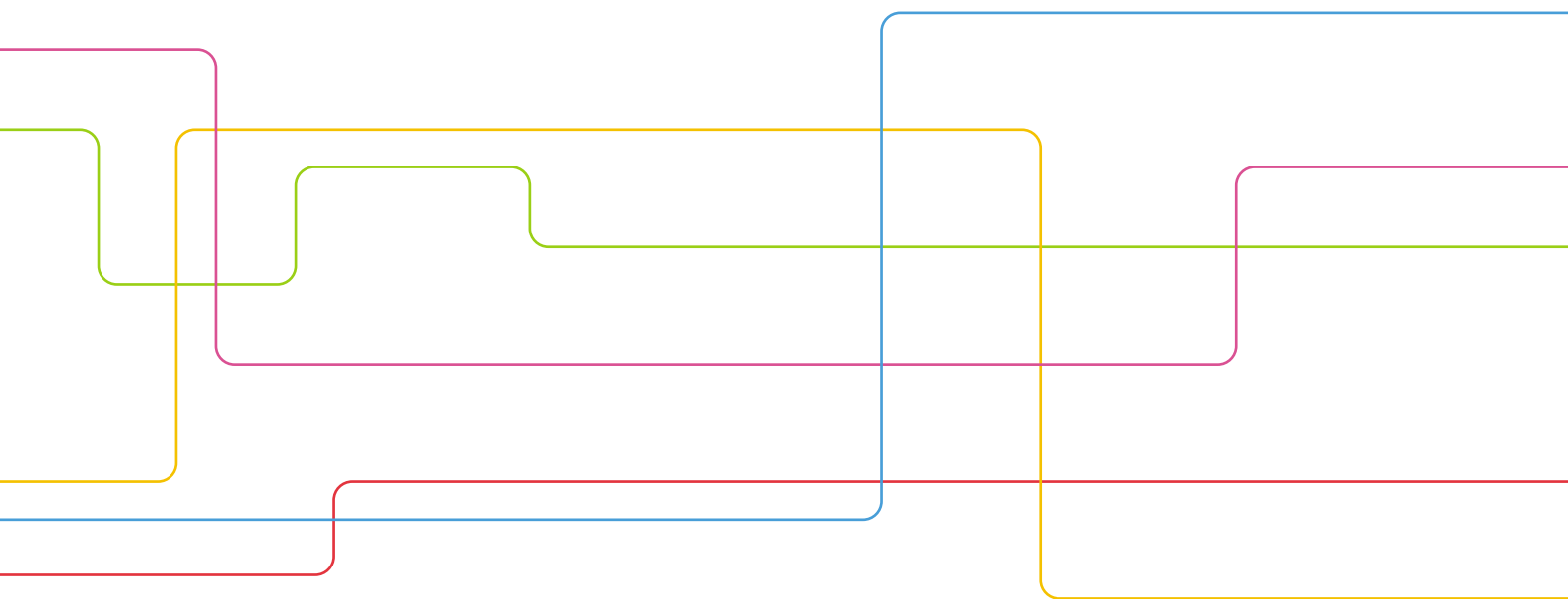




KTH ROYAL INSTITUTE  
OF TECHNOLOGY

# 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 benefits society – in the present day, and as we face the future.

We formulate crucial issues that lead to sustainable solutions and practical answers to some of humanity's greatest challenges, such as climate change and urbanisation. Serving society is part of our mission.

Our success relies on cooperation and collaboration on the global and national level – with the international scientific community, and with business and the surrounding community. From these engagements we gather ideas and thoughts around society's needs, and – not least of all – we gain inspiration.

A linchpin of KTH's work for a sustainable future is our students. Our recruitment strives for diversity with regard to skills, background and gender.

Everyone should have an opportunity to participate in shaping a brighter tomorrow.

Please join us!

*Sigbritt Karlsson*  
PRESIDENT, KTH



## Introducing KTH – a model campus for the world



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 at KTH to create a brighter, more sustainable future. The university has around 3,700 full-time positions, and an annual turnover of over SEK 4 billion, nearly two-thirds of which is related to research. KTH's diverse areas of study and research include engineering, natural

sciences, architecture, industrial management and urban planning. Basic and applied research are 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. In 2015, KTH won the International Sustainable Campus Excellence Award.

## World-class ranking

|     |   |        |      |     |       |
|-----|---|--------|------|-----|-------|
| 158 | University of Liverpool<br>United Kingdom   | 16,815 | 13.0 | 30% | 52:48 |
| 159 | KTH Royal Institute of Technology<br>Sweden | 12,062 | 14.6 | 31% | 30:13 |
| 160 | University of Erlangen-Nuremberg<br>Germany | 16,746 | 12.9 | 19% | 49:55 |

KTH is ranked as the 12th best technical university in Europe. Additionally, Times Higher Education 2016 ranks KTH as the 159th best university in the world and as number 36 in Engineering & Technology. QS World Universities Rankings 2016 lists KTH among the world's top 100 universities, and among the top 50 in five subjects: Electrical Engineering (17th), Architecture and Built Environment (24th), Mechanical Engineering (25th), Materials Science (30th) and Civil and Structural Engineering (40th).

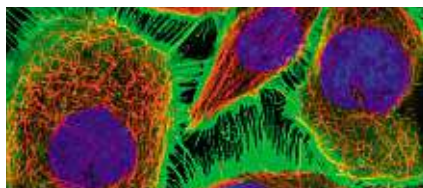


### Women in technology



Gender balance is not just about equality – it’s also about quality of learning, research, and results. KTH has a number of initiatives designed to increase the number of women among its faculty and students, which reflects the university’s belief that a more inclusive and lively environment for learning and research leads to more innovative solutions.

### The Human Protein Atlas



The Human Protein Atlas is an open source tissue-based interactive map of the 20,000 proteins in the human body. This major, multinational and multi-disciplinary research project is a partnership between KTH and Uppsala University. The Atlas makes it possible for researchers to hunt for “biomarkers” in these proteins. This, in turn, could lead to earlier diagnosis of, and improved treatments for various diseases.

### Internationally recognised excellence



In 2015 Professor Stephen Hawking gathered the world’s leading researchers in cosmology and theoretical physics at KTH for the international Hawking Radiation Conference to discuss whether singularities in black holes exist and whether Hawking radiation has any bearing on their existence.

# 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 12,000 full-time students and 2,000 doctoral students from around the world gather at KTH's world-class facilities to learn and innovate, making it one of Europe's key centres of intellectual talent.

KTH offers over 60 Master's programmes in nine fields of study: Architecture and Civil Engineering, Electrical Engineering, Engineering Physics and Mathematics, Energy and Sustainable Development, Industrial Management and Innovation, Information and Communication Technology, Life Science Technology, Chemistry and Chemical Engineering, Materials Science and Engineering, and Mechanical Engineering.

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 exchange partners include Shanghai Jiao Tong, National University of Singapore, ETH Zürich, University of Illinois at Urbana-Champaign and Danmarks Tekniske Universitet. These 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).

*KTH offers several Master's programmes in the fields of Information and Communications Technology and Electrical Engineering, including Machine Learning and Systems, Control, and Robotics.*

## 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.*



# Innovative thinking, unlimited possibilities

**KTH is a dynamic research institution whose work encompasses a wide range of disciplines, including engineering, natural sciences, architecture, industrial management, urban planning, history and philosophy. This spectrum of research demands variation in focus, approach and formation.**

The university works to create an open and collaborative atmosphere and break down traditional barriers between academic disciplines. Collaborative work is encouraged. Basic research is conducted in parallel with applied research, and the same is true of interdisciplinary and specifically targeted work. In this way, KTH fosters multi-faceted solutions to global challenges.

With these global challenges in mind, KTH has designated energy, transportation, information and communication technology, life science, and materials as focus areas of research. Within these areas, cooperative and multidisciplinary work is especially encouraged. Yet, KTH research goes beyond these strategic areas. The university also performs cutting-edge work in chemical science, computer and engineering sciences, technology and health, 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 competence centres dedicated to new subject areas. These centres are often managed in partnership with leading companies, government institutions, and other universities.

*KTH's Solar Lab is one of the few laboratories in the world dedicated to the development of concentrated solar power, a promising sustainable energy technology. In addition to researching solar power and solar receivers, Solar Lab conducts basic research on high temperature materials such as those used in rocket engines and fusion reactors. The lab also investigates chemical reactions under high light influx.*

## A live-in lab for sustainable housing

KTH Live-In Lab is a testbed created to transform how society builds and lives, to develop tomorrow's resource-optimized sustainable housing and to enhance the capacity for innovation in the construction and housing sectors. The lab is a real living environment for students, where products, services and methods can be tested in order to promote greater knowledge, next-generation building codes and wider use of new and innovative residential building techniques.





# 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 65,000 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.

*One of the main goals of the Master's course taught at KTH's newly established Openlab is for students from multiple academic disciplines to work together, in the hopes of facilitating knowledge transfer between clients, students, and educators from various departments. Combining different scientific perspectives and practices can lead to the development of innovations that provide lasting benefits.*

## 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.

## A collaboration to explore new ideas



KTH Integrated Transport Research Lab (ITRL) is a multi-stakeholder research centre, involving academia, industry and society. The centre conducts research and demonstration projects in the area of sustainable transport solutions, gathering leading-edge multidisciplinary competence. Initiated by KTH and Scania, led and funded jointly by KTH, Scania and Ericsson, it's continuously growing. ITRL explores system aspects in areas such as connectivity in transport and nighttime city delivery services.





### From idea to innovation



Every year some 300 ideas, born out of research and education at KTH, start their journey from idea to innovation. With a strong and modern programme, KTH helps students and faculty turn their ideas into businesses through an internationally recognised process including coaching, legal and financial advice, as well as other support. Student Inc., the student incubator, further accelerates support for young companies.

### Finding commercial opportunities



KTH supports the commercialisation of work by students and researchers, helping transform ideas and research results into marketable products and services. Volumental is a company that uses 3D body scanning to customise products. The technology grew from KTH research on software algorithms, and is now used to tailor-make eyewear and footwear. Today, Volumental has 20 employees and in 2014 secured a seed investment of USD 3 million from FOUNDER.org and MOOR Capital.

### Sparking young imaginations



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

# Where inspiring minds meet

Stockholm is 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 is the capital of Sweden and consistently ranks as one of the most innovative and entrepreneurial cities in Europe<sup>1</sup>. It's also one of the greenest. The city is considered to be the second most productive technology hub in the world after Silicon Valley<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. The spirit of innovation and entrepreneurship runs equally deep on all five of KTH's campuses: Stockholm city, Haninge, Södertälje, Flemingsberg and Kista. Campus culture and activities aim to stimulate open minds and experimentation. 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.

*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.*

<sup>1</sup> Source: PwC's Cities of Opportunity, 2014

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

## 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, the Stockholm County Council, Bombardier Transportation and Stora Enso. The collaborations are multidisciplinary and characterised by elements such as personnel exchanges, educational partnerships, recruitment, and joint research projects.

## Towards a sustainable future



Active participation in the shift to a sustainable society is part of KTH's responsibility. Climate change, increasing energy demands, food security, ageing populations and uncontrolled urban growth are pressing challenges facing global society. Successfully meeting these challenges will require a sustainable approach. KTH research contributes to the development of methods and tools for understanding and improving the interaction between technology and social, ecological and economic systems.



## 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.

## Unexpected interactions



Openlab, located at KTH, is a creative centre where solution-focused Design Thinking methodology is applied to emerging urban challenges in Stockholm. Openlab's proposals incorporate ideas from multiple sources, crossing the lines between different disciplines and professions. Founding partners include the City of Stockholm, Stockholm County Council, the County Administrative Board of Stockholm, Karolinska Institutet, Stockholm University, Södertörn University, and KTH.


## Learn more about KTH



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