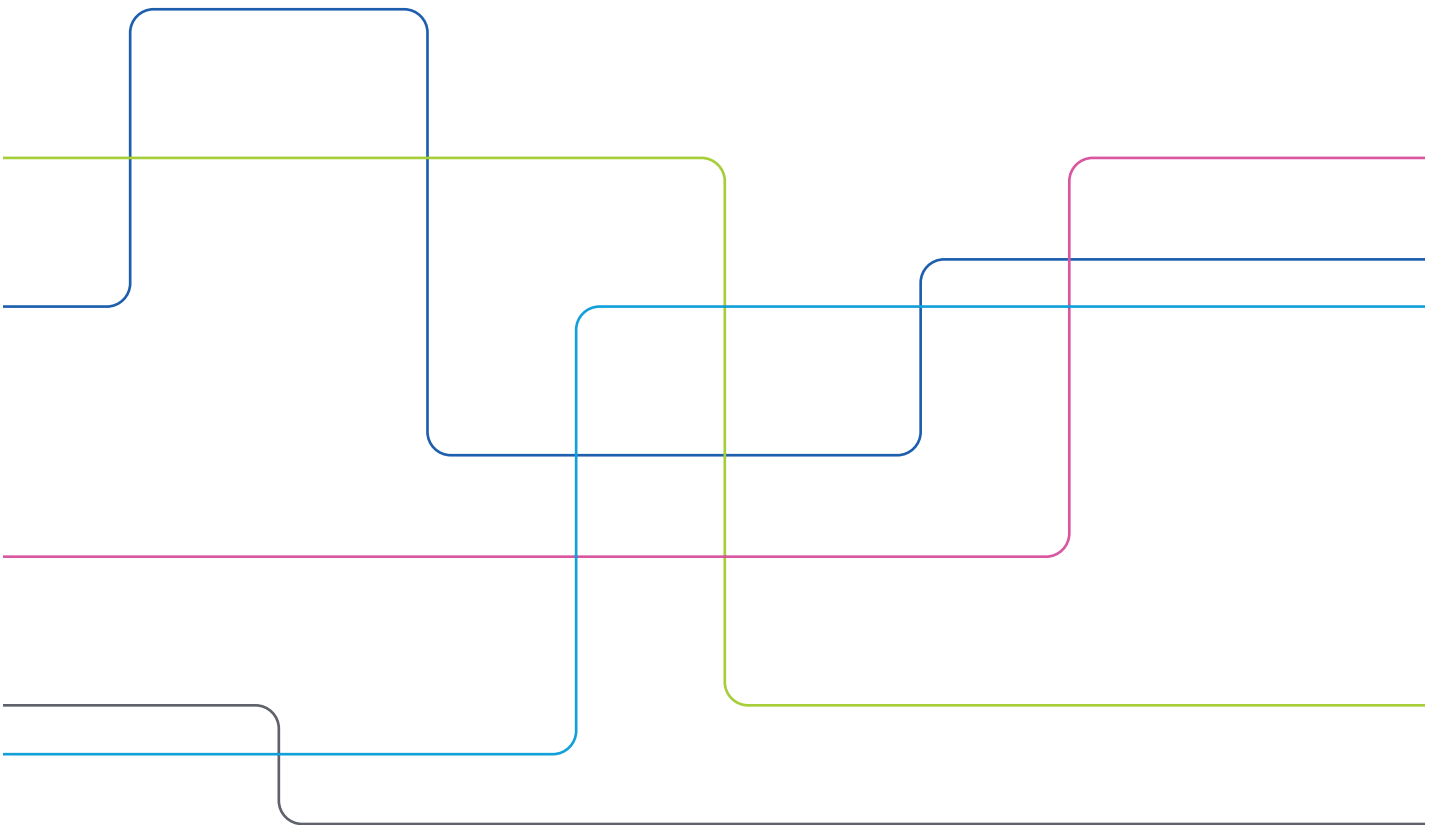




# Research and education for a brighter tomorrow



# Building a sustainable future

We dare to be optimistic at KTH. As one of Europe's top technical universities, we see how our high-quality research and education benefit society – now and in the days to come.

We are tackling some of humanity's greatest challenges, for example climate change and urbanisation, with sustainable solutions and practical answers. Serving society is part of our mission and KTH takes responsibility for the role of technology in societal development.

KTH's organisation as a whole is characterised by internationalisation. Our success relies on cooperation and collaboration with the international scientific community, with the private and public sectors and with the surrounding society. Our recruitment strives for diversity with regard to skills, background and gender. Everyone should have the opportunity to participate in shaping a brighter tomorrow. Daring to be optimistic about the future encourage us in our endeavor to become a more sustainable, digitalised, international and equal KTH.

A handwritten signature in grey ink, reading "Sigbritt Karlsson". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

**Prof. Sigbritt Karlsson**

President

KTH Royal Institute of Technology



# This is KTH – one of Europe’s leading technical universities

KTH Royal Institute of Technology was established in 1827 to meet the Industrial Revolution’s growing demand for engineers. As technology has changed, so has KTH’s mission. Today, students and faculty from all over the world work together to create a brighter, more sustainable future.

KTH is Sweden’s largest technical research and learning institution and home to students, researchers and faculty from around the world dedicated to advancing knowledge. The university’s diverse area of study and research include engineering, natural sciences, architecture, industrial management, urban planning, history and philosophy, social science, humanities and artistic research.

Basic and applied research is performed side-by-side, and interdisciplinary research is conducted alongside work in specific fields. In this way, KTH fosters multi-faceted solutions to global challenges, and the innovative climate at KTH creates many opportunities to turn ideas into realities.

The educational programmes foster a new generation of engineers, architects, teachers and undergraduate engineers.

KTH has around 3,600 full-time positions, over 13,000 full-time students and over 1,700 doctoral students. The university’s annual turnover of over SEK 5 billion, of which around two thirds is related to research.

Onwards, KTH will continue to focus on research and education for a brighter, more sustainable tomorrow. Continuously assessing the impact of the efforts in society and contributing with the intellectual resources of students and researchers to create new approaches to some of the most critical challenges.

## World-class ranking

QS 2019 ranks KTH as the 98th best university in the world.  
THE 2019 ranks KTH as number 62 in Engineering & Technology and as number 7 in the University Impact Rankings.

### QS Ranking by Subject

- Electrical Engineering, 19
- Architecture / Built Environment, 23
- Mechanical Engineering, 26
- Materials Science, 26
- Statistics & Operational Research, 29
- Computer Science & Info Systems, 41
- Civil & Structural Engineering, 43
- Mathematics, 44



# Five campuses filled with innovation and entrepreneurship

The KTH campuses are situated in the Stockholm region. Each having its own individual strength and distinctive character, all sharing focus on sustainability, internationalisation, equality and digitalisation. The strategic placement enables in-depth collaboration and close contact with the industry and surrounding community.



## **KTH Campus**

The main KTH Campus is located in central Stockholm and has been an important centre for research and education of international status since the early 20th century. With many of KTH's central functions and engineering programmes being based here students enjoy a vibrant environment. The campus is an area undergoing constant development, which ranges from living lab environments to new student accommodation.



## **KTH Kista**

KTH Kista is located in the heart of Kista Science City, the largest ICT cluster in northern Europe and home to over 1,000 ICT companies. The international research and education focus primarily on building the information society of today and tomorrow. Close collaborations between KTH and neighbouring companies create unique opportunities for students to interact with industry.



## **KTH Flemingsberg**

KTH Flemingsberg is located in one of northern Europe's most important areas for medical technology both in terms of research and industrial activity. Here, KTH conducts education in medical engineering, computer engineering, electrical engineering and engineering and economics. Flemingsberg is an area of strong growth and it is attracting major investments in its future.



## **KTH Södertälje**

KTH Södertälje focuses on sustainable production in subject areas such as logistics, system knowledge, process development, optimisation, quality, design and product development. There exists close collaboration with industry and students maintain close links and contact with nearby companies such as Scania and AstraZeneca. Together with them and Södertälje Municipality KTH is a key partner in Södertälje Science Park.



## **KTH Solna**

KTH Solna is located in one the most important national hubs for research within various life science disciplines. The main focus of the campus is the Science for Life Laboratory, a joint effort between four of the best-ranked universities in Scandinavia; KTH, Karolinska Institutet, Stockholm University and Uppsala University. SciLifeLab is a national centre for molecular biosciences with focus on health and environmental research.



# Nurturing minds and shaping things to come

Sweden is considered one of the world's most technologically innovative countries, and KTH is considered Sweden's most prestigious technical university. More than 13,000 full-time students and over 1,700 doctoral students from around the world gather at KTH's facilities to learn and innovate, making KTH one of Europe's key centres of intellectual talent.

KTH offers over 60 Master's programmes in five fields of study:

- Architecture and the Built Environment
- Engineering Sciences in Chemistry, Biotechnology and Health
- Electrical Engineering and Computer Science
- Industrial Engineering and Management

The university is focused on the practical application of higher learning, and maintains close relationships with leading companies in a number of fields. This mutually beneficial arrangement allows KTH students and industry leaders to explore ideas and solutions that would otherwise be unavailable to them. KTH conducts a number of international projects, and is in active cooperation with other top universities around the world.

KTH's strategic partner universities include:

- Hong Kong University of Science and Technology
- Nanyang Technological University
- Shanghai Jiao Tong University
- University of Illinois at Urbana-Champaign
- University of Tokyo

The cooperative efforts include, but are not limited to, research and exchange programmes.

The university is also an active partner in several prestigious academic networks, such as CLUSTER (Consortium Linking Universities of Science and Technology for Education and Research).

## Education at KTH

### **Bachelor's programme, three years** (1st cycle)

Courses are generally offered in Swedish, with the exception of the Bachelor's degree programme in Information and Communication Technology.

### **Master's programme, five years** (1st and 2nd cycle)

This programme combines KTH's Bachelor's programme with additional years of study that lead to a Master's degree. The first three years are generally offered in Swedish. The last two years of Master's level studies are generally offered in English.

### **Master's programme, one or two years** (2nd cycle)

This programme offers students who have completed a Bachelor's programme (or equivalent) at an institution other than KTH the opportunity to obtain a Master's degree. Courses are generally offered in English.

### **Doctoral/Ph.D. programme, four years** (3rd cycle)

Students who wish to pursue a doctorate at KTH must dedicate themselves to a research project under the guidance of an experienced researcher. They are also expected to take doctorate level courses and write a thesis. Typically, KTH doctoral students are employed by the university and receive a monthly salary.

KTH also offers separate teacher education courses and education for professionals.



At KTH students gain access to a prestigious academic environment. They are encouraged to submit their own research ideas and following in the footsteps of Swedish innovators such as Alfred Nobel, KTH encourages students to look for solutions to challenges and real-world problems, contributing to a brighter tomorrow.

# Innovative thinking, unlimited possibilities

KTH is a dynamic technical university and encompasses a wide range of disciplines, including engineering, natural sciences, architecture, industrial management, urban planning, history and philosophy, social science, humanities and artistic research. This spectrum of research demands variation in focus, approach and formation.

Research carried out is of crucial importance to the creation of a sustainable society on scientific foundations.

The university works to create an open, multidisciplinary and collaborative atmosphere and overcome traditional barriers between academic disciplines. Applied research in engineering sciences is conducted in parallel with more science-oriented and basic research. Collaborative work is encouraged and KTH fosters multi-faceted solutions to global challenges. With sustainability at its core, KTH has designated digitalisation, energy, industrial transformation, life science technology, materials and transport as focus areas of research. Within these areas, cooperative and multidisciplinary work is especially encouraged.

Yet, KTH research also goes beyond these focus areas. The university also performs cutting-edge work in for example chemical science, computer science, engineering sciences, built environment, electrical

and industrial engineering and biotechnology.

Close collaboration with society and industry creates a natural arena and better conditions for the practical implementation of research results. Researchers and students have the opportunity to work in an excellent academic environment and see their ideas make a tangible impact on society.

One way KTH enables such collaborations is through research centres dedicated to certain subject areas. These centres are often managed in partnership with leading companies, government institutions and other universities.

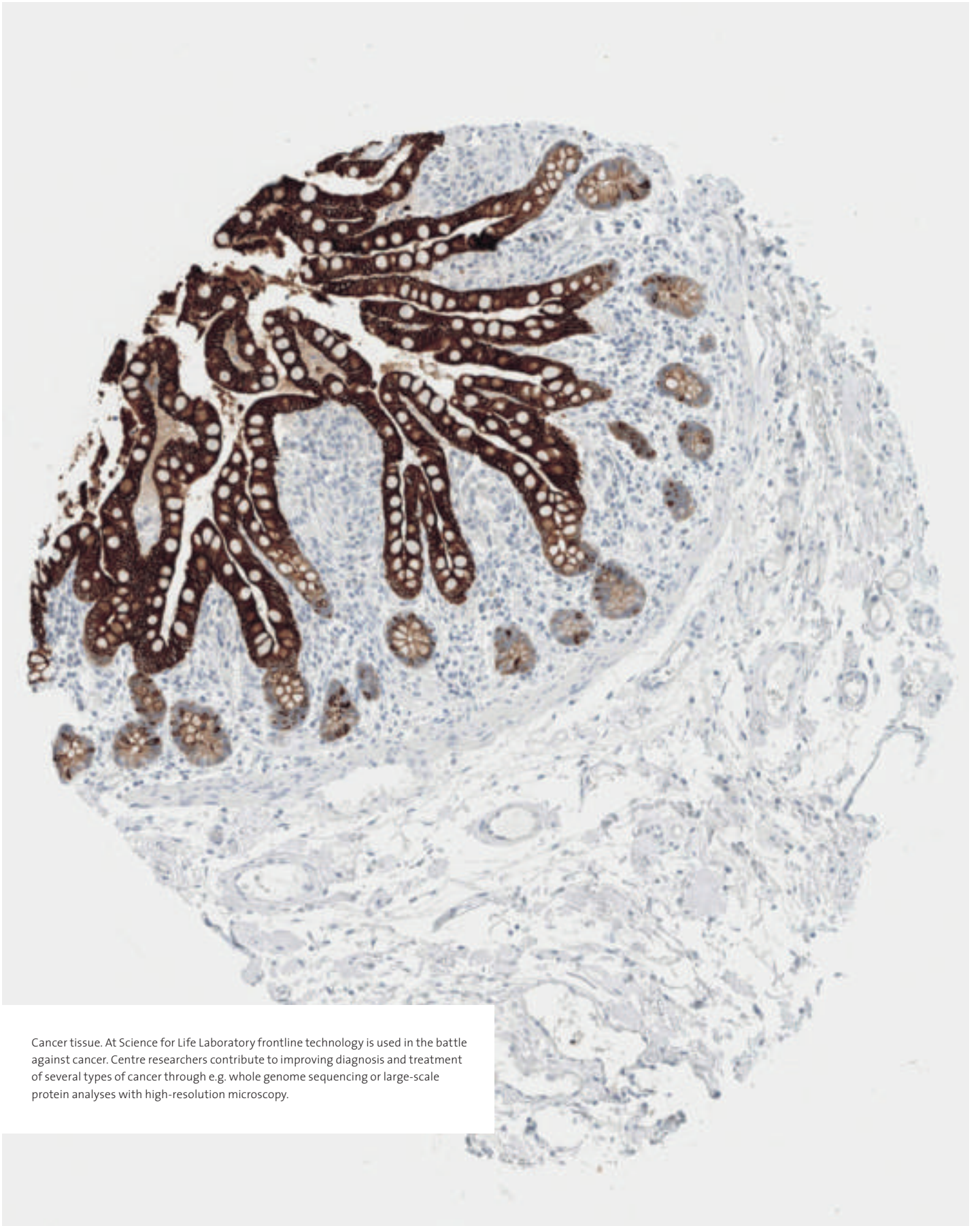
## New services for sustainable accessibility

The Mistra SAMS research programme examines transformations of accessibility and mobility through new service innovations. Mistra SAMS is based on a deep transdisciplinary approach and its researchers represent the engineering, behavioral, and social sciences disciplines. The programme uses multiple methodologies, including a Living Lab-approach that is based on collaboration and dialogue between researchers and stakeholders.

The 4-year research programme is supported by Mistra, the Swedish Foundation for Strategic Environmental Research. KTH Royal Institute of Technology and VTI, the Swedish National Road and Transport Institute, are core academic partners.







Cancer tissue. At Science for Life Laboratory frontline technology is used in the battle against cancer. Centre researchers contribute to improving diagnosis and treatment of several types of cancer through e.g. whole genome sequencing or large-scale protein analyses with high-resolution microscopy.

# Collaborating on a brighter future

The world is changing rapidly and the boundaries between academia, the public sector and the private sector are no longer clearly defined. KTH has long recognised this, and greatly respects the fact that the university's work influences society as a whole – whether it is conducted solely by KTH, or in partnership with public and private organisations.

The utilisation of research is an important part of academia's mission, and KTH uses a collaborative approach to fulfil this mission. The university has contributed to many technological, cultural, medical, economic and even legislative advances. Each achievement is its own unique success story. KTH works continuously to assess the impact of its work on quality of life, and to expand and improve the ways it collaborates.

Through collaboration with KTH, the university's partners gain access to the university's cutting-edge research infrastructure and advanced laboratories, as well as the intellectual resources of its students and faculty. Collaborations with external organisations are also attractive to KTH students, who get to see their work have a measurable impact on the world outside academia.

KTH also interacts with society through its well-developed network of 85,000 alumni.

KTH alumni are spread throughout 100 countries, holding prominent positions in a wide range of fields and organisations. The network is highly active and involved, assisting the university with student recruitment, partnerships with industry and in securing funding.

KTH secures long-term funding through a number of other methods and sources as well. Research and education demand more resources than ever before so these efforts are critical. Through funding and gifts, students and researchers are able to continue their groundbreaking and necessary work. This work may result in a world-changing discovery, the emergence of an outstanding business leader, or simply in a more effective learning experience.

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## Strategic mobility



Through its strategic alliances, KTH can more easily identify innovative solutions to future challenges. KTH's many successful collaborations with outside organisations often come in the form of personnel exchanges. For example: well-qualified, experienced individuals with specialist knowledge and strong networks can be assigned work as adjunct professors. At KTH, they enrich the research and education processes, and are exposed to the latest scientific

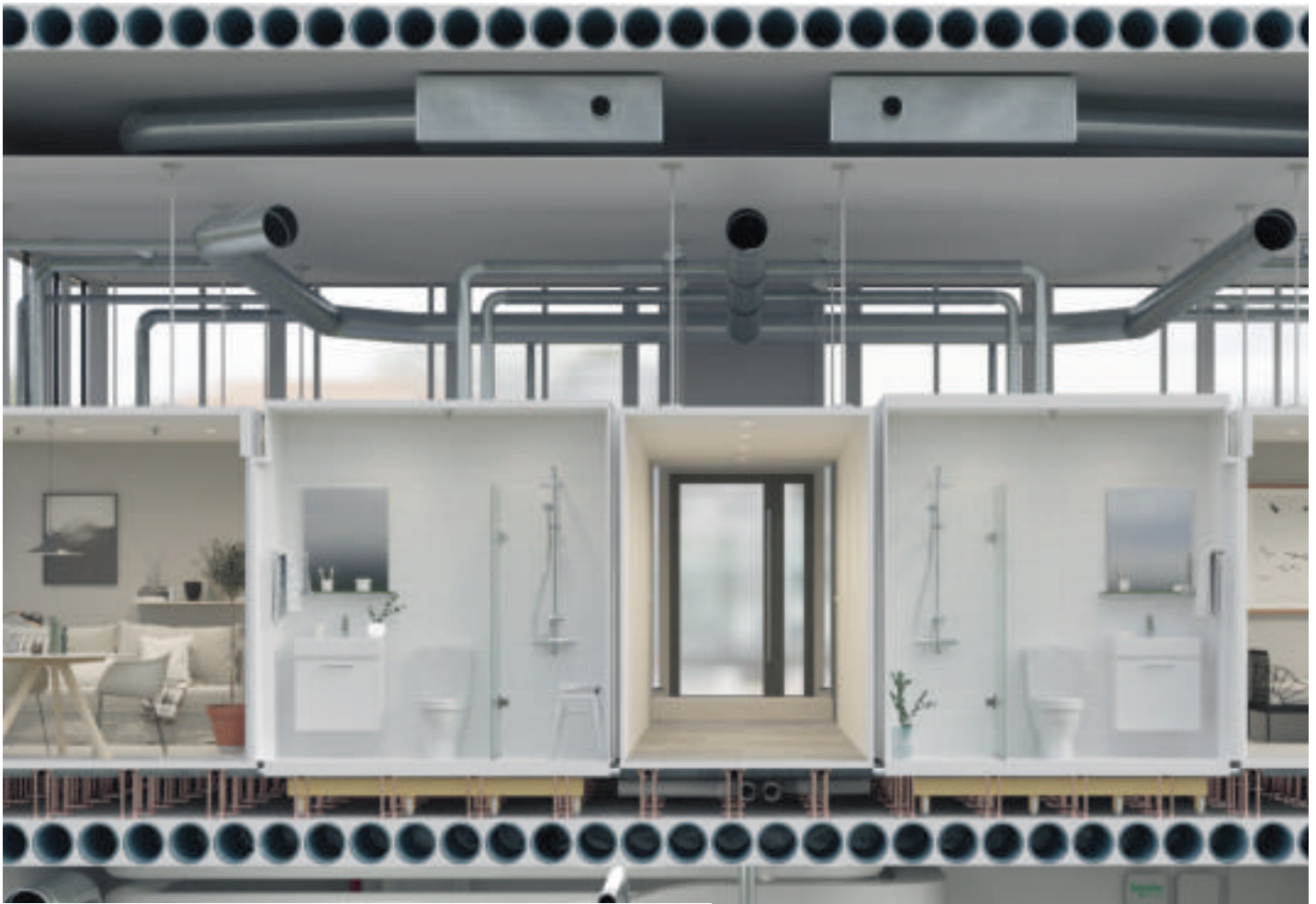
developments. KTH doctoral students are often employed by industrial companies and other organisations, where they are able to hone their expertise and facilitate knowledge exchanges between KTH and the business world. Another strategic collaboration instrument is affiliated faculty, with which both parties can strengthen and influence the direction and focus of a research area, or support undergraduate and advanced education at KTH.

## Sparkling young imaginations



Vetenskapens Hus (House of Science) is an educational centre co-owned with Stockholm University, with City of Stockholm as a partner. The centre increases primary and secondary pupils' interest in and knowledge of science, technology, engineering, and mathematics, using relevant themes and age-appropriate, hands-on activities. KTH runs activities such as project assignments and study visits to university facilities.





KTH Live-in Lab is an innovative platform to accelerate the transition to more sustainable and resource-efficient buildings. It consists of four testbeds for research and development within construction solutions, where evaluation is based on data from the inhabitants. KTH Live-in Lab is a collaboration between industry, academia and society.

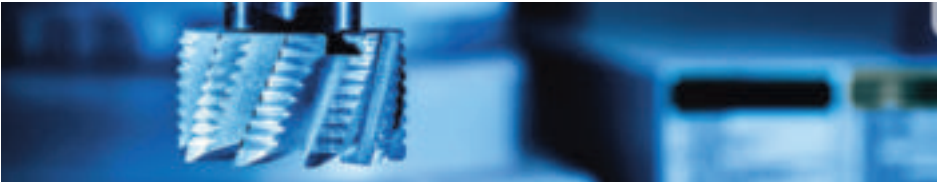


## Unexpected interactions



Openlab, located at KTH, is a challenge-driven innovation community. By bringing people from different fields Openlab uses design thinking methods to enable innovative solutions addressing societal issues in the region. Founding partners include the City of Stockholm, Stockholm County Council, the County Administrative Board of Stockholm, Karolinska Institutet, Stockholm University, Södertörn University, and KTH.

## Swedish-German collaboration



Swedish-German collaboration strengthens the Swedish heavy vehicle industry Powertrain Manufacturing for the Heavy Vehicles Application Lab (PMH) is a centre at KTH that works with research and development to improve the manufacturing technologies for engines, gearboxes and axles of heavy vehicles. The focus of the business is to implement innovative manufacturing technologies into

industrial applications and to offer education and technology dissemination. The projects are conducted in close collaboration with industrial and technology companies. The aim is to strengthen the Swedish heavy vehicle industry. PMH is run in collaboration with the German research organisation Fraunhofer and RISE – Research Institutes of Sweden.

# Focus on a better tomorrow

KTH is actively pushing for a more sustainable and equal society by ensuring that our research, education and collaborations exert an influence on our surroundings. An excellent international student and researcher body is one way and a prominent position in research within the field of digitalisation is another way.

KTH takes a holistic view of and a systematic approach to sustainability. To support the shift towards a sustainable society, sustainability objectives are integrated into the core KTH activities of education, research and collaboration to improve the interaction between technology and social, ecological and economic systems. Incorporating sustainability competencies and features into KTH education programmes develops and equips students to be able to contribute their knowledge and ideas on how to build a sustainable future.

Consciously contributing to the United Nation Sustainable Development Goals by integrating sustainability in all operations, campuses and services is a priority. KTH monitors and targets travel and transport, materials, energy and chemicals, campus development, and the procurement of products and services, to reduce our impact on the environment. The university is certified according to the international environmental management standard ISO 14001.

Creating and maintaining a learning and working environment that offers equal opportunities to learn, receive an education, conduct research and collaborate, irrespective of gender, creates quality in research and education. Similar to the approach to sustainability, KTH has started the process of implementing knowledge of equality and diversity issues into all educational and research programmes. Gender equality modules are also being introduced in an increasing number of courses, and this measure is pushing the organisation and the sphere it operates in towards a more equal environment.

With the objective of recruiting the best teachers and students, KTH focuses on internationalisation and international cooperation by continuously developing high-quality research collaborations and student exchanges with leading universities globally. KTH is creating key partnerships with prominent international universities on an ongoing basis that are university-wide and include mobility for students and researchers, joint courses and educational programmes, summer courses and online education, as well as research and collaborating with society. The success of the European Framework Programmes makes KTH prominent player in the EU arena. KTH is a partner in five 'Knowledge and Innovation Communities' within the European Institute of Innovation and Technology (EIT); these are EIT Innoenergy, EIT Digital, EIT Health, EIT Raw Materials and EIT Urban Mobility.

Digitalisation is revolutionising education and research and KTH is investing heavily in seizing the opportunities. KTH is partnering with major industrial players and the public sector in large-scale research projects, to drive forward developments, with the aim of creating a future digital environment in which citizens thrive, act, participate, learn and develop. Utilising the resources into expanding digital courses, exercises and self-assessment has resulted in changes to the pedagogy, planning and implementation of education and actual changes to the physical design of our educational facilities.



The visualization studio at KTH offers technology that can manage and interact large amounts of data and support relevant applications through modalities such as haptics, eye tracking, multi-touch and various stereoscopic systems.



# Where inspiring minds meet

Stockholm is the capital of Sweden and perhaps best known as the home of the Nobel Prize. As such, the city's business and academic communities work hard to embody Alfred Nobel's vision of creating a better world through innovation and cooperation. Stockholm consistently ranks as one of the most innovative and entrepreneurial cities in the world<sup>1</sup> and the highest number of so-called unicorns per capita, after Silicon Valley, are produced here.<sup>2</sup>

In addition to being an important IT hub, Stockholm also hosts major biotechnology and industrial engineering clusters. As a result, this progressive city has become globally influential. Working and studying at KTH means having access to a broad network of leading international companies that choose Stockholm for its deep reservoir of intellectual talent.

KTH's campuses are in many ways microcosms of Stockholm itself; classically beautiful and bursting with exciting new ideas. KTH students and researchers working to transform an idea into a marketable product find that the support they need is readily available. Also, according to Swedish law, teachers, researchers, and students at KTH own the results of their work and any materials they produce. They are not automatically considered employees of their

universities if they seek to patent the results of their work, as is often the case in other countries. In addition, they have full control over when, where and how to publish their findings.

Stockholm is one of the world's most liveable cities, thanks in large part to Sweden's strong social safety net. This safety net, in combination with KTH-specific benefits, ensures a secure and comfortable working environment at the university. These benefits include occupational pensions, additional parental compensation, health care perquisites and paid holidays from the first day of employment. KTH also offers tailor-made career support for spouses, in order to make the transition to KTH and Stockholm as smooth and beneficial as possible.

<sup>1</sup> Source: PwC's Cities of Opportunity, 2016

<sup>2</sup> Source: Atomico, a technology focused venture capital firm

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## Strategic cooperation with KTH



Extensive cooperation with the community and the business world has always been a priority for KTH. There are currently hundreds of bilateral cooperation projects underway. The university's partners include companies of varying sizes, research institutes, and a number of public organisations. All play an important role in raising the quality of KTH's research and education programmes. KTH has established strategic partnerships with eleven organisations which are

particularly important to KTH's goals and mission: Skanska, Vattenfall, Scania, Ericsson, ABB, Saab, Sandvik, the City of Stockholm, Region Stockholm, Bombardier and Stora Enso. The collaborations are multidisciplinary and characterised by elements such as personnel exchanges, educational partnerships, recruitment, and joint research projects.

## From idea to innovation



Every year, some 300 ideas born out of research and education at KTH start their journey from idea to innovation. KTH Innovation helps students and faculty accelerate development of their ideas and find opportunities both in Sweden and abroad. A structured, inclusive and internationally recognised process and hands-on programmes give access to support in all areas needed to bring new technology to market.



Stockholm is Sweden's cultural, political and economic centre. The city is spread over 14 islands in Lake Mälaren, and full of parkland, forest, and lakeshore beaches. In The Old Town (Gamla Stan), modern energy infuses 700-year-old architecture. With one of Europe's most vibrant food scenes and packed with cultural attractions, Stockholm and its 900,000 inhabitants welcome over 1,000,000 visitors a year.

### Finding commercial opportunities



KTH supports the commercialisation of work by students and researchers. Adaptive Simulations is a company that uses intelligent algorithms and High Performance Computing to simulate flow around objects. Its service Ingrid Cloud®, based on a decade of KTH research, produces results close to tests performed in reality, and is now used to optimise design of urban areas or vehicles. Founded with support from KTH Innovation, the company secured 1.5 MEUR in VC funding in 2017.

### Europe – global leader for innovation



KTH is part of four consortia of the prestigious EU collaboration; European Institute of Innovation and Technology that aim to make Europe a global leader for innovations in ICT, sustainable energy, raw materials and healthy living and active ageing. Other consortia members include research institutes, major engineering companies, and several leading European technical universities.

### Learn more about KTH

Read more about KTH at: [www.kth.se/en](http://www.kth.se/en)



