrepreneurship and its importance for sustainable growth and social development, how institutional framework conditions affect entrepreneurship as well as consequences of new technologies and their implementation in businesses.

MATHEMATICS AND SYSTEMS ENGINEERING

Many inventions that we currently take for granted are based on mathematical innovations and models. The aim of the research is to develop and strengthen the theoretical mathematics for the future's need for new advanced and sustainable products.

PEOPLE, HEALTH AND TECHNOLOGY

The research focuses on the areas of nursing and health sciences. The recurring element of the research is applied health technology, that is, how health can be affected by the use of new technologies and how technological research can help promote a good life.

PLANNING AND THE BUILT ENVIRONMENT

The research in planning explores how planning works and the different control mechanisms that affect spatial development, but also how planning processes are initiated and managed, as well as the institutions and stakeholders involved.

PRODUCT DEVELOPMENT

The research field has mechanical engineering as scientific foundation and drive product development capability for innovation in a sustainable society as a comprehensive focus.

SOFTWARE ENGINEERING

Software engineering covers techniques, methods and processes for the development of complex software systems and the application of systematic, disciplined and quantifiable approaches to the development, operation and maintenance of software-intensive systems, services and products.

STRATEGIC SUSTAINABLE DEVELOPMENT

The research focuses on methodological support for companies, municipalities and other organizations that want to work strategically with sustainable development, that is, organizations that want to contribute to society's transition towards sustainability in a way that strengthens the organization.

MEDIA AND COMMUNICATION TECHNOLOGY

The research straddles the line between technology and aesthetics, and is about integrating the two. We create and present experiences, information, data and processes as well as participatory methods in creative and boundary-crossing ways.

TELECOMMUNICATION SYSTEMS

Our researchers are specifically qualified for evaluation and handling of IT architectures, mobile multimedia, web services, as well as virtualized environments, such as cloud computing and cloud networking.

VISUAL AND INTERACTIVE COMPUTING

The research focuses on visual and interactive computing which includes computer science disciplines such as computer graphics, visualisation, game technologies, and human-centered computing.

RESEARCH FOR **SOCIETY'S CHALLENGES**

There are a variety of ongoing research projects at BTH. Some examples are presented below.

MINIMISING TRAIN TRAFFIC DELAYS

How can rail traffic be re-scheduled when disturbances occur?

By developing and demonstrate optimisation-based decision support for real-time train traffic management, research at BTH contribute to minimising train traffic delays. The focus lies on transportation policy analysis, simulations, development of search algorithms and finding sustainable transportation solutions.

Smart cities and communities rely on efficient, reliable and robust transport systems. The participants in the European collaboration project TRANS-FORM will develop, implement and test a data driven decision making tool that will support smart planning and pro-active and adaptive operations. The tool will integrate new concepts and methods of behavioural modelling, passenger flow forecasting and network state predictions into real-time operations.

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SUPPORTING COMPANIES IN BECOMING SUSTAINABLE

With the objective to support manufacturing companies to integrate and implement sustainability on strategic, tactical and operational levels, a focus on early design phases are applied in research at BTH in close collaboration with companies. The research group is for example working on ways of providing engineers with a quantifiable assessment model that makes the value of sustainable innovations explicit. Also, to find a systematic way for how to integrate sustainability in the risk management processes is crucial.

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EMPOWERING PEOPLE WITH MILD DEMENTIA

It is estimated that around nine million people are living with dementia in Europe. With BTH's focus on applied health technology and with access to longitudinal studies on elderly's health, the participation in the EU-wide research project SMART4MD is welcomed. SMART4MD is focused on empowering people with mild dementia and on supporting their carers, by creating a system designed to help with adherence to treatment and sharing health-related data.

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SOLVING INDUSTRY'S SOFTWARE CHALLENGES

The research in software engineering at BTH is conducted by SERL Sweden, which is one of the leading research groups in empirical and evidence-based software engineering in Europe. At BTH we are closely collaborating with industry to solve actual industrial challenges and strengthen our partners' competitiveness in the development of software-intensive systems, services and products.

Within a recently started large research initiative, SERT, the formulation of 3:rd generation empirical software engineering will utilize related knowledge areas as catalysts to solve challenges. Value-based engineering, data-driven evidence based engineering, and human-based development will complement software engineering competence in an integrated eco-system of competence focused on the challenges at hand.

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IMPROVING ENTREPRENEUSHIP CONDITIONS

With the aim om improving entrepreneurship conditions research at BTH focuses on improving the conditions for technology, innovation and entrepreneurship. It shows the role technology and innovation play for the competitiveness of companies and also their influence on entrepreneurship and economy-wide growth. Part of the research also analyses how policy influences.

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INTEGRATING GAME AND REALITY

How can playing in a physical location be perceived as a relational technology? By situating and integrating the embodied play in the city, playing is no longer a solitary affair but an installation and manifestation in the public sphere. Games that focus on playing as a process of responding raise questions about how we can become engaged and live together with cities of the future.

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The fact is that sometimes we should be fascinated by how much works around us, instead of complaining when it malfunctions.

Professor Claes Wohlin
Software engineering researcher, BTH

BTH FACTS

- Approximately 5 000 students
- Approximately 500 employees
- Approximately 50 professors
- Approximately 110 PhD students in engineering

BTH is among the world's most outstanding higher education institutions within software engineering and sustainable development. In systems and software engineering, **BTH is ranked sixth in the world** and first within the EU, according to the Journal of Systems and Software. BTH is also deemed to be the best in Sweden and in third place within Europe for sustainable development, according to a report from the Alliance for Global Sustainability.

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