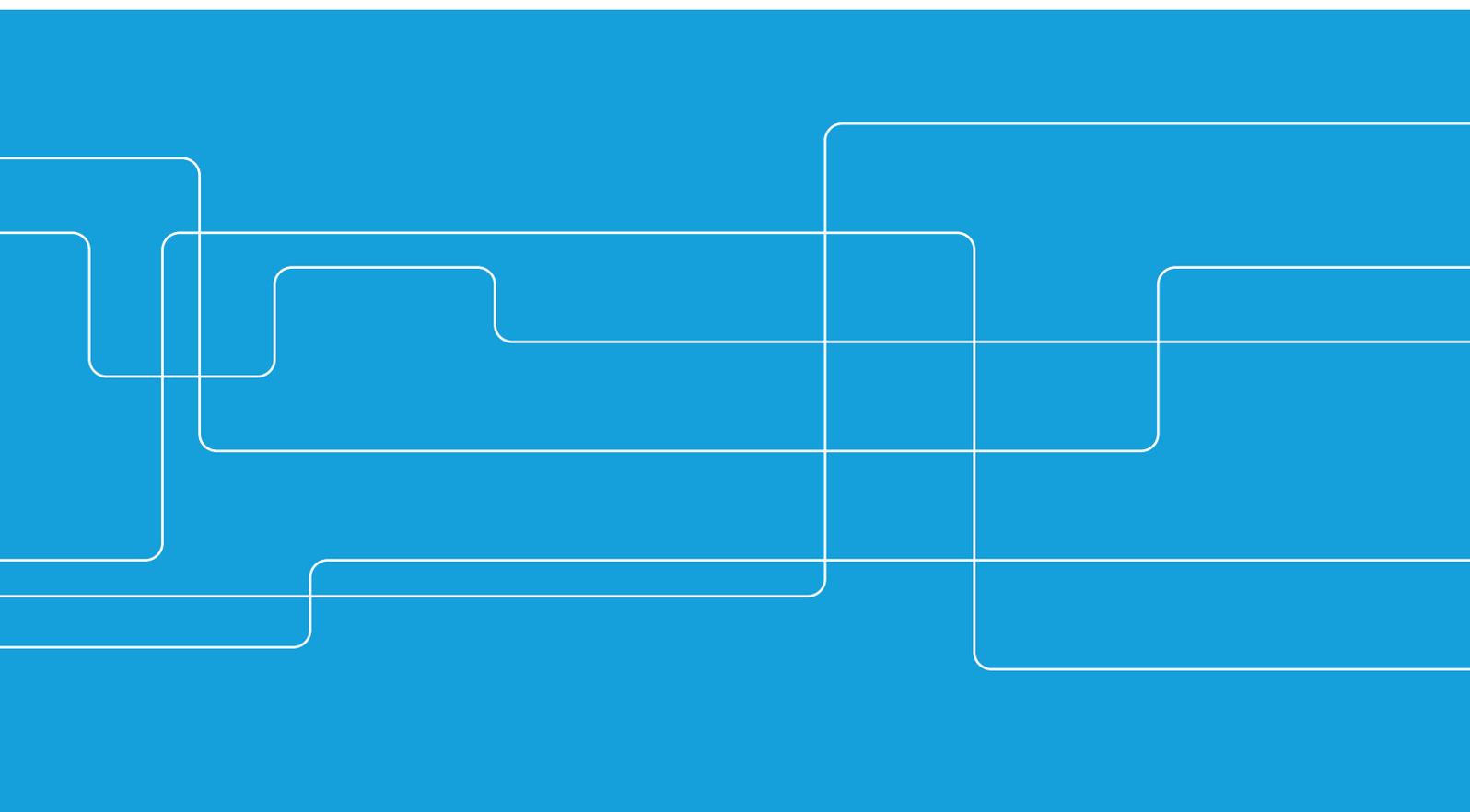




# A leading KTH

A leading technical and international university creating knowledge and competence for a sustainable future

*Development plan 2018–2023*



## President's foreword

Focus, route and direction. These are the crucial ingredients in KTH's Development Plan that will guide our work over the coming six years. Intensive efforts over the course of 2017 have seen our Development Plan grow through a comprehensive working process covering a number of different internal and external forums. With Vision 2027 in mind, the Development Plan has taken shape through reflection over our current position and our operating environment, as well as the important routes we must traverse over the coming years to further strengthen KTH. By breaking new ground – in viewpoints, thoughts and ideas – the essence and vision have been exposed and made clear. Many thanks to all of you who have participated at various levels for your great commitment in the preparation of this strategic document.

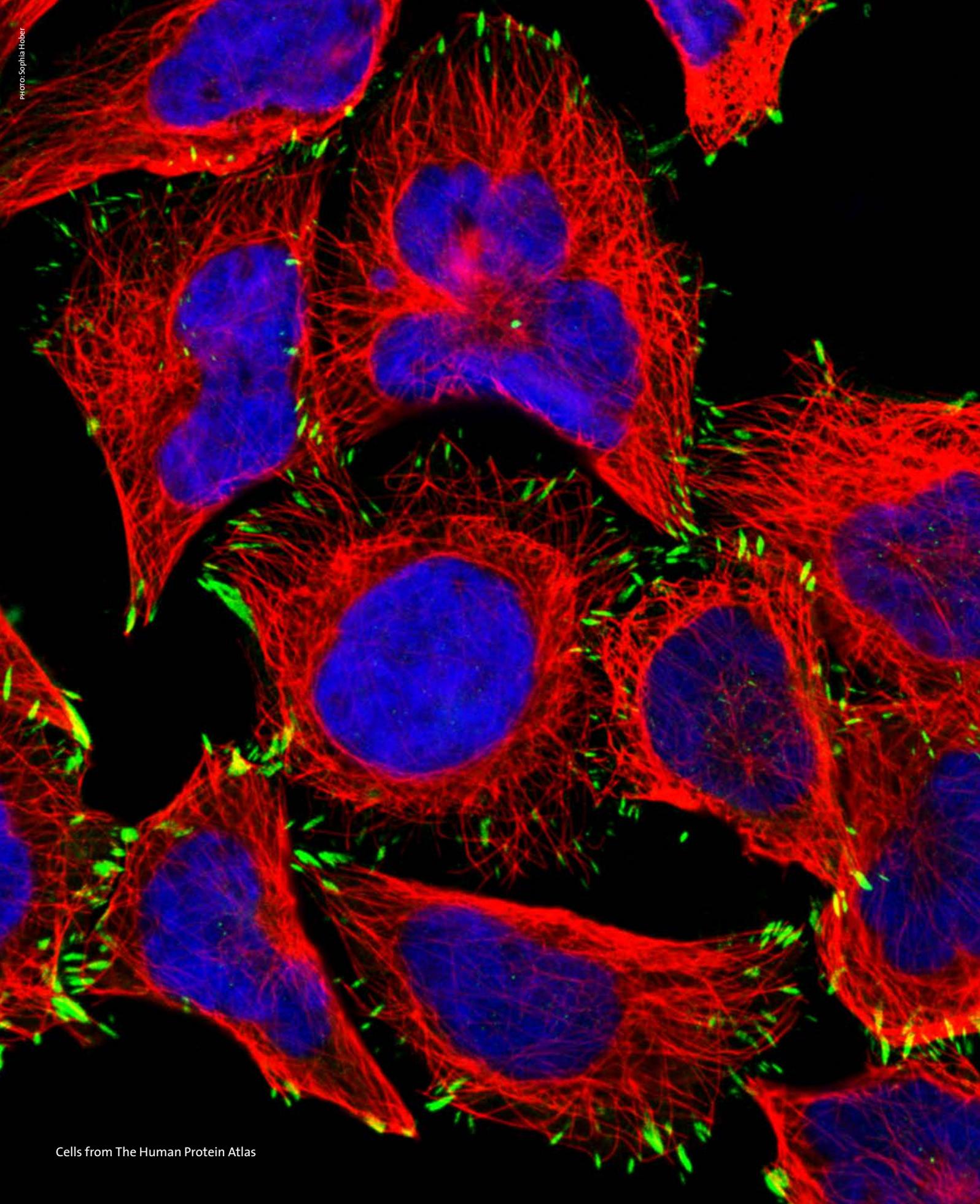
The Development Plan, as adopted by the University Board, is a document that we can return to and lean on and that provides answers to the questions of what KTH is, where it is going and what it will be. Based on this plan we will in turn construct more concrete plans for the day-to-day operational activities at our various schools and departments.

KTH's focus lies in becoming even more internationally competitive, both by developing new areas of expertise and by ensuring that we make further strides in those in which we already excel. Everyone connected to KTH can participate in striving towards the leading, integrated, visible, open, increasingly digitalised, more sustainable, more international and more equal KTH described in greater detail in this Development Plan. The creation of social benefits and a belief in the future are fundamental to a KTH in which research, education and collaboration are based on these principles.

Welcome to A leading KTH!

*Sigbritt Karlsson*





# A leading KTH

## Leading education

World-class research is a prerequisite for leading education. There must be a close relationship between education and research – teacher to researcher and researcher to teacher.

The education offered at KTH must be world class and it must attract the most suitable and motivated students. A high level of pedagogical awareness guarantees that the most appropriate methods are chosen for each learning situation. The digitalisation of education must continue with the preparation of a clear strategy in which the student's learning is emphasised. An experimental learning environment utilising modern infrastructure guarantees the professional relevance of study programmes. A rich and inclusive student life creates added value and reinforces KTH as an attractive study environment.

KTH must introduce a transparent incentive structure that emphasises the importance of pedagogy and encourages an outstanding educational environment. All teachers must have competence in teaching in higher education. Skills development for teachers also means further studies in their chosen field and relevant professional contacts.

## Leading research

Research breakthroughs sometime come when one least expects them. It goes without saying that basic and curiosity-driven research has a place at a technical university together with applied and commercial research. KTH has world-class research expertise in a number of fields and this must be more clearly highlighted both externally and internally.

Up-to-date, fit-for-purpose infrastructure is of fundamental importance to outstanding research. KTH must carry out continuous needs analyses of strategic research infrastructure, and ensure that investments are made as effectively and broadly as possible.

Leading research demands strong leadership resting on KTH's core principles and awareness of

sustainability, equal opportunity and scientific integrity. Major projects and grants require collaboration between a number of stakeholders. Here, it is vital to define roles and responsibilities so that KTH can contribute in the most relevant manner.

## Leading collaboration

It is important that KTH takes responsibility for the role of technology in societal development and creates breakthroughs and social benefits from education and research. This applies locally, regionally, nationally and globally. Collaboration with private and public-sector stakeholders is an effective way to create breakthroughs and social benefits while at the same time contributing to the quality and relevance of our own education and research.

KTH must maintain its position at the forefront of collaboration and social benefit, something that demands challenging goals, continuous learning and systematic and ongoing development.

Collaboration and social benefits are concern for KTH as a whole and initiatives must be implemented in this area to further increase awareness and engagement among students and staff.

### A leading KTH

- provides education based on world-class research and driven by skilled educators and dedicated teachers working with motivated, engaged students
- conducts applied research augmented by curiosity-driven basic research and cross-disciplinary collaborations
- is characterised by digitalisation, sustainable development, internationalisation and equal opportunities
- works within a first-class joint infrastructure and is driven forward by professional leadership
- creates major social benefits through outstanding collaborations in education and research

# An integrated KTH

KTH is strengthened by the fact that all study and research programmes are collected under a common scientific faculty that, in addition to classic technical fields, also covers natural sciences, life sciences, architecture and design as well as the humanities, social sciences and learning.

Education is a joint concern throughout KTH. Students' primary affiliation is to a study programme. Programmes are school-wide and use assets – human and material – distributed throughout KTH. As a consequence of this, study programmes must be a joint responsibility and be developed in accordance with common strategies in order to maintain the highest levels of quality.

Humanities and social science aspects are necessary for sustainable technological development. Complementary skills, such as intercultural competence, are necessities for today's – and tomorrow's – labour market.

Education and research are KTH's core activities and must be clearly integrated with one another. Faculty appointments should generally be financed from both education and research and educational needs must always be weighed when deciding on the establishment of new teaching positions.

Infrastructure, both educational and research, is an area in which integration is vital in financing investments. Research infrastructure demands a common inventory process followed by overall investments with increased use and availability as our watchwords. Collaboration, both with strategic partners and other educational institutions, creates more robust conditions for such investments.

Centres of excellence facilitate a short-term focus on a specific field of research through collaboration between academia and private or public-sector stakeholders. Centres also provide a meeting place for researchers and teachers from different fields, broadening knowledge on the problems being addressed. In order to ensure that they are integrated elements of KTH, centres must have a clearly defined position within the organisation.

Organisational support must be professional and appropriate. A concentration of support activities at central school or joint KTH levels can offer greater availability and increased professionalism. The research support organisation must be reinforced through clear goals and greater integration, to give researchers common access to the various support functions. In addition, an investment must be made in *Research Intelligence* with business intelligence, analysis and proactive support for researchers.

## An integrated KTH

- offers attractive study programmes with scope for individual choice, with students offered easy access to different KTH departments
- recruits and employs teachers who combine great dedication to teaching with world-class research
- has a robust joint infrastructure that is used for both teaching and research
- has developed centralised support for externally financed research
- provides coherent, professional and accessible organisational support





# A visible KTH

One important element of KTH's mission is to actively participate in the public discourse in the fields in which our researchers can contribute relevant research results. KTH researchers have a responsibility to explain the role of technology in societal development. Even if universities and other higher education institutions are viewed as highly credible by the public, core values such as integrity, good scientific practice and independence must be respected if we are to retain this trust.

KTH is expected to engage with the major challenges facing society. In order to create greater opportunities to contribute, the content in research must be discussed at an earlier stage, more transparently and with a wider range of interested parties. Researchers must be offered support in systematically explaining how their research will contribute to technological developments that solve societal challenges. At the same time, the fundamental academic freedom to choose problems and methods must be respected.

KTH has a physical presence in the region through our campuses at Valhallavägen (with AlbaNova and from 2019 also Albano), Kista, Flemingsberg, Södertälje and the Science for Life Laboratory in Solna, a collaboration with Karolinska Institutet, Stockholm University and Uppsala University. The individual strengths of these campuses must be highlighted while at the same time they are presented as components of a cohesive KTH. KTH's focus on digitalisation, sustainability, internationalisation and equality must be communicated externally and be visible at KTH's various campuses.

KTH's visibility can also be reinforced by the innovations based on ideas originating with KTH's students, teachers and researchers. KTH innovations must be offered the necessary support for their commercialisation. KTH's alumni activities must be developed further so that they contribute to a visible KTH through all of our graduates who work in so many parts of the world.

Our operating environment – commerce and industry, government agencies, the media, prospective students – must see KTH as an integrated whole. This must also be made clear internally. In particular, this applies to centres and research facilities that are largely externally financed or facilities that employ a large percentage of international researchers. In such environments, it may be necessary to take measures to create a greater understanding of KTH's organisation in general, as a university and a public authority. KTH's research must have a higher profile among students in order to create a greater sense of inclusion and to promote KTH's study programmes.

The quality of education and research develops continuously through the engagement of teachers and researchers in pedagogical development, international research and societal challenges. Systematic quality assurance in education and research must evolve in harmony with national and European guidelines. A self-initiated research evaluation will be conducted, with digitalisation, sustainability, internationalisation and equal opportunities as important aspects.

## A visible KTH

- has more teachers and researchers engaged in the public discourse
- contributes world-class research in more fields, and is associated with this internationally and nationally
- has a number of campuses contributing to visibility and strength
- is behind more leading technical innovations
- leads to more students and staff feeling a strong affinity with KTH
- has effective systems for continuous monitoring of quality in education, research and collaboration

# An open KTH

KTH must be open and accessible to the world around us. A balance must be struck between responsiveness to social challenges, critical attitudes and accountability, and the capacity to develop new fields of expertise. Within the framework of *One KTH*, there is a receptiveness to great diversity, to a wide range of fields, traditions and individuals. KTH's core values are based on democracy, the equal worth of all people, human liberties and rights, and free and open discussion.

Students and staff at KTH should be representative of society at large with regard to factors such as gender, socioeconomic background and ethnicity. KTH's location at several different campuses contributes to broader participation.

Study programmes must be characterised by social relevance. Collaboration with businesses, the public sector and external organisations about and in education is an important instrument for achieving this. Development should be ongoing with regard to challenge-driven courses and projects, increased mobility for teachers, increased engagement among visiting and adjunct professors in teaching and systematic theses work with external links. Creativity, innovation and entrepreneurship must be integral to all study programmes. Elements of challenge-driven education must increase in all study programmes. Every student must have access to laboratory infrastructure such as *Maker Spaces*.

All teachers at KTH must have an up-to-date understanding of their students' coming professional life. Pedagogical tools must be developed on an ongoing basis in order to integrate the working-life perspective with relevant issues, such as strategic partnerships. The role of collaborative skills must be further developed as a qualification when recruiting and promoting.

In a mutable, rapidly evolving labour market – not least due to increased digitalisation – continuous skills development is a necessity. KTH must offer courses that are professionally up-to-date and relevant. KTH must also be able to offer professional assignment training.

Campus environments are important points of contact between academia and society at large. Campuses must be developed with openness as our watchword. KTH shall conduct close collaborations with research institutes on or near our various campuses. Increased student accommodation provides campus environments with space for student life, something that is of great importance if KTH is to be an attractive place of learning.

KTH must offer an outstanding work environment and, thereby, be an attractive employer. All staff must be offered the opportunity to develop and grow. Respect for and receptiveness to a variety of tasks and cultures contributes to rewarding collaboration. Transparency in recruitment demonstrates openness and increases diversity. Skills development, especially internationally, should be encouraged. Staff with great dedication and high levels of motivation also require a clear balance between work and leisure.

## An open KTH

- provides creative and innovative study environments
- provides open and inviting campus environments characterised by collaboration and student life
- employs teachers and researchers who to a large degree move between academia and society
- contributes to lifelong learning with relevant and up-to-date study programmes
- offers a good work environment characterised by openness and skills development

# A KTH for a more digitalised world

Digitalisation is a strong driving force for development and change in today's society. KTH, with its expertise in the field, must be at the forefront of digitalisation in education, research, collaboration and organisational support. Digitalisation leads to increased quality and streamlining in a variety of processes and activities.

With the help of digitalisation, education can be made more innovative, accessible and resource efficient. Investments in e-learning in the broader sense must continue and provide concrete results in the form of changes to the pedagogy, planning and implementation of education, as well as the physical design of educational facilities. Digitalisation offers enormous opportunities for broader participation by various student groups and therefore contributes to greater diversity.

The field of digitalisation is the subject for considerable research investment, both on the part of the state and EU and by private and public-sector stakeholders. This applies not least to sustainability, with transport offering one obvious example. These investments are multidisciplinary and must be coordinated in order to meet our operating environment's needs in education, research and innovation. Digital infrastructure for research must be expanded.

Digitalisation offers new possibilities for collaboration with stakeholders in the private and public sectors working on digital solutions to meet social challenges. Digitalisation also creates collaborations through customised study programmes, commercial research and innovation.

KTH's operational support can be developed by utilising the possibilities of digitalisation in streamlining and improving quality, thereby freeing resources to create added value in relation to KTH's overall goals.

## **An increasingly digitalised KTH**

- has, with the help of digitalisation, developed its education
- has increased its world-class research into digitalisation in various areas
- invests in digitalisation as an important element of collaboration with industry and society
- utilises the possibilities offered by digitalisation in increasing the quality and efficiency of internal processes

# A KTH for a more sustainable world

Students graduating from KTH shall contribute to the sustainable development of society. The sustainability perspective must be integrated in study programmes and a clear progression in this field must be ensured. Engineers, architects and teachers with a clear sustainability profile to their education will provide crucial contributions to social change.

At KTH, research is carried out of crucial importance to the creation of a sustainable society on scientific foundations. A large part of all research at KTH can be linked to one or more of the UN's 17 sustainable development goals, either because the research itself is directly aimed at technical advances, or because it is working on the preconditions necessary to achieve the goals. Sustainability must be a driving force behind the development of new and existing fields of research and the 17 global goals provide an obvious point of reference. The goals balance ecological, financial and social aspects that embrace equality and diversity issues.

KTH is in a strong position to contribute to a number of research areas that are closely linked to one or more of the UN's sustainability goals. Among others, these include limiting climate change and emissions, circular and bio-based economics, sustainable urban development, digitalisation for a sustainable society, public health, and transport. In these areas, specific multidisciplinary and cross-school activities will be undertaken.

Among technical universities, KTH in particular has the potential to contribute in the field of sustainability, having the conditions for taking a holistic view and systematic approach. Here, we conduct applied and commercial research in engineering sciences, as well as more science-oriented and basic research. In addition, we also conduct social science, humanities and artistic research. This multidisciplinary collaboration must be developed, not least in order to create greater dynamism in projects with a sustainability perspective.

Strategic partnerships with industry, the public sector and international universities provide a forum for discussions about long-term challenges for which the global sustainability goals provide a natural starting point. In the Stockholm region, KTH must contribute to sustainable urban development in collaboration with municipalities, Stockholm County Council and other educational institutions.

Sustainability must be our guiding light in developing our campuses. The ecological and social value of KTH's various campuses must be highlighted. Campus environments must be shop windows for research, demonstrating innovative solutions. KTH's own direct and indirect environmental impact must be reduced and sustainable development integrated into governance and monitoring processes.

## A more sustainable KTH

- graduates engineers, architects and teachers with current knowledge and driven by a dedication to change society in a sustainable direction
- develops research areas with sustainability as their natural driving force
- provides a unique multidisciplinary research and education environment in which different perspectives are integrated
- is, in collaboration with its external partners, a leading proponent of the transformation to a more sustainable society
- has campus environments that are clearly characterised by sustainable solutions and reduced environmental impact



# A KTH in a global world

KTH's organisation as a whole must be characterised by international integration. KTH is an international educational institution where education and research must maintain the very highest standards, not least in order to attract international students, teachers and researchers. Recruitment of students and faculty members must be carried out both nationally and internationally. International visibility is vital to KTH's brand.

Our strategic partnerships have shown the value of in-depth relationships with societal stakeholders and international universities. Internationalisation activities must be implemented in dialogue with KTH's strategic partners. KTH enjoys considerable opportunities to develop partnerships with international companies. Internships with suitable companies can form part of any offer to paying international students.

KTH has established five strategic partnerships with universities in the United States, China and Singapore. Our aim is to increase the number of strategic partnerships with universities that share KTH's ambitions and values. With regard to student recruitment, KTH has primarily concentrated its efforts on India and China. In addition to these countries, the opportunity to develop collaboration with Southeast Asia is of particular interest. Certain prioritisations will need to be made between existing collaborations. Collaborations must contribute to KTH's development, both with regard to education and research.

European collaboration requires revitalisation. Exchange studies with European universities must be made easier and more students need to understand the value of a period spent at a foreign university. The EU's next Framework Programme, FP 9, will commence in 2020. This demands a proactive analysis and exchange of information, as well as increased support to create the preconditions for KTH researchers to compete successfully.

Teachers and researchers should be active internationally. International mobility among teachers and researchers must be encouraged. Sabbaticals at overseas universities form part of the faculty's skills development, both with regard to education and research.

For KTH, universities of interest may be located in countries that, for various reasons, are or may be controversial from a Swedish perspective. This demands open discussion based on our core values and the opportunities available to contribute to development, for example in the area of equal opportunities. A board of ethics will be appointed to consider any such issues.

KTH shall be bilingual. Marketing and information materials must always be available in both Swedish and English. In many instances, KTH's research environment is entirely English speaking. Initiatives are required to strengthen the standing of Swedish in such environments, thus contributing to improved integration within KTH's organisation and society at large.

## **A more international KTH**

- has deepened and expanded its international partnerships and measures for student recruitment and exchanges
- has a large proportion of students who have spent at least one term of their studies abroad
- has increased its research grants from the EU
- has a programme to facilitate regular overseas stays by teachers and researchers
- has a clear strategy for ethically responsible international collaboration

# An equal-opportunities KTH

In order for KTH to continue to develop as a leading technical university, the very best students and staff will be required. Diversity is an asset and KTH must be perceived as an open and welcoming place for prominent individuals, irrespective of their gender, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation or age.

Gender equality and the repudiation of all forms of discrimination are both a matter of quality and a self-evident part of KTH's core values. In-depth work is required in terms of creating awareness and developing skills with regard to equal opportunities and core values if we are to achieve our goal of an open and welcoming KTH. Managers at all levels need to be aware of their responsibilities and how they should act in order to promote this work. Knowledge and awareness regarding gender and equality must be integrated into all study programmes so that, after graduating, students are able to contribute to more equal society. The gender perspective must also be integrated into research to a greater extent.

The low percentage of women in many environments and in many study programmes shows that recruitment potential is not being realised. Specific measures are required in order to take advantage of the opportunities for excellence that KTH currently fails to grasp.

Any renewal of the faculty must be characterised by gender equality. Announcements regarding appointments must be widely and openly distributed and preceded by an inventory to identify the best possible candidates. Every announcement must form part of an overall recruitment strategy for the long-term renewal of the faculty in accordance with KTH's overall goals.

Awareness of equality issues can be related to a more general need to improve social sustainability. Equality issues must be centrally coordinated so that they are transparent and inspirational. This work

must be based on research in the field. It must identify obstacles to equality integration and contribute to resolving how these are to be overcome. In certain situations, it may be necessary to change the prevailing culture, in which case more comprehensive measures may be required.

KTH must also outwardly work for greater gender equality in academia and society at large, together with our strategic partners and international contacts. For example, KTH should work to have gender equality included in rankings. KTH must contribute to improving the conditions for female researchers to apply for and receive research grants.

The division of resources is a central issue for achieving increased equality. The division of internal resources must be monitored from a gender-equality perspective. At a more overall level, it must be ensured that basic financing for the faculty creates more equal conditions between the faculty at different schools and departments.

## An equal-opportunities KTH

- enjoys a more even distribution of women and men within the organisation and on decision-making bodies
- has gender-aware management
- has integrated the gender perspective into all study and research programmes
- works to achieve gender equality outside KTH
- divides resources with a gender-equality perspective and with equal conditions for staff in different areas of KTH



KTH Courtyard

