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About KTH

Since its founding in 1827, KTH has grown to become one of Europe's leading technical and engineering universities, as well as a key centre of intellectual talent and innovation. As Sweden’s largest arranger of technical education and research, KTH attracts students, teachers and researchers from all over the world.

KTH works with industry and society in the pursuit of sustainable solutions to some of humanity’s greatest challenges: climate change, future energy supply, urbanisation and quality of life for the rapidly-growing elderly population.

Education and research at KTH covers a wide area – science and technology of course, but also architecture, industrial economics, urban planning and education, for example. The innovative climate promotes versatile solutions and creates a new generation of engineers, architects and teachers.

KTH participates in international research collaborations and a large number of educational exchange or joint programmes with universities and colleges the world over. KTH's collaboration with strategic partners such as commercial companies, the authorities and organisations gives students and researchers a wide network of contacts to make use of.

KTH's educational and research activities are distributed across five campus areas in the Stockholm region. The central campus is in the Stockholm city centre next to Norra Djurgården. KTH and Stockholm University jointly organise education and research in biotechnology and physics at AlbaNova, near Roslagstull. Karolinska Institutet Science Park in Solna is home to the Science for Life Laboratory, which is operated together with Karolinska Institutet, Stockholm University and Uppsala University. Education and research in the field of IT is located at Kista in northern Stockholm, close to IT industry companies and research institutions. In Stockholm's southern suburbs, KTH is represented in Haninge, Flemingsberg and Södertälje. A major initiative in Södertälje was commenced in 2015 in collaboration with Scania, AstraZeneca and the Municipality of Södertälje, with government support.

KTH in figures 2016

Educational activities

- Master of Architecture and 15 Master of Science in Engineering programmes
- Master of Science in Engineering combined with Degree in Education
- 8 Bachelor of Science in Engineering programmes
- Bridging Teacher Education Programme
- Master’s programmes (one and two year)
- Bachelor’s programmes and two-year university diplomas
- Further education, technical preparatory programme
- 13,063 full time students, of which 33 per cent are women and 67 per cent men (including fee-paying students)
- 11,033 annual performance equivalents (including fee-paying students)
- 1,792 active research students (at least 50 per cent activity), of which 31 per cent are women and 69 per cent men
- 2,606 new students on the first year of Master of Science in Engineering, Master of Architecture and Bachelor of Science in Engineering programmes of which 34 per cent are women and 66 per cent men
- 737 admitted to the Technical Preparatory Programme, of which 36 per cent are women and 64 per cent men
- 2,458 new students on one and two-year Master’s programmes, 33 per cent women and 67 per cent men, of whom
- 1,164 students previously on Master of Science in Engineering studies programmes and 1,294 students studying on a one or two-year Master’s programme at KTH
- 292 newly-admitted students to doctoral studies programmes, of which 30 per cent are women and 70 per cent men
- 42 Master of Architecture degrees, 62 per cent to women and 38 per cent to men
- 913 Master of Science in Engineering degrees, 36 per cent to women and 64 per cent to men
- 214 Bachelor of Science in Engineering degrees, 25 per cent to women and 75 per cent to men
- 1,174 Master/Master of Science (one and two-year) degrees, 33 per cent to women and 67 per cent to men
- 279 PhDs, 28 per cent to women and 72 per cent to men
- 100 licentiate degrees, 31 per cent to women and 69 per cent to men

Research

Primary responsibility for five national strategic research areas;
- E-science
- IT and mobile communication
- Transport research
- Production engineering
- Molecular biosciences (Science for Life Laboratory)
- Partner in another five areas

Lead partner in four programme areas within the European Institute of Innovation and Technology (EIT);
- EIT InnoEnergy
- EIT Digital
- EIT Health
- EIT Raw Materials

External financing, income from grants, 1,593 MSEK (excluding transfers):
- MSEK 318 the Swedish Research Council
- MSEK 249 EU
- MSEK 169 Vinnova
- MSEK 180 Wallenberg Foundations
- MSEK 392 other government agencies
- MSEK 285 other external financing including private funds

Financial situation

- MSEK 4,908 in total turnover (of which MSEK 482 transfers)
- Government grants (excluding transfers);
  - MSEK 1,045 First and second level (undergraduate) educational programmes
  - MSEK 1,170 Research and third education cycle

Employees

- 5,178 employees, the equivalent of 3,572 full time positions, of which 1,332 are women and 2,240 men of which;
- 310 professors, 49 women and 262 men (including visiting and adjunct professors)
- 287 associate professors, 66 women and 220 men

Floor Space

- 269,000 m²
Organisation

KTH management and faculty

KTH has educational and research activities in ten schools. Under each of these there are a number of departments, centres of excellence and study programmes. The schools all report directly to the President. Each school is led by a Head of School and a Deputy Head of School and has a Management Group. There is also a Strategic Council for each school, which is an advisory body to the Head of School in certain issues.

The University Board monitors all KTH internal affairs and is responsible for ensuring that its tasks are fulfilled. The board consists of 13 members: the President, eight external members, three faculty members and three student representatives.

The President leads university activities, subject to the University Board. The Deputy President may deputise for the President. The President’s Management Council addresses central strategic issues. It consists of the President, Deputy President, Dean of Faculty, Vice Dean of Faculty, Vice Presidents for Research and Collaboration, University Director and a student representative. KTH also has Vice Presidents for faculty renewal and equal opportunity, international issues and sustainable development. The President’s Strategic Council deals with strategic issues that concern all schools and is made up of the President, Deputy President, Dean of Faculty, Vice Dean of Faculty, University Director, all Vice Presidents, all Heads of Schools, Communications Director and two student representatives. New Vice Presidents with partially different areas of responsibility entered office on 1 January 2017.

The Faculty Council represents the entire faculty and has overall responsibility for issues relating to the quality of education, research and collaboration. The Council is also an advisory body to the President. There is a faculty meeting group, the main task of which is to facilitate and reinforce the faculty’s access to information and influence on processes and decisions. The Education Committee of the Faculty Council has three main tasks: overall design of the educational offering at the undergraduate, graduate and doctoral levels; preparing KTH’s work on quality development and monitoring education; and the preparation of the development of rules and guidelines for education for the whole of KTH. The Appointments Committee of the Faculty Council has three main tasks: preparation and decisions in promotion cases, preparation and decisions on matters relating to recruitment of teaching staff, and the preparation of KTH’s work on quality development and follow-up with regard to teaching staff appointments. The Faculty Council also has a promotions board and recruitment committees.

In 2016, the Faculty Council appointed a Resource Allocation Committee that particularly prepares matters concerning the allocation of the government funding to research and doctoral education.

KTH Schools with operating areas

At end of December 2016

**School of Architecture and the Built Environment (ABE)**
- Architecture
- Civil and Architectural Engineering
- Real Estate and Construction Management
- Philosophy and History
- Sustainable Development, Environmental Science and Engineering
- Urban Planning and Development
- Transport and Economics

**School of Biotechnology (BIO)**
- Genetic Technology
- Glycosciences
- Industrial Biotechnology
- Protein Technology
- Proteomics and Nanobiotechnology
- Theoretical Chemistry and Biology

**School of Computer Science and Communication (CSC)**
- Computational Science and Technology
- Media Technology and Interaction Design
- Robotics, Perception and Learning
- Speech, Music and Hearing
- Theoretical Computer Science

**School of Electrical Engineering (EES)**
- Electromagnetic Engineering
- Electric Power and Energy
- Fusion Plasma Physics
- Communication Network
- Communication Theory
- Micro and Nanosystems
- Automatic Control
- Space and Plasma Physics
- Signal Processing

**School of Industrial Engineering and Management (ITM)**
- Energy Technology
- Industrial Economics and Management
- Production Engineering
- Machine Design
- Materials Science and Engineering
- Applied Mechanical Engineering

**School of Information and Communication Technology (ICT)**
- Electronics
- Industrial and Medical Electronics
- Integrated Devices and Circuits
- Communications Systems
- Materials and Nano physics
- Software Engineering and Computer Systems

**School of Chemical Science and Engineering (CHE)**
- Fibre and Polymer Technology
- Chemistry
- Chemical Engineering

**School of Technology and Health (STH)**
- Health Systems Engineering
- Medical Engineering
- Environmental Physiology

**School of Engineering Science (SCI)**
- Aeronautical and Vehicle Engineering
- Physics
- Solid Mechanics
- Mathematics
- Mechanics
- Theoretical Physics
- Applied Physics

**School of Education and Communication in Engineering Science (ECE)**
- Library
- Learning
The President’s foreword

An annual report not only tells about what happened in terms of KTH’s development and growth in the form of facts and figures. It also lays the foundation for the upcoming year in particular and for the university’s future in general.

The annual report is a comprehensive and thorough source of information ranging from the number of applicants to our programmes and how our research works to our collaboration and development of innovation. Simply put, all of the components, abilities and areas of expertise that make up one of Europe’s highest ranking technical universities and its campuses.

I took office as the President at the end of the year, on 12 November, and this report presents the development that my predecessor worked on. Being entrusted to assume the leadership of such a thriving university is an honour and, as a springboard for the future, the 2016 results are impressive.

Without belittling or detracting from any part, as every little cog is necessary in a university’s enormous machinery with around 13,000 full-time students and 5,000 employees, I focus here on the three pillars that KTH’s activities should build on and there is a great deal of interesting reading with them in mind.

The three pillars are equal opportunity, internationalisation and sustainable development, and KTH will continue to build excellence with them as a base.

In the past year, it is clear that KTH is on a stable level in terms of equal opportunity. Compared with the previous year, the proportion of women students increased somewhat. KTH’s effort to broadened recruitment has yielded results in the form of a more balanced gender distribution with regard to new appointments in the faculty. A deliberate strategy in the recruitment of associate senior lecturers also provided clear results. But much remains to be done in terms of, among other things, certain programmes where women are still under represented.

As to internationalisation, KTH is active in a global market and accordingly subject to global competition. Our students are educated to be viable resources in both the domestic and international labour market. This demands exchanges and collaboration in the global arena at multiple levels. This is why it is naturally very pleasing to see that the effort to recruit more foreign students has done well and that many of KTH’s students choose to study abroad. KTH also has a number of international collaborative arrangements and strategic partnerships.

A great deal has also happened in the area of sustainable development as a result of persistent, systematic work that includes sustainable development as an increasingly given component of all educational programmes, as well as research and development.

The strategic partnerships of which there are now 11, KTH Innovation’s broad activities, our e-learning initiative with two new MOOC courses during the year, our educational growth – especially considering the project where new arrivals are given the chance to quickly be trained in software development, the strong demand for our educational programmes. The list of KTH’s development achievements and successes can go on and on.

This is an excellent foundation from which to take KTH to a new level and thereby contribute to the development of society.

Enjoy your reading!

Sigbritt Karlsson
__Education__

**First and second-cycle education**

**Recruitment of students to KTH programmes, starting at first cycle**

Recruitment efforts have the goal of attracting students who have both the drive and the circumstances to complete the programmes. Technical education should be presented as a natural choice for young people who want to contribute to sustainable societal development. KTH has a communication platform that sets out what KTH should communicate to potential students. The platform also forms the basis of the activities and measures planned or begun to achieve a more balanced gender distribution, reduce social imbalance in recruitment and stimulate ethnic diversity. KTH also works long term with young people in compulsory school as a target group.

Recruitment work prioritises the personal encounter between representatives of KTH and potential students. KTH works intensively with upper secondary schools. This work is mainly done by around 45 “student ambassadors”, who are KTH’s front-line representatives among upper secondary pupils. These student ambassadors represent most of KTH’s degree programmes and campuses. The student ambassadors reflect the diversity at KTH in terms of gender, geographic origins, ethnicity and social background. They are chosen with great care, the greatest priority being their ability to inspire young people. All student ambassadors receive extensive training in communicating with young people, presentation techniques, messages for student recruitment and information about the target group, as well as individual coaching.

The web is KTH’s most important communication channel; together with other digital means such as social media and student blogs, this is a way of making KTH accessible to many, wherever they may live. In 2016, extensive efforts were made to allow potential students to compare KTH’s various programmes with each other, find the programme that attracts them the most based on areas of interest, and gain a good insight into the contents of the various programmes. This work is conducted together with KTH’s teachers and is a direct result of a systematic evaluation of the website.

Over two days in March every year, KTH organises an Open House for the purpose of informing about KTH’s educational programmes on site, in the university environment. The 2016 event attracted some 1,100 visitors, and according to a visitor survey, almost all of them said that they received answers to their questions. The KTH student ambassadors also answered questions on the web during the course of the year.

Upper secondary students also had the opportunity to accompany a student during a normal day’s studies. During the first few months of the spring semester, about 260 3rd-year upper secondary students visited KTH. Of them, around 50 per cent were women. During the 2015/2016 recruitment year, KTH also met potential students at the SACO educationals fairs in Gothenburg and Stockholm, which attracted 30,000 visitors between them. According to a target group survey done on site at the educational fair in Stockholm, among the upper secondary students qualified for studies at KTH who visited KTH’s stand during the day, around 70 per cent became interested in learning more about KTH and KTH’s programmes.

Around half of KTH’s direct target group, 3rd-year upper secondary students in science and technical programmes, are women. Women also account for around half of the participants in KTH’s student recruitment activities. According to KTH’s development plan for 2013–2017, the percentage of women is also to increase among new students in the engineering programmes. The target is 37 per cent women in the engineering master degree programmes and 27 per cent in the engineering bachelor degree programmes. KTH has worked diligently on this for a number of years and is just below the target at the end of 2016. At present, the greatest challenge in terms of recruitment is that certain specialisations and educational environments still have a distinct imbalance. The work of recruiting women has therefore to some extent been redirected towards the subject areas and programmes with the largest imbalance.

To reach more upper secondary students in KTH’s direct target group, KTH identifies around 100 prioritised upper secondary schools every year. The prioritisation is based on average marks, college entry, geographical location, number of pupils, importance given to technical education and previous experience and collaboration. Both visits by student ambassadors to upper secondary schools and visits to KTH are offered to all upper secondary schools.

In addition to the activities targeted at upper secondary schools, KTH also works to increase knowledge and interest in technology, science and mathematics among children and young people. The hub of this work is Vetenskapens Hus, the House of Science, which is run by KTH and Stockholm University with the City of Stockholm as a long-term partner. School pupils, from preschool to upper secondary, visit the premises at AlbaNova or in the Bergius Botanic Gardens to perform experiments or activities involving biology, physics, chemistry, mathematics or technology. Further teacher training in these subjects is also offered. The House of Science also hosts a number of other initiatives for the purpose of increasing knowledge and interest in technology, science and mathematics. These include for example Technology Week, Researchers’ Night, First Lego League and Maths Coach on the internet. More than 72,000 pupils and teachers a year visit the House of Science.

**Recruitment of students to second-cycle education**

KTH is active in an international market and has to compete with other excellent universities for the best researchers and students. According to KTH’s development plan for 2013–2017, the target for fee-paying students registered for the autumn semester 2017 should be 750. The target has thus been set of achieving in the long term the same number of non-Euro-
European students as before the introduction of fees. KTH has established a number of priority regions for targeted action. These are still China, India, South East Asia and Brazil.

For each region, an academic and an administrative coordinator have been tasked with increasing student exchanges with the best universities in the respective region, spreading the reach of the KTH brand and creating opportunities for the recruitment of fee-paying students and to develop research collaboration. Special efforts have been made in respect of China, so as to overcome technical and communication barriers. To reach fee-paying students in China, KTH has established a Chinese website with information on educational programmes, as well as an increased presence in Chinese social media, such as Weibo, RenRen and WeChat.

KTH is working extensively to engage international student ambassadors, in other words foreign master’s students currently studying at KTH. These ambassadors have the task of serving as contact surfaces for potential master’s students, representing their former university in the scope of various kinds of digital marketing activities and being hosts in visits to KTH. The student ambassadors also participate in other forms of activities with the aim of attracting paying students, with a clear focus on digital arenas.

Prioritised regions

KTH does not register the nationality of students, which is why the information on the students’ origin below is based on where they did their qualifying education.

China: Three new agreements, according to the so-called 3+2 model, were signed with Shanghai Jiao Tong University (SJTU), Joint Institute (UM-SJTU-JI) and Huazhong University of Science and Technology (HUST). The earlier agreements with Zhejiang University (ZJU), Harbin Institute of Technology (HIT) and Beijing Jiaotong University (BJTU) are continuing. As before, this means that students can be admitted to the second cycle after three years’ study at a normally four-year education at the bachelor’s level in China.

Several activities took place in cooperation with KTH’s strategic partner SJTU. At the Swedish Center at SJTU, an Innovation Day is arranged, as well as a Sweden Day with the support of Swedish companies and the Stockholm Business region. At KTH, a doctoral student school in biomedical technology was arranged at which some 40 doctoral students and researchers from both universities participated.

During the year, around 600 students from China participated in a master’s programme at KTH, 113 began studies at KTH, of which 106 are fee paying. There were a further 24 students through recruitment agreements (3+2). It total, 137 (144) students from China commenced master’s programme studies at KTH, of whom 130 (133) were fee paying. As part of the scholarship collaboration with the China Scholarship Council (CSC), KTH welcomed 29 doctoral students, 18 guest doctoral students, one postdoctor and five researchers during the year.

India: For the fourth year running, the competition KTH Master’s Challenge was organised with the aim of attracting students to master’s programmes in wireless systems, electric power technology and industrial product development. The competition was organised in collaboration with ABB, Formulate IP and Scania. The prize consisted of three scholarships for studies at the master’s level at KTH and practice or examination work at one of the companies.

University visits and participation at student fairs also took place with the aim of recruiting students and discussing collaboration opportunities. In cooperation with Business Sweden and the Swedish Institute, events were arranged where KTH met admitted students prior to their studies at KTH. During the year, approximately 1,070 students with an education in India applied for master’s programmes at KTH (excluding ETF). 132 (110) students began studies, of which 113 (89) were fee paying.

The strategic efforts in India focus on a partner university. During the year, KTH joined the capacity expansion project DIELES as a partner in Erasmus+.

South East Asia: KTH participated in recruitment fairs in the Philippines, Indonesia, Singapore, Thailand and Vietnam and arranged events for newly admitted students in Indonesia and Thailand. In Indonesia, an award ceremony was arranged in the KTH Master’s Challenge where two students in aerospace and automotive technology won their scholarship for studies at KTH.

In Indonesia, KTH signed a student exchange agreement in railway technology with the Institut Teknologi Bandung and signed an agreement with the scholarship organisation Indonesia Endowment Fund for Education (IPDP). In addition, KTH renewed a Memorandum of Understanding (MOU) with Chulalongkorn University in Thailand and signed a supplement to the student exchange agreement for students in electric power technology with the same university. KTH has also been granted Erasmus+ non-European mobility funding for students and teachers in exchanges with Kasetsart University, Thailand.

Considerable student exchange continues with the National University of Singapore (NUS) and Nanyang Technological University (NTU) comprising about 80 term places in each direction in total. There was also exchange through the iLead programme with the NUS, which involved company practice and courses in entrepreneurship, with eight outgoing and 25 incoming students during the year. The NUS and NTU are thus still KTH’s largest exchange partners.

Around 200 students educated in South East Asia applied for master’s programmes at KTH in 2016. 23 began studies, all fee paying. Indonesia accounts for the majority of the students with 122 applications and 19 who began studies at KTH.

Brazil: A number of trips were made during the year to recruit students and cement academic contacts. KTH participated in multiple events and seminars, including within the scope of the Swedish Academic Collaboration Forum (SACF). The cooperation with the state research authority Minas Gerais FAPEMIG, where KTH has four projects distributed over three of KTH’s schools, was further strengthened through a new MOU being signed. In October, KTH also intro-
duced an alumni section in Sao Paulo.

The student recruitment work during the year had different conditions as the Brazilian scholarship programme Science without Borders was ended. Focus for the student recruitment was on university visits and study fairs. During the year, approximately 80 students with an education in Brazil applied for master’s programmes at KTH (excluding EIT). 15 students began studies, of which two were fee paying.

**Student fee financed activities**

The student fee financed activities mainly affect the education planning. It is difficult to foresee the number of paying students and what programmes they are interested in. Discussions concerning the dimensioning of the programmes, especially in the second cycle, must therefore continuously be conducted. As KTH’s operations for paying students increase in volume, so do the work on recruitment and reception activities at both the schools and centrally at KTH.

In collaboration with the student union, KTH has organised an arrival and introduction service for all international students prior to the spring and autumn semester. During special reception days, the students were met at Arlanda and taken to the KTH Entrance where they could sign a contract for housing and receive service and information. The introduction also included information meetings, a welcoming ceremony on Stockholm City Hall and social activities arranged by the student union.

In addition to the basic arrival and introduction service, the paying students are offered a housing guarantee, cost-free primary care, expanded insurance coverage, a preparatory course in English, an introduction course in the Swedish language and culture and membership in an exercise facility. In 2016, KTH endeavoured to give new students more personal and individualised service than before. The staff at the student service department met more than 1,600 students to guide them accurately in the contact with authorities and institutions in Swedish society.

Tuition fees for second-cycle programmes and courses were SEK 145,000 per academic year, except for architecture where the tuition fee was SEK 245,000 per academic year. The fee level for first-cycle programmes and courses was SEK 115,000 per academic year in all areas except for architecture where the fee was SEK 195,000 per academic year. For 2017/2018, a decision has been made to raise tuition fees. For example, the fee for second-cycle programmes and courses will then be SEK 155,000 per academic year. Different fee levels exist within programmes that are offered in collaboration with other universities.

**Demand for KTH programmes**

Demand for KTH programmes that lead to professional qualification continues to be high and has once again increased compared with previous years. The number of first-choice applications for these programmes in 2016 was 5,725 (5,631) in total. The number of planned places was 2,235 (2,233). In its development plan for 2013–2017, KTH has the goal for 2017 of having at least 1,100 first-choice applicants to the engineering bachelor degree programmes and 4,300 to the engineering master degree programmes. In 2016, there were 1,046 first-choice applicants to these bachelor’s programmes and 3,793 to these master’s programmes.

In the autumn semester of 2014, KTH began its first English language first-cycle programme, the Bachelor’s Programme in Information and Communication Technology. In 2016, the programme had 546 (660) first-choice applicants, of which 253 were in the national admissions round and 293 in the admissions round for English language programmes. This indicates extensive interest in English language programmes even in the first cycle.

The number of applications at the master’s degree level also increased in 2016. In connection with the introduction of tuition fees in 2011, the number of applicants dropped drastically, but since 201 has increased from around 5,000 to nearly 13,000 applicants in 2016.

Of 12,967 (9,425) web registrations for the second-cycle English speaking programmes before the autumn 2016 semester, 9,870 (6,708) were subject to fees and of these 3,021 (2,602) paid the registration fees. There were 114 (121) first-choice applicants for the (three) Swedish speaking one-year master’s programmes.

KTH also coordinates admissions to the umbrella programme of eight different tracks, which is provided by EIT Digital within the framework of the European Institute of Innovation and Technology (EIT). Some enrolled students begin their studies at a seat of learning other than KTH and some do not study at KTH at all, only at partner universities. The EIT programme received 1,197 (1,590) applications.

The qualifying Technical Preparatory Year and Technical Preparatory Semester had a total of 2,155 (2,220) first-choice applicants in 2016. The programmes begin in both the spring and autumn semesters. The preparatory year at the KTH Campus, beginning in the autumn semester, had 981 (1,316) first-choice applicants, which means that it is the most sought after programme at KTH.

**Alternative selection, mathematics and physics test**

For autumn 2016 admissions, KTH used mathematics and physics tests as an alternative selection to the degree programmes in Engineering Physics, Electrical Engineering and Vehicle Engineering. The mathematics and physics test is designed and administered by Chalmers and has been used as a selection model for admissions to degree programmes in engineering since 2007 at Chalmers and since 2011 at KTH.

Up to a third of the places in these programmes can be given to applicants with approved results in the mathematics and physics tests. A minimum result must be achieved in the test in order to gain acceptance. In the autumn semester of 2016, 45 applicants were accepted into engineering physics, five into electrical engineering and four into vehicle engineering.
Assessment of prior learning
In 2016, KTH worked to further develop the handling of prior learning. The issue is regularly addressed and employees have been assigned the task of deepening their knowledge in the area, examining how other universities and organisations work and establishing networks with them. This took place through participation in numerous conferences, seminars and meetings with prior learning and other validation measures as the topic, arranged by the European Association for International Education (EAIE), the Swedish Council for Higher Education (UHR), the Validation Delegation at the Government Offices and other Swedish universities.

At present, work is under way to prepare readily available and clear information online addressed to people in need of an assessment of prior learning for qualification to higher studies and/or validation to count prior experience in KTH’s areas of education. The objective is to highlight the possibility of having one’s prior learning assessed and to facilitate the application process for the applicant.

Beginners
In 2016, a total of 2,606 (2,621) beginners started year 1 studies in KTH’s programmes that lead to professional degrees, of which 1,04 (106) were in the Master of Architecture programme, 1,845 (1,838) in Master of Science in Engineering programmes and 657 (677) in Bachelor of Science in Engineering programmes. See Figure 1 for further details.

The two final years of a Master of Science in Engineering programme are registered as a master’s programme, meaning that Master of Science in Engineering students are registered as new students on a master’s programme when they start the fourth year of their engineering programme. Master’s programmes had 2,320 (2,106) beginners. Of them, there were 1,156 (1,044) new students who started with KTH’s master’s programme while 1,164 (1,062) were already students in the five-year Master of Science in Engineering programme. The one-year master’s programmes had 138 (149) beginners.

Of the total number of beginners in 2016, 34 per cent were women and 66 per cent were men. In 2017, KTH has the target of women accounting for at least 37 per cent of the beginners in the engineering master’s programmes and 27 per cent in the engineering bachelor’s programmes. Of the beginners in the engineering master’s programmes, 35 (34) per cent were women and 65 (66) per cent were men. Of the beginners in the engineering bachelor’s programmes in 2016, 27 (25) per cent were women and 73 (75) per cent were men, which is on a par with the targets of the development plan. The distribution between men and women differs sharply, however, between KTH’s various programmes. See Figure 1 for the gender distribution within programme types and programmes, and Figure 2 for the development in the past 10 years.

The median age for beginners in the Master of Architecture and Master of Science in Engineering programmes was 20 for women and 21 for men in 2016. For beginners in the Bachelor of Science in Engineering programmes, the median age was 22 for both men and women. The median age for both men and women in the one- and two-year master’s programmes was 24. For the technical preparatory programme, the median age was 21 for both men and women. These are essentially the same levels as in 2015.

In addition to the admission of beginners in year 1,181 (176) new students began in the later parts of the Master of Science in Engineering programme. There is also an option of starting in the later part of a one- or two-year master’s programme, which 149 (118) students did.

KTH’s goal is that 750 fee-paying students will be registered in the autumn semester 2017. In the autumn semester 2016, 523 (440) new fee-paying students were registered at KTH, of which 153 (127) were women and 370 (313) were men, which means that KTH continues to see a positive development since the tuition fees were introduced. Of the fee-paying students, 473 began studies in the first year of a bachelor’s programme or one- or two-year master’s programme, and 50 began studies in the second year of the two-year master’s programme. Of these fee-paying students, 88 (38) had been awarded scholarships financed by Swedish or KTH-affiliated scholarship programmes: 38 (39) Swedish Council for Higher Education scholarships, 2 (2) financed by ABB, 3 (2) financed by Ax:son Johnson, and 2 (0) financed by the KTH India Scholarship Foundation and 43 (5) through the Swedish Institute (SI). The increase in scholarships from 21 was because the budget is now back to its original level after the cut-backs of the previous year.

Of the remaining 435 (402) students, 84 (63) and 42 (54), respectively, came via the EU knowledge and innovation groups EIT Digital and EIT InnoEnergy.

KTH has the goal that the number of externally recruited beginners from the EU/EEA/Switzerland will be 850 in 2017. In 2016, 824 externally recruited programme beginners from the EU/EEA/Switzerland, including Sweden, began second-cycle studies, of which 293 women and 531 men.

The technical preparatory year is a one-year qualifying programme for students who have not achieved full qualification for KTH’s programmes during their upper secondary studies. The preparatory year extends over two semesters and provided supplemental education at the upper-secondary level in mathematics, physics and chemistry. It is also possible to only apply for the second semester of the preparatory year, which is particularly well-suited for those who followed the upper-secondary technical programme. Passing marks in the preparatory year or preparatory semester guarantees a place at one of KTH’s engineering bachelor’s or five-year master’s programmes. In 2016, 737 students began in the technical preparatory programmes, compared with 812 the year before. Of the beginners, 36 (36) per cent were women and 64 (67) per cent were men.

Of those who began in the preparatory programme in autumn 2015 or spring 2016, 43 (44) per cent or a total of 340 (389) students (59 per cent women and 71 per cent men), continued on to a bachelor’s programme or five-year master’s pro-
## Figure 1
Total number of new students 2013–2016

<table>
<thead>
<tr>
<th>Master of Architecture, Degree Programme</th>
<th>2016 Proportion (%) of women/men</th>
<th>2015 Proportion (%) of women/men</th>
<th>2014 Proportion (%) of women/men</th>
<th>2013 Proportion (%) of women/men</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 HE credits</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>Master of Science in Engineering Degree Programme</td>
<td>300 HE credits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biotechnology</td>
<td>104 60/40</td>
<td>106 61/39</td>
<td>110 64/36</td>
<td>112 65/35</td>
</tr>
<tr>
<td>Engineering and Education</td>
<td>187 21/79</td>
<td>206 15/85</td>
<td>190 16/84</td>
<td>192 11/89</td>
</tr>
<tr>
<td>Design and Product Realisation</td>
<td>117 51/49</td>
<td>115 52/48</td>
<td>120 51/49</td>
<td>117 51/49</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>77 14/86</td>
<td>80 11/89</td>
<td>82 13/87</td>
<td>79 8/92</td>
</tr>
<tr>
<td>Energy and Environment</td>
<td>84 52/48</td>
<td>82 56/44</td>
<td>84 55/45</td>
<td>81 49/51</td>
</tr>
<tr>
<td>Vehicle Engineering</td>
<td>112 21/79</td>
<td>121 18/82</td>
<td>110 9/91</td>
<td>107 17/83</td>
</tr>
<tr>
<td>Industrial Engineering and Management</td>
<td>160 36/64</td>
<td>159 29/71</td>
<td>170 33/67</td>
<td>173 36/64</td>
</tr>
<tr>
<td>Information and Communication Technology</td>
<td>80 26/74</td>
<td>78 22/78</td>
<td>70 24/76</td>
<td>77 16/84</td>
</tr>
<tr>
<td>Engineering Chemistry /Chemical Science and Engineering</td>
<td>69 55/45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>201 27/73</td>
<td>165 30/70</td>
<td>157 22/78</td>
<td>157 27/73</td>
</tr>
<tr>
<td>Materials Design and Engineering</td>
<td>48 33/67</td>
<td>47 43/57</td>
<td>50 50/50</td>
<td>47 28/72</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>56 55/45</td>
<td>59 58/42</td>
<td>57 44/56</td>
<td>56 61/39</td>
</tr>
<tr>
<td>Media Technology</td>
<td>69 54/46</td>
<td>70 47/53</td>
<td>70 30/70</td>
<td>69 51/48</td>
</tr>
<tr>
<td>Civil Engineering and Urban Management</td>
<td>178 44/56</td>
<td>180 53/47</td>
<td>173 49/51</td>
<td>162 40/60</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>134 16/84</td>
<td>137 20/80</td>
<td>130 16/84</td>
<td>142 13/87</td>
</tr>
<tr>
<td>Open entrance</td>
<td>144 33/67</td>
<td>141 28/72</td>
<td>119 37/63</td>
<td>137 28/72</td>
</tr>
<tr>
<td>Sub-total</td>
<td>1,845 35/65</td>
<td>1,838 34/66</td>
<td>1,809 33/67</td>
<td>1,780 31/69</td>
</tr>
<tr>
<td>Bachelor of Science in Engineering, Degree programme 180 HE credits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructional Engineering and Design</td>
<td>178 35/65</td>
<td>174 29/71</td>
<td>173 42/58</td>
<td>167 35/65</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>138 15/85</td>
<td>142 15/85</td>
<td>135 13/87</td>
<td>136 7/93</td>
</tr>
<tr>
<td>Electronics and Computer Engineering</td>
<td>41 12/88</td>
<td>34 6/94</td>
<td>49 4/96</td>
<td>34 21/79</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>44 7/93</td>
<td>47 11/89</td>
<td>45 7/93</td>
<td>39 8/92</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>53 49/51</td>
<td>47 60/40</td>
<td>48 56/44</td>
<td>48 42/58</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>113 19/81</td>
<td>113 20/80</td>
<td>129 11/89</td>
<td>121 10/90</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>41 39/61</td>
<td>35 46/54</td>
<td>54 31/69</td>
<td>46 35/65</td>
</tr>
<tr>
<td>Engineering and Economics</td>
<td>49 43/57</td>
<td>85 27/73</td>
<td>82 32/68</td>
<td>83 29/71</td>
</tr>
<tr>
<td>Sub-total</td>
<td>657 21/73</td>
<td>677 25/75</td>
<td>715 25/75</td>
<td>764 22/78</td>
</tr>
<tr>
<td>Subject Teacher Education in Technology, Secondary Education, 270 HE credits</td>
<td>- -</td>
<td>- 5 60/40</td>
<td>11 55/45</td>
<td>4 25/75</td>
</tr>
<tr>
<td>Bridging Teacher Education</td>
<td>41 29/71</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>Masters programmes</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>Masters programmes 120 HE credits</td>
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<td>2,106 33/67</td>
<td>1,920 33/67</td>
<td>1,652 30/70</td>
</tr>
<tr>
<td>of which within Master of Science in Engineering programmes</td>
<td>1,164 32/68</td>
<td>1,062 32/68</td>
<td>1,043 33/67</td>
<td>969 30/70</td>
</tr>
<tr>
<td>Masters programmes 60 HE credits</td>
<td>138 49/51</td>
<td>149 56/44</td>
<td>119 43/57</td>
<td>146 49/51</td>
</tr>
<tr>
<td>Sub-total</td>
<td>2,458 33/67</td>
<td>2,255 34/66</td>
<td>2,039 33/67</td>
<td>1,798 31/69</td>
</tr>
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<td>Bachelors programmes 180 HE credits</td>
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<td>115 35/65</td>
<td>139 36/64</td>
<td>162 35/65</td>
</tr>
<tr>
<td>University Diploma programmes 120 HE credits</td>
<td>43 28/72</td>
<td>40 13/88</td>
<td>40 43/57</td>
<td>49 22/78</td>
</tr>
<tr>
<td>Technical Preparatory Year, Technical Preparatory Semester 60/30 HE credits</td>
<td>737 36/64</td>
<td>812 36/64</td>
<td>894 33/67</td>
<td>818 30/70</td>
</tr>
<tr>
<td>Total</td>
<td>3,999 34/66</td>
<td>5,848 34/66</td>
<td>5,757 33/67</td>
<td>5,397 31/69</td>
</tr>
</tbody>
</table>

Source: Ladok
programme at KTH in 2016. The majority of those who continue their studies at KTH did so in the 5-year master’s programmes.

**Preparatory courses between upper secondary school and university**

Once again in 2016, KTH offered Internet-based preparatory courses to applicants for science and technology programmes. The courses are intended to support beginners and ease the transition from upper secondary level to university. KTH works with several other universities and colleges in the preparatory courses in mathematics. The students are registered at and examined by the seat of learning to which they apply. The courses in mathematics had 647 (1,748) participants. The decrease was attributable to KTH now specially inviting and targeting students who applied for KTH’s programmes beginning the following autumn semester.

In 2016, KTH also offered preparatory courses in physics, computer engineering, urban planning and architecture. The preparatory courses had a total of 3,220 (3,548) participants.

**International mobility**

KTH shall actively strive for the students to place a part of their education abroad to a greater extent. The goal is that 700 students will study at least one semester abroad in the scope of their education and the KTH students have access to well-renowned universities. In 2016, a total of 654 (662) students began studies abroad; KTH accordingly is at a stable level, see Figure 3. Of the students studying abroad, 50 (51) per cent studied at a university outside the EU/EEA/Switzerland. The most common countries for foreign studies were Singapore, Australia, the USA, France, Germany and Switzerland.

KTH has continued to actively work to achieve a balance in the student exchange. The work that began in 2014 with reviewing the administrative processes for inbound and outbound students has continued and the system support Mobility Online has been gradually developed with the aim of supporting the activities in the best way.

The single largest effort to increase the number of students studying abroad is KTH Global, which was held for the fifth consecutive year over three days in November. The programme offered a fair with invited partner universities, information meetings and talk shows. In addition, a blog that highlights selected students who are studying abroad contributed to providing insight into what foreign studies involve.

Interest in studying as an exchange student at KTH remained high. During the year, 1,002 (662) exchange students began studies at KTH. The increase over the previous year concerns the USA and Germany, among others. Within Europe, most students came from universities in Germany, France, Switzerland and the Netherlands. Of all inbound exchange students, 40 (38) per cent came from countries outside the EU/EEA/Switzerland, most of whom were from Singapore, the USA and China.

In addition to the exchange students, KTH has a relatively large group of incoming double degree students in specific collaboration agreements with universities in Europe and Japan. These students study mainly at the second-cycle level for one and a half to two years and then take a Master of Science in Engineering degree from KTH and an equivalent degree from their home university. During the year, 151 (159) students began double degree studies at KTH.

Interest in various types of projects abroad, such as doing...
a degree project, remains high. KTH is endeavouring to offer more scholarships for these purposes. During the year, 47 (37) students started Erasmus internships at a company or organisation in Europe. In 2016, KTH was awarded significantly fewer scholarships from the Swedish Council for Higher Education (UHR) under the Sida-financed programme Minor Field Studies (MFS). The reason is that the government decided to reduce the budget for Sida’s projects, including the national MFS budget. A total of 36 applications were received, of which 20 were granted, compared with 50 the year before. The destinations most scholarship holders travelled to were Tanzania, Peru, Cameroon and Ghana.

E-learning

One goal in the KTH development plan for 2013–2017 is that e-learning will be a natural part of the KTH programmes. There is rapid development in the field, which demands that KTH works to evaluate methods and technical support for education in accordance with the prepared vision for e-learning. KTH’s development plan identifies in particular the link between educational development work and Internet-based learning through a clear connection between educational methods and technical support.

Global competition for the best students means that courses, or parts of courses, must be made available on the Internet. This in turn requires knowledge of, and the development of, adapted educational methods. Many teachers have been active in e-learning for a number of years and they are continuing with the implementation of e-learning in the educational programmes. The primary emphasis must be on increasing the quality of the programmes, and digital resources must be beneficial and easy to use. KTH is also investing in infrastructure to support the development of e-learning. In 2015, KTH established an administration unit to organise support for e-learning. In 2016, a major effort was made on a new learning platform for the entire university. Work began in 2016 and is scheduled for completion in 2017. In addition, work is under way to produce Massive Open Online Courses (MOOC) that KTH offers globally. In 2016, two MOOC courses were offered, Human Spaceflight and Reliable Distributed Algorithms, part 1.

During the year, there was a continued reinforcement of user support for teachers, improvement of the teacher-supported web and establishment of local support for the handling of the learning platform at all KTH schools. In the scope of the administration unit, KTH developed system support for course development and introduced a new system for plagiarism checks. In addition, the new video platform KTH Play is offered to all teachers through integration in the learning platform. In 2016, a new portfolio management model was introduced, which brings closer collaboration between e-learning (administration unit and projects), the study administration department and the IT department through a new Steering Committee. In 2017, this will result in several joint efforts to create a better overall experience for both teachers and students.
**Integration efforts**

*Sfinx:* The course called Swedish for Engineers in Stockholm County (Sfinx) started in project form in 2008 and since 2011 has been a coordinated programme included in KTH’s ordinary activities. The objective is to ease the entry into the labour market for engineers who have immigrated to Sweden.

Sfinx is a unique joint venture between KTH, the Municipality of Järfalla, the City of Stockholm, the County Administrative Board of Stockholm and the Swedish Association of Graduate Engineers. For 18 months, engineers study Swedish from the immigrant course level through to upper secondary level, as well as English. They also learn about Swedish industry and the Swedish labour market. The students make observation visits or gain credits in their field of engineering at KTH in parallel with the opportunity to participate in a mentorship programme organised by the Swedish Association of Graduate Engineers.

Approximately 130–140 students participate in Sfinx each year and more than 750 students in total have participated in the programme. As in 2015, students in 2016 have mainly made classroom observation visits at the first and second cycle rather than taking whole courses. Reporting was in the form of written accounts integrated into the Swedish course, and contributed to students’ Swedish grades.

A tendency that continued since 2015 is that industry has begun to contact Sfinx to recruit people with the relevant expertise. One explanation for this may be that Sfinx has now established itself as a concept in the eight years that the programme has been in existence. After completing the programme, around 45 per cent of the participants in the latest group found employment in engineering-related work.

KTH has been assigned the task of building up supplementary education for people who have completed a foreign architecture programme and supplementary education for people who have completed a foreign engineering programme.

In October 2016, the government decided that KTH would be given this assignment. The work to plan for the supplementary programmes is consequently still in an initial phase. A working Group has been formed to discuss the structure of the programmes that have individually adapted lengths of study. Contacts have also been made with the universities that together with KTH have the same assignment.

KTH has been assigned by the Wallenberg Foundations to conduct an education project where recent arrivals are rapidly trained in software development over three months at KTH. The objective is to further educate recent arrivals who are matched with the labour market over three months at KTH. The programme is developed in cooperation with industry. The objective is to contribute to securing the future of Swedish industry through leading education and research.

KTH has also carried out in close cooperation with industry. The programmes are developed in cooperation with industry in Södertälje and several of the courses are also carried out in close cooperation with industry.

**Performance**

The number of state-funded full-time equivalents (FTEs) and annual performance equivalents in first- and second-cycle education in 2016 amounted to a total of 12,349 (12,244) and 10,420 (10,289), respectively. A certain number of examinations for the autumn term will continue to be late in December. For the outcome in 2016, this means that 281 annual performance equivalents that were registered in January 2016 relate to examinations that took place in December 2015.

Of the total number of FTEs, 92 per cent were connected with the science and technology educational areas. KTH can receive funds for a maximum of 123 FTEs and annual performance equivalents, respectively, in the subject area of design. However, the design area had 349 FTEs and 318 annual performance equivalents in 2016. The FTEs and annual performance equivalents that exceed 123 are deducted from in the technology education area.

The performance rate for KTH’s first- and second-cycle studies is 84 (85) per cent calculated as the number of annual performance equivalents in relation to the number of FTEs.

The percentage of women among the FTEs is 34 per cent and the percentage of men is 66 per cent. This is the same level as in the recent years. In the 5-year engineering master’s programme and the architecture programme, the per—
Figure 5
**Full year students 2013–2016**

<table>
<thead>
<tr>
<th>Program Type</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Architecture, 300 HE credits</td>
<td>60/40</td>
<td>58/42</td>
<td>52/1</td>
<td>54/46</td>
</tr>
<tr>
<td>Master of Science in Engineering, 270 HE credits</td>
<td>32/68</td>
<td>32/68</td>
<td>52/79</td>
<td>31/69</td>
</tr>
<tr>
<td>in addition, within Master programmes</td>
<td>33/67</td>
<td>33/67</td>
<td>52/79</td>
<td>32/68</td>
</tr>
<tr>
<td>Bachelor of Science in Engineering, 180 HE credits</td>
<td>26/74</td>
<td>25/75</td>
<td>15/32</td>
<td>23/77</td>
</tr>
<tr>
<td>Bridging Teacher Education, 90 HE credits</td>
<td>30/70</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Subject Teacher Education in Technology, Secondary Education</td>
<td>100/0</td>
<td>102/78</td>
<td>102/78</td>
<td>110/78</td>
</tr>
<tr>
<td>Masters Programmes</td>
<td>34/66</td>
<td>34/66</td>
<td>26/74</td>
<td>26/74</td>
</tr>
<tr>
<td>Bachelor of Science in Engineering</td>
<td>32/68</td>
<td>32/68</td>
<td>32/68</td>
<td>32/68</td>
</tr>
<tr>
<td>Exchange students arriving at KTH</td>
<td>30/70</td>
<td>32/68</td>
<td>32/68</td>
<td>32/68</td>
</tr>
<tr>
<td>Science without Borders</td>
<td>30/70</td>
<td>30/70</td>
<td>30/70</td>
<td>30/70</td>
</tr>
</tbody>
</table>

Total | 12,349 | 12,244 | 12,004 | 11,143 |

Source: Ladok

Figr 6
**Full year students and performance rate, fee-paying students 2013–2016**

<table>
<thead>
<tr>
<th>Program Type</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Architecture, Master of Science in Engineering</td>
<td>300 HE credits</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bachelor of Science in Engineering</td>
<td>180 HE credits</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Bachelors Programmes 180 HE credits</td>
<td>3</td>
<td>1</td>
<td>110</td>
<td>12</td>
</tr>
<tr>
<td>Masters Programmes 60 HE credits</td>
<td>18</td>
<td>9</td>
<td>330</td>
<td>86</td>
</tr>
<tr>
<td>Masters Programmes 120 HE credits</td>
<td>673</td>
<td>86</td>
<td>85</td>
<td>420</td>
</tr>
<tr>
<td>Science without Borders</td>
<td>19</td>
<td>83</td>
<td>72</td>
<td>18</td>
</tr>
</tbody>
</table>

Total | 714 | 86 | 571 | 85 |

Source: Ladok
### First degrees 2013–2016

<table>
<thead>
<tr>
<th>Degree</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Proportion (%) of women/men</td>
<td>Total</td>
<td>Proportion (%) of women/men</td>
</tr>
<tr>
<td>Master of Architecture 270/300 HE credits</td>
<td>42</td>
<td>62/38</td>
<td>105</td>
<td>46/54</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>113</td>
<td>36/64</td>
<td>1316</td>
<td>29/71</td>
</tr>
<tr>
<td>Engineering and Education</td>
<td>32</td>
<td>62/38</td>
<td>58/42</td>
<td>36</td>
</tr>
<tr>
<td>Computer Science and Engineering</td>
<td>22</td>
<td>23/77</td>
<td>67/33</td>
<td>27</td>
</tr>
<tr>
<td>Design and Product Realisation</td>
<td>62</td>
<td>48/52</td>
<td>55/45</td>
<td>84</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>50</td>
<td>20/80</td>
<td>13/87</td>
<td>76</td>
</tr>
<tr>
<td>Energy and Environment</td>
<td>31</td>
<td>68/32</td>
<td>53/47</td>
<td>0</td>
</tr>
<tr>
<td>Vehicle Engineering</td>
<td>80</td>
<td>31/69</td>
<td>16/84</td>
<td>12</td>
</tr>
<tr>
<td>Industrial Engineering and Management</td>
<td>106</td>
<td>34/66</td>
<td>118</td>
<td>28/72</td>
</tr>
<tr>
<td>Information and Communication Technology</td>
<td>15</td>
<td>23/77</td>
<td>36</td>
<td>11/89</td>
</tr>
<tr>
<td>Chemistry and Chemical Engineering/Chemical Science and Engineering</td>
<td>42</td>
<td>50/50</td>
<td>69</td>
<td>49/51</td>
</tr>
<tr>
<td>Surveying</td>
<td>9</td>
<td>44/56</td>
<td>8</td>
<td>50/50</td>
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<tr>
<td>Mechanical Engineering</td>
<td>109</td>
<td>25/75</td>
<td>145</td>
<td>25/75</td>
</tr>
<tr>
<td>Materials Design and Engineering</td>
<td>21</td>
<td>43/57</td>
<td>32</td>
<td>19/81</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>50/50</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>16</td>
<td>44/56</td>
<td>27</td>
<td>59/41</td>
</tr>
<tr>
<td>Media Technology</td>
<td>29</td>
<td>59/41</td>
<td>39/61</td>
<td>38</td>
</tr>
<tr>
<td>Microelectronics</td>
<td>11</td>
<td>27/73</td>
<td>18</td>
<td>11/89</td>
</tr>
<tr>
<td>Civil Engineering and Urban Management</td>
<td>119</td>
<td>51/49</td>
<td>122</td>
<td>41/59</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>85</td>
<td>27/73</td>
<td>130</td>
<td>22/78</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>3</td>
<td>0/100</td>
<td>7</td>
<td>43/57</td>
</tr>
<tr>
<td>Not within programme/specialisation</td>
<td>6</td>
<td>50/50</td>
<td>20</td>
<td>20/80</td>
</tr>
<tr>
<td>Bachelor of Science in Engineering 180 HE credits</td>
<td>214</td>
<td>25/75</td>
<td>358</td>
<td>23/77</td>
</tr>
<tr>
<td>Degree of Master of Science in Secondary Education</td>
<td>12</td>
<td>8/92</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Master of Science 120 HE credits</td>
<td>1,099</td>
<td>33/67</td>
<td>1,344</td>
<td>30/70</td>
</tr>
<tr>
<td>of which also graduated as a Master of Science in Engineering</td>
<td>495</td>
<td>31/69</td>
<td>580</td>
<td>33/67</td>
</tr>
<tr>
<td>of which joint degree</td>
<td>15</td>
<td>20/80</td>
<td>25</td>
<td>8/92</td>
</tr>
<tr>
<td>Degree of Master of Science 60 HE credits</td>
<td>70</td>
<td>43/57</td>
<td>106</td>
<td>43/57</td>
</tr>
<tr>
<td>Degree of Master of Science 240 HE credits</td>
<td>4</td>
<td>25/75</td>
<td>28</td>
<td>25/75</td>
</tr>
<tr>
<td>Master Degree 90 HE credits</td>
<td>1</td>
<td>0/100</td>
<td>9</td>
<td>44/56</td>
</tr>
<tr>
<td>Degree of Bachelor of Science 180 HE credits</td>
<td>739</td>
<td>40/60</td>
<td>873</td>
<td>37/63</td>
</tr>
</tbody>
</table>

1) this year and earlier  
2) according to older regulations  

Source: Ladok
In total, KTH issued 1,099 (1,344) Master of Engineering degrees. Of them, 495 (580) also received the Master of Science in Engineering in 2016 or earlier. The one-year Master of Engineering degree, 60 ECTS credits, was awarded to 70 (106) persons.

Of the 739 (873) Bachelor of Engineering degrees awarded, 569 (711) were taken out by students in the Master of Science in Engineering programmes and 95 (72) by students in the Master of Architecture programme.

In the 2015 annual report, KTH assessed that the increase in degrees this year could be attributable to students that began a programme before 2007 had the possibility to take out their degree until the end of June 2015 according to the older regulations in the Higher Education Ordinance Appendix 2.

The information above shows that many students choose to take out multiple degrees based on the same studies. The most common combination is a Master of Science in Engineering with a Master of Engineering degree and a Bachelor of Engineering degree. The trend is that the percentage of students who take out an additional one or two degrees based on the same studies is increasing. In 2016, this percentage was 31 (40) per cent.

The proportion of women graduating as Master of Science in Engineering was 36 (29) per cent and the proportion of men 64 (71) per cent. For the Master of Architecture, women made up 62 (46) per cent and men 38 (54) per cent. See Figure 9 for the gender distribution within programme types and programmes.

KTH also issues master’s degrees jointly with other universities. The number of degrees issued jointly with other universities was 15 (25) in 2016.

In 2016, 6 (4) one-year master’s degrees and 162 (186) two-
Figure 9
Newly admitted and registered research students 2013–2016

<table>
<thead>
<tr>
<th>New students per research field</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total of women/ men</td>
<td>Total of women/ men</td>
<td>Total of women/ men</td>
<td>Total of women/ men</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>2/50/50</td>
<td>1/0/100</td>
<td>1/0/100</td>
<td>1/0/100</td>
</tr>
<tr>
<td>Computer and Information Science</td>
<td>43/37/63</td>
<td>32/22/78</td>
<td>35/14/86</td>
<td>49/20/80</td>
</tr>
<tr>
<td>Economics and Business</td>
<td>0/0</td>
<td>3/67/33</td>
<td>12/58/42</td>
<td>12/33/67</td>
</tr>
<tr>
<td>Electrical Engineering, Electronic Engineering, Information Engineering</td>
<td>50/16/84</td>
<td>39/18/82</td>
<td>41/12/88</td>
<td>62/23/77</td>
</tr>
<tr>
<td>Philosophy, Ethics and Religion</td>
<td>0/0</td>
<td>2/50/50</td>
<td>1/0/100</td>
<td>1/0/100</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>23/26/74</td>
<td>14/57/43</td>
<td>28/7/93</td>
<td>31/16/84</td>
</tr>
<tr>
<td>History and Archaeology</td>
<td>2/100/0</td>
<td>1/100/0</td>
<td>0/0/0</td>
<td>4/75/25</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>7/14/86</td>
<td>1/100/0</td>
<td>3/100/0</td>
<td>2/50/50</td>
</tr>
<tr>
<td>Industrial Biotechnology</td>
<td>12/33/67</td>
<td>14/50/50</td>
<td>20/50/50</td>
<td>14/57/43</td>
</tr>
<tr>
<td>Chemical Sciences</td>
<td>18/39/61</td>
<td>15/40/60</td>
<td>9/44/56</td>
<td>7/57/43</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>13/31/69</td>
<td>24/38/63</td>
<td>34/32/68</td>
<td>20/35/65</td>
</tr>
<tr>
<td>Arts</td>
<td>7/57/43</td>
<td>2/0/100</td>
<td>4/75/25</td>
<td>1/100/0</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>38/29/71</td>
<td>45/36/64</td>
<td>34/29/71</td>
<td>28/18/82</td>
</tr>
<tr>
<td>Mathematics</td>
<td>15/7/93</td>
<td>9/22/78</td>
<td>12/25/75</td>
<td>6/67/33</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>28/18/82</td>
<td>30/13/87</td>
<td>25/20/80</td>
<td>35/34/66</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>3/100/0</td>
<td>9/56/44</td>
<td>3/0/100</td>
<td>2/100/0</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>25/44/56</td>
<td>34/35/65</td>
<td>33/42/58</td>
<td>33/39/61</td>
</tr>
<tr>
<td>Educational Sciences</td>
<td>3/0/100</td>
<td>3/67/33</td>
<td>4/75/25</td>
<td>0/0/0</td>
</tr>
<tr>
<td>Other Engineering Technologies</td>
<td>0/0</td>
<td>0/0/0</td>
<td>0/0/0</td>
<td>0/0/0</td>
</tr>
<tr>
<td>Total new research students</td>
<td>292/30/70</td>
<td>284/32/68</td>
<td>305/29/71</td>
<td>316/30/70</td>
</tr>
<tr>
<td>Total number of students registered</td>
<td>2,004/30/70</td>
<td>2,074/31/69</td>
<td>2,168/30/70</td>
<td>2,184/30/70</td>
</tr>
</tbody>
</table>

Source: Ladok
year master’s degrees were issued to students who had paid tuition fees for their studies at KTH. These degrees are included in the information presented above.

Third-cycle education

Recruitment
Third-cycle education at KTH is attractive, which means that there are many applicants to the advertised doctoral studentships. A high level of competition benefits the quality of education. In 2016, KTH conducted coordinated advertisement of places in doctoral studies in the daily press. The aim of such coordinated advertising is to give KTH a high profile and increase interest in KTH as both a workplace and a university.

In 2016, a total of 203 (183) doctoral student position were advertised. A total of 13,260 people applied for these, 2,582 of them women and 10,661 men. Of the total number of applicants, 17 did not indicate their gender. Recruitment to doctoral studies also takes place without prior advertising. This relates to doctoral students funded via scholarships, partnerships with industry, etc., as well as doctoral students in primarily international collaboration.

Admissions
According to the KTH development plan for 2013–2016, a total of 1,750 doctoral students were to be admitted during the period.

In 2016, 292 (284) doctoral students were admitted. The percentage of women was 30 (32) per cent and of men was 70 (68) per cent. Of the new doctoral students, 9 per cent were admitted to take a licentiate degree. Of them, 41 percent were women and 59 percent were men. In total over the period 2013–2016, 1,197 doctoral students were admitted, which is far from the target of 1,750. In connection with the extension of the development plan to also cover 2017, the target was revised to 1,450.

Of the year’s new doctoral students, 34 (44), of which 26 per cent were women and 74 per cent were men, have their main activities outside the university and conduct their doctoral studies in the scope of their employment (externally employed doctoral students). The employer may be in the private or public sector.

Of those admitted to doctoral studies in 2016, 32 (54) per cent or 94 (66) people had a KTH degree. Among them, it was most commonly a Master of Science in Engineering. Of the new doctoral students with KTH degrees, 31 (53) per cent have a Master of Science in Engineering and 49 (46) per cent a one- or two-year master’s degree. Of the new doctoral students in 2016, 48 (47) per cent have a degree from a country other than Sweden.

The number of new doctor students decreased which is not in line with KTH’s development plan. There are several possible reasons. One partial explanation may be higher costs for financing studies. In addition, KTH has significantly fewer students in the master’s programmes, without prior admission to the 5-year master’s programme, since tuition fees were introduced. The number of new admissions to doctoral studies with a one- or two-year master’s degree from KTH as their prior education decreased from 90 in 2012 to 46 in 2016. In addition, the number of new admissions with a Master of Science in Engineering from KTH has also decreased.

Level of activity and financing of studies
Of a total of 2,004 registered doctoral students at KTH in 2016, 1,792 have worked at least 50 per cent of full time, and 1,984 have worked at least 10 per cent.

In 2016, employment as a doctoral student continued to be the predominant form of financing studies. At year end, 1,107 or 61 per cent of doctoral students at KTH had this form of financing on a full or part-time basis. Of those who had doctoral employment, 30 (59) per cent were women and 70 (71) per cent were men.

Of the doctoral students, 13 per cent financed themselves by means of paid work connected with the study programme (externally employed doctoral students), 4 per cent by means of other positions within the university and 14 per cent through full or part-time scholarships. 9 per cent financed their studies, full or part time, through other means. A large number of the doctoral students who finance their studies through scholarships receive them from the China Scholarship Council.

KTH’s doctoral programmes
The doctoral programmes were established in 2011 and there are 30 of them today. All of the new doctoral students are admitted to a doctoral programme or a programme that KTH offers in cooperation with one or more partners. The purpose of the doctoral programmes is to ensure the quality of the education in an organised structure of study. A number
Figure 11
Licentiate and doctorate degrees 2013–2016

<table>
<thead>
<tr>
<th>Licentiate degrees per research field</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Proportion (%) of women/men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Computer and Information Science</td>
<td>9</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Electrical Engineering, Information Engineering</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Philosophy, Ethics and Religion</td>
<td>24</td>
<td>9</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>History and Archaeology</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Industrial Biotechnology</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Arts</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mathematics</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>15</td>
<td>27</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Educational Sciences</td>
<td>23</td>
<td>19</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>122</td>
<td>125</td>
<td>135</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Doctorate degrees per research field</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Proportion (%) of women/men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Computer and Information Science</td>
<td>35</td>
<td>26</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>Economics and Business</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Electrical Engineering, Information Engineering</td>
<td>40</td>
<td>41</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Philosophy, Ethics and Religion</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>19</td>
<td>23</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>History and Archaeology</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Industrial Biotechnology</td>
<td>8</td>
<td>16</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Chemical Sciences</td>
<td>16</td>
<td>31</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>20</td>
<td>36</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>Arts</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>21</td>
<td>34</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Mathematics</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>38</td>
<td>43</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>Medical Engineering</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>29</td>
<td>37</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Educational Sciences</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Engineering Technologies</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>279</td>
<td>328</td>
<td>279</td>
<td>252</td>
</tr>
</tbody>
</table>

Source: Ladok
of quality requirements are set in terms of purpose, target group and content, etc. in order to establish a doctoral programme. The doctoral programmes have support at KTH’s schools and the introduction was beneficial to the quality of the doctoral studies. In 2016, a review of the general study plans for third-cycle subjects was established at KTH. More information about this may be found in the section entitled Quality management.

Student mobility in third-cycle education
There is a large international element in KTH’s doctoral studies. Of the new doctoral students in 2016, about 50 per cent have a qualifying degree from a country other than Sweden. During the year, nearly 300 doctoral students spent at least one week abroad and more than 350 foreign doctoral students spent at least one week at KTH.

Degrees
KTH’s development plan for 2013–2016 sets 1,000 doctoral degrees as the target for the period. In 2016, 279 (328) PhDs and 100 (122) licentiate degrees were awarded. Of those earning PhDs, 28 (31) per cent were women and 72 (69) per cent were men. Of those earning licentiate degrees, 31 (31) per cent were women and 72 (69) per cent were men. Of the year’s PhDs, 10 (4) were awarded jointly with other universities. In total during the period 2013–2016, KTH awarded 1,138 PhDs, i.e. over the set target of 1,000. KTH’s revised development plan for 2013–2017 has the target of 1,450 PhDs in total.

Awarding a licentiate degree as a step in doctoral studies, and thus providing a natural check of studies to date, is normal at KTH. Of those awarded a doctoral degree in 2016, 34 (39) per cent had previously been awarded a licentiate degree. A technical licentiate degree is also extremely relevant for employment in industry.

Calculations of the study period for students who are awarded doctoral degrees show that the net study period for a doctoral degree in 2016 was 4.3 (4.3) years and 2.6 (2.7) years for a licentiate degree. Women have somewhat shorter net study periods than men for both types of degree. The calculations of the study period are done according to the procedures provided through the study documentation system Ladok.

National collaboration

Conditions for educational collaboration
KTH’s development plan for 2013–2017 states that KTH will develop structures for educational collaboration. KTH has developed internal rules, as well as support documents and a processing procedure. KTH has also set up a working group for educational collaboration.

Master of Science in Engineering and Education
The combined engineering and teacher education programme is run in close collaboration with Stockholm University (SU). The Master of Science in Engineering and Education programme leads to an MSC degree as well as subject-related teaching qualifications for upper secondary school in mathematics and one of physics, chemistry or technology. KTH is authorised to award both examinations. Recruitment to the programme has been stable and, in autumn 2016, 57 students began the programme. The percentage of women among the beginners was 44 per cent and for men, it was 56 per cent. In 2016, 12 students graduated from the programme.

The Master of Science in Engineering and Education programme, which was offered between 2002 and 2016, was a programme contracted by the government (U2002/1041/UH) where SU issued the teaching qualification and KTH the engineering qualification to those completing the programme. KTH was not authorised to issue the teaching qualification during the years this programme was current. From this programme, KTH and SU jointly awarded degrees to 10 students in 2016. During the year, a major alumni survey was conducted with questionnaires and interviews. The results show that the alumni thrive at their workplaces. They are appreciated in both the teacher and engineer roles and the survey shows that they quickly gain extensive responsibilities in schools and companies. A majority felt to be favourably treated in the labour market.

Subject teacher education
From autumn 2016, the subject teacher programme at KTH is dormant and no admissions will be made. Despite recruitment efforts in the period 2013–2015, interest from potential students was low. However, KTH will continue to contribute to the teacher education in the subject of technology in cooperation with SU.

Bridging teacher education
The bridging teacher education programme comprises 90 higher education credits and leads to a teaching degree for upper secondary school and years 7–9 of compulsory school in one or more of the subjects physics, chemistry, mathematics and technology. To be admitted to the programme, adequate academic qualifications in these subjects are required. Supplemental teaching education began for the first time at KTH in June 2016. The programme had 332 first-choice applicants and 41 registered beginners. At the end of the year, more than 30 students were active. The programme is provided at a distance, with instruction at KTH a few days a month. The rest of the time is devoted to self-study or teaching via a web platform. Some parts of the programme are offered by SU. The programme also runs during the summer semesters, which means that a student who begins in June can be a finished teacher at the end of August the following year. One third of the education is comprised of placement, which means that the students are on site at a school where they participate in the daily work under supervision.

Bridging teacher education for those with PhDs is arranged as a joint programme that leads to a joint degree.
The programme runs over 12 months at a higher rate of study. Those admitted to the programme have the opportunity to receive a special educational grant during the period of study. Prior to the start of the programme in January 2017, 238 first-choice applicants applied to 25 planned places.

Cooperation with universities of fine arts
KTH’s development plan for 2013–2017 states that collaboration will be developed with artistically-oriented universities, in particular the University College of Arts, Crafts and Design. In 2011, a declaration of intent was signed regarding extended collaboration in education and research between KTH and the University College of Arts, Crafts and Design. In 2013, a doctoral programme was established at KTH in which the University College of Arts, Crafts and Design is responsible for a considerable part of the teaching. The programme focuses on the intersection of art, technology and design. The first doctoral students were admitted in 2014. Five doctoral students are currently taking the programme. Courses under the programme are given at both KTH and the University College of Arts, Crafts and Design. Extended collaboration has also begun in first and second cycle education. In order to provide doctoral students, supervisors and researchers with a good shared environment, a central programme is also planned in collaboration between KTH, the University College of Arts, Crafts and Design and other arts universities. In 2016, a project group worked to prepare the vision and organisation plan for this centre formation. Also, a declaration of intent was signed regarding extended collaboration in education and research with the Royal College of Music.

Licentiate programme in cooperation with external stakeholders
KTH has established a Professional Licentiate of Engineering School (PLEng), with licentiate degrees as the objective and in close cooperation with industry and other external stakeholders. The school is primarily aimed at professionals who wish to train for leadership positions in research and development. A pilot round with seven admitted doctoral students at KTH is still under way. Besides KTH, the pilot round also includes Blekinge Institute of Technology and the University of Örebro. The KK Foundation has granted financing for the pilot round. In 2017, the school will go over to permanent operation at KTH.

Other collaboration
In January 2011, KTH and Mid Sweden University signed an agreement to collaborate on strengthening the Master of Science in Engineering programmes. This agreement runs up to and including 2017 and means that students can continue on certain master’s programmes at KTH after the first three years of an engineering programme at Mid Sweden University. In autumn 2016, 14 (6) students from Mid Sweden University began master’s programmes at KTH.

KTH and Stockholm University (SU) entered an agreement on a joint programme at the master’s level in mathematics that will lead to a joint degree. In autumn 2016, 13 (41) students began the programme and seven students graduated.

A three-party collaboration project between KTH, Karolinska Institutet and Stockholm University was established in 2014 for the Science for Life Laboratory (SciLifeLab) in Stockholm. The collaboration project is taking place within the framework of a master’s programme, leading to a joint degree. The first students were admitted to the programme in autumn 2015. In autumn 2016, 20 (6) students began the programme.

Since 2014, KTH and Karolinska Institutet have conducted a joint third-cycle programme in medical technology. The collaboration leads to a joint degree. In 2016, two doctoral students were admitted and two PhDs were issued during the year.

International cooperation
Strategic cooperation partners and networks
One of the objectives in the KTH development plan for 2013–2017 is to have eight international strategic university partners by 2017. At present, KTH has decided to collaborate with six strategic partners: University of Illinois at Urbana-Champaign in the USA, Aalto University in Finland, Nanyang Technological University in Singapore, Shanghai Jiao Tong University in China, The Hong Kong University of Science and Technology in Hong Kong and the University of Tokyo in Japan. A coordinator has been appointed for each partnership and joint projects have been initiated in both education and research.

In 2016, KTH had the chairmanship of the network Nordic Five Tech (N5T) and during the year, a workshop was arranged at KTH under the topic “Leadership for quality enhancement and development of engineering education” with participants from the network’s five universities.

KTH participates in the network Deans Forum together with MIT, University of Cambridge, University of California and University of Tokyo, among others. The President of KTH visited the University of Cambridge in October to discuss forms of cooperation with industry, among other matters.

CLUSTER is a network that consists of 12 technical universities in Europe. In 2016, CLUSTER and the 18 Chinese universities in the platform Sino-European Engineering Platform (S3EP) arranged a conference with the topic EU CO2 neutral by 2040. A summer school was arranged in August at KTH and TU Eindhoven for 60 doctoral students from Europe and China. CLUSTER has supported joint project applications within Erasmus+ and two strategic partnership projects were started in the autumn.

Within the network Magalhães, consisting of 35 universities in Latin America and Europe, KTH coordinates the project group that promotes joint project applications for external financing within Erasmus+ among other things.
European Institute of Innovation and Technology (EIT)

KTH participates in four of EIT’s knowledge and innovation groups (KICs), in the areas ICT (EIT Digital), energy (EIT InnoEnergy), materials (EIT Raw Materials) and health (EIT Health). Also refer to the section Research.

For EIT Digital, KTH continues to be responsible for admissions, study follow-up and examination while management, financial compensation and parts of recruitment and programme development have been taken over of EIT Digital centrally.

During the year, 699 (771) students were admitted to the master’s programme within EIT Digital. 389 (392) began their studies at one of the 19 partner universities in the consortium, of which 26 (24) per cent women and 74 (76) per cent men.

The proportion of self-paying students corresponds to 38 (13) per cent. Other students receive some form of scholarship from EIT Digital or are students from the EU/EEA/Switzerland and thus released from paying tuition fees. The students come from 44 different countries, thus confirming that there is a wide recruitment base. Of the total of 289 students, 62 (74) began their studies at KTH. After completing the first year of study at one of the partner universities, 74 (45) students commenced their second year at KTH in 2016.

Within EIT InnoEnergy, seven master’s programmes are offered, of which KTH participates in five. In autumn 2016, 84 (73) students began their first year at KTH. 15 (24) students began the second year of their studies at KTH after one year at one of the partner universities. During the year, a total of 158 students were registered at KTH within EIT InnoEnergy.

Erasmus+ and Erasmus Mundus

From the 2016 announcements in Erasmus+, KTH was awarded a number of projects as coordinator or partner.

In the area of capacity expansion, KTH will coordinate a new project and participate in 13 new projects as a partner. These new projects have a broader geographic spread than the earlier ones and include China, India and South-East Asia.

KTH was also granted 33 mobility scholarships for non-European exchanges of students and staff with universities in India, Kirgizistan, Cuba, Tanzania and Thailand. As in previous years, KTH also obtained a large number of scholarships for mobility within Europe for studies, practice and the exchange of staff.

KTH coordinates a strategic partnership that involves six cluster universities. The project is aimed at studying the extra value and increased employability that is linked to programmes with double degrees. KTH also coordinates a strategic partnership with four cluster universities and five compulsory schools in Europe. The project aims to work for equality and broader recruitment in sciences and technology (STEM). Commenced projects and activities included in the EU programme Tempus are now a part of the Erasmus+ capacity expansion. KTH currently participates in six Tempus projects in Asia, North Africa, the Middle East and the western Balkans, which will be concluded in 2017.

In total, KTH coordinates three and participates as partners in 20 projects within the Erasmus+ capacity expansion since before. The projects cover the development of new educational programmes in technology, the environment and sustainable development, geographical information systems, geoinformatics and company systems, as well as support for students, innovations and university administration.

There were a total of 163 (245) Erasmus Mundus Action 1 students registered in 2016. The five master’s programmes within Erasmus Mundus that KTH coordinated since 2009 submitted their final reports to the European Commission in autumn 2016. The programmes contributed to KTH’s development of and expertise in implementing joint programmes.

The five doctoral programmes, of which KTH coordinates three, are continuing without new admissions with annual doctoral defences until 2020.

Linnaeus-Palme

Linnaeus-Palme is a Sida-financed exchange programme, the purpose of which is to stimulate bilateral exchanges between universities in Sweden and developing countries. For the period 2016–2017, KTH has been granted two projects totalling approximately SEK 40 million within the framework of the programme.

Research Training Partnership Programme, Sida

Within Sida’s research effort of bilateral collaboration, KTH was granted two projects in 2016 with Eduardo Mondlane University in Maputo, Mozambique. In Tanzania, KTH has seven projects, distributed between Ardhi University and University of Dar es Salaam, and in Uganda, KTH has three on-going project collaboration with Makerere University. As part of the bilateral programmes, KTH will receive and supervise doctoral students from Tanzania, Mozambique and Uganda and work on the development of master’s programmes.

Swedish Academic Collaboration Forum (SACF)

KTH is involved in the Swedish Academic Collaboration Forum (SACF) project together with Lund University, Chalmers University of Technology, Uppsala University, Linköping University and Stockholm University. The project is partly financed by STINT (Stiftelsen för internationalisering av högre utbildning och forskning) and the aim is promoting collaboration in research and partners in specially selected countries. During 2016, research seminars were held in Indonesia and Brazil.

Marie Skłodowska-Curie

Marie Skłodowska-Curie is part of the EU Horizon 2020 programme and is the most important mobility programme for doctoral students and researchers. In 2016, KTH researchers were invited to a number of applications in Marie Skłodowska-Curie, thanks to their well-established network of contacts and internationally acknowledged expertise. In 2016, seven new projects were granted with KTH participation. In total, KTH was involved in 36 projects in the programme during the year.
Research

Objectives
The KTH development plan for 2013–2016 states that KTH must strengthen its position as one of Europe’s foremost technical universities, through excellence in research and education and in close collaboration with the community.

The following concrete targets are given for what KTH should achieve in 2013–2016:

- SEK 400 million annually in international research financing. (2016: SEK 275 million in grant revenue)
- SEK 270 million annually in research financing from Swedish and foreign companies. (2016: SEK 146 million in grant income and SEK 66 million in assignment income received)
- 25 per cent increase in citation and publication. (Publications, fractionalised: 2013: 1,466, 2015: 1,489. Citation level 2013: 1.15, 2015: 1.10)

External research financing
KTH has a high proportion of external financing, both from the public sector and from other actors in Sweden and abroad. Swedish and foreign companies contribute to the external financing through commitment to many research projects. In most project collaboration with companies, there is no direct financing by the companies, but instead the companies contribute working input to the projects. This means that growing collaboration with the corporate sector does not necessarily mean increased income directly from this sector. For a number of years, KTH has been working on creating strong strategic partnerships with companies in which financing of research is part of the collaboration, such as through centres or research projects.

For more information, see the section on Collaboration.

EU financing
International research financing accounts for approximately 9 per cent of the research income. The EU is the primary source of financing. International research financing also includes other financiers in the EU, US, financing and to a smaller extent grants from other regions and supranational organisations, such as the UN.

The EU Horizon 2020 (H2020) programme entered its third year in 2016 and the number of funded projects remains at a stable high level. KTH is the Swedish university that received the most projects from Horizon 2020 in the early years. In terms of financing, KTH is in third place among Swedish universities during the same period.

Master’s students at KTH developed a visualisation tool for Vinnova in 2016. It is now on Vinnova’s website. Using the visualisation tool, it is easy to search based on project, financing and collaborative partners. The searches can be done at various levels, such as country, university, project or based on various programmes in Horizon 2020. The tool can be used for example with the aim of finding out which partner may be interested in participating in a certain project or as an analysis tool to better understand where support needs to be given. Figure 14 presents the Swedish universities’ granted Horizon 2020 projects in declining order, until the
most recent update of the database on 30 September 2016.

Horizon 2020 places greater emphasis than previous general programmes on research that contributes to innovations, economic growth and jobs. The possibilities of research projects achieving this are thus a significant component for success. During the year, KTH continued the work of building up support for how the parts of research applications concerning effects on and collaboration with society can be improved. The grants are provided in the form of courses, thematic workshops and support for individual researchers. Thematic workshops are arranged by the research platforms in cooperation with KTH’s schools to highlight the impact perspective. Support for individual researchers is given in connection with their respective applications, main to those who intend to coordinate Horizon 2020 projects. During 2016, approximately 280 applications were submitted and 32 were granted. KTH coordinates two of these projects. Divided into the various programmes within Horizon 2020, four of the projects granted during 2015 are in ERC (for individual pioneering research), four in the Marie Sklodowska Curie project (researcher mobility) and 24 in more traditional research collaboration focusing on societal issues and developments in technology.

The KTH development plan for 2013–2016 includes the goal that 20 new ERC grants should go to KTH researchers during the period. Now that the period is coming to an end, KTH has received 19 ERC grants. In addition, another researcher has chosen to move the Starting Grant to KTH in 2015. By 2017, the target is 25 new ERC grants.

In 2016, three researchers were granted funding within the Starting Grant: Danupon Nanaongkai at the School of Computer Science and Communication, Peder Roberts at the School of Architecture and the Built Environment and Mahiar Max Hamedi at the School of Chemical Science and Engineering. In the request for a Proof of Concept in 2016, Göran Stemme, School of Electrical Engineering, was granted funding. After the 2015 annual report was completed, Dan Henningson, School of Engineering Sciences, was granted funding in the scope of the 2015 Advanced Grant call for proposals. In the 2016 Advanced Grant call for proposals, three KTH applicants moved on to step 2 and the results will be announced in March 2017. One researcher received the highest evaluation rating in Consolidator Grant 2016, but no financing.

**National external financing**

External research financing from Swedish financiers with regard to what kind of research is supported, what instruments are used and what financiers may be relevant for KTH’s research continues to follow the same direction as in recent years. During the year, KTH continued to be successful in obtaining financing from the Swedish Foundation for Strategic Research, and from the Swedish Research Council’s large call for proposals, both of which support primary research to a large extent.

In 2016, the Swedish Research Council granted KTH funding of SEK 210 million, SEK 154 million of which was in the major science and technology announcement. KTH was again one of the universities that received the most funding granted in this call for proposals. In addition to this, the National Infrastructure for Microscopy in Life Sciences was granted SEK 31 million.

In 2016, the Knut and Alice Wallenberg Foundation awarded project grants to Fredrik Laurell, School of Engineering Sciences, of SEK 32 million for the project Multifunctional fiber optics, and Hans Hertz, School of Engineering Sciences, of SEK 33 million for the project Molecular X-Ray Micro Imaging and to Johan Hästad, School of Computer Science and Communication, of SEK 32 million, for the project Approximability and proof complexity.

Two young KTH researchers have been named Wallenberg Academy Fellows and will each receive SEK 7.5 million over five years for concentrating on their research. The two researchers are Emma Lundberg, School of Biotechnology, and Shervin Bagheri, School of Engineering Sciences.

In 2016, the Swedish Foundation for Strategic Research awarded grants in two framework programmes, Smart systems and Material science. KTH was awarded five grants in the former call for proposals. They went to Dimos Dimarogonas and Karl Henrik Johansson, both at the School of Electrical Engineering, who were each awarded SEK 32 million, Kristina Höök and Hedvig Kjellström, both at the School of Computer Science and Communication, who were awarded SEK 33 million and SEK 22 million, respectively, and Dejan Kostic, School of Information and Communication Technology, who was awarded SEK 27 million. Within the other framework programme, Anna Finne Wistrand, School of Chemical Science and Engineering, was awarded SEK 35 million and Fredrik Laurell, School of Engineering Sciences, was awarded SEK 30 million. Within the Future Research Leader call for proposals, three young KTH researchers were awarded grants of SEK 12 million each. They are Shervin Bagheri, School of Engineering Sciences, David Bromann, School of Information and Communication Technology and Thomas Crouzier, School of Biotechnology.

Vinnova is also an important external research financier for KTH and awarded grants for SEK 164 million in 2016. This included renewed centre grants for the competence centre Hero-M of SEK 35 million and to BiMac Innovation of SEK 14 million. KTH also received coordination funding for the strategic innovation areas Medtech4Health of SEK 12 million and InfraSweden2015 of SEK 10 million, which KTH coordinates. Within the scope of the calls for proposals in the strategic innovation programmes, KTH was granted project funding of SEK 27 million. Other major external research funding bodies are the Swedish Energy Agency and Formas.

**Centres and other special efforts**

Centres are important for KTH in its development of competitive research environments with industrially relevant issues and to help contribute networks for senior researchers and
doctoral students. A centre is a neutral collaboration platform where different parties agree on a common operations plan and contribute resources for its implementation. In 2016, an internal study was done regarding centres, which is currently under continued preparation. The inventory was conducted of the number of centre formations with KTH as the principal showed that 36 had financial activity during the year. The number of centres financed by Vinnova decreased in 2016 when the time for financing ended. During the year, Vinnova announced funding for competence centres, both for existing centres and new centre formations. The KTH centre Hero-M was granted financing and another four KTH applications went on in the assessment process and are awaiting a decision from Vinnova in spring 2017. The Swedish Foundation for Strategic Research also announced funding for centre formations in the Industrial Research Centres programme. Three KTH applications continued in the assessment process and are awaiting a decision.

The KTH Centre of Building Efficiency was initiated during the year. The centre’s aim is to develop platforms for collaboration and development in the area of building efficiency between institutions and schools at KTH, other universities, business and society.

Resource Extraction and Sustainable Arctic Communities – A Nordic Centre of Excellence received financing from Nordforsk. The centre will work with innovation in sustainable development and is led by KTH in cooperation with Stockholm University and the Stockholm Environment Institute.

During the year, a centre in the area of heavy power trains, Powertrain Manufacturing for Heavy Vehicles Application Laboratory, was established in cooperation with the Fraunhofer Institutes and RISE (the state ownership company for the research institutes of Sweden). Many of Sweden’s largest transport companies, such as Volvo, Scania and Sandvik, are also affiliated with the collaboration. The centre also received grants from Vinnova.

KTH has established the KTH Centre for the Future of Places with the main funder the Axel and Margaret Ax:son Johnson Foundation, which finances the centre’s activities with at least SEK 5 million per year for five years. The centre aims to strengthen the research environment in urban planning and city design with a focus on the public space, especially safety and the built environment’s effect on mental and physical health.

KTH is a principal for the Wallenberg Centre for Protein Research after a decision in December 2015 regarding financing of SEK 320 million over eight years from the Knut and Alice Wallenberg Foundation. In total, the effort comprises SEK 560 million. This is a collaboration between KTH, Uppsala University and Chalmers University of Technology. AstraZeneca is also included as a party in the research collaboration. The goal is to develop the target-controlled biopharmaceuticals by using the research conducted in the scope of the Human Protein Atlas project that for more than ten years systematically mapped the human proteome.

As a part of Stockholm County Council’s development of New Karolinska, KTH signed a framework agreement with Philips Healthcare to build up a collaboration primarily in biotechnology and life science in general to promote both medical and technical research. This means no direct economic funding, but is expected to facilitate the collaboration between the parties in the area and lead to the improvement of e.g. medical equipment. Some development projects have already started with external grants.

**Strategic innovation areas**

Strategic innovation areas are an effort where leading players from industry, academia and the public sector themselves point out and define areas where they see a need for a Swedish mobilisation of resources and joint efforts. In the research bill Knowledge in collaboration – for society’s challenges and stronger competitiveness, the government points out strategic innovation areas as one of the main efforts being conducted to address the major social challenges Sweden is facing. Since 2013, within the framework of these areas, Vinnova finances strategic innovation programmes and KTH participates in ten of the 17 programmes established to-date. KTH coordinates two of them, InfraSweden2030, which was approved in 2015 and the new programme, Smart Sustainable Cities, which was approved in 2016. Vinnova’s cut-backs in the traditional centre environments are being replaced to some extent by significantly increased efforts in strategic innovation areas.

**Strategic research areas**

Since 2010, KTH has been responsible for five strategic research areas (SFOs), and has also participated in a further five where other universities have the main responsibility. The government clarified in November in the research bill that all of the areas in which KTH is involved will receive continued financing.

**Initiatives with government capital**

The President decided on an investment of SEK 259 million over four years, most of which is financed by government capital, but also with contributions of funding. Most of the initiatives were begun in 2016, although in the latter part of the year. The aim is to contribute to KTH’s objectives within equality and sustainable development. The initiatives comprise 1245 employment as associate senior lecturers in strategic areas and, with the addition of SEK 35 million of funding, a number of centre formations. These centres began operations in 2016 and are in such areas as software research, art, technology and design, space technology, water and circular economy.

**Sustainable production initiative in Södertälje**

KTH’s Södertälje initiative comprises new educational programmes, new research and a new campus. Besides KTH, Scania, AstraZeneca, Acturum and Södertälje Municipality are participating in the initiative. In brief, the research pro-
files can be summarised under the concept sustainable industry with three different specialisations: process and flow control, operating and maintenance strategies, and logistics and supply systems. The faculty is planned to grow from 22 people to around 60–80 people until 2022, and the majority of the employees will have both teaching and research in their position. In addition to the new dedicated government faculty funding, there are agreements on financing from Scania, AstraZeneca and Acturum, as well as the Wallenberg sphere with financing for professorships and in-kind funding through industry-employed doctoral students and adjunct professors. The Municipality of Södertälje supports the efforts with funding for infrastructure, among other things.

The establishment of the research organisation is in full swing and the first positions were announced in spring 2016. Two senior lecturers and two adjunct professors are in place. In the autumn, a further four positions were addressed: one professorship, two senior lectureships and one associate senior lecturer. In spring 2017, the first professor will begin activities, as well as an associate senior lecturer. Interviews are under way for a further two professorships, a senior lecturership and an adjunct position.

In summer 2017, the operations will move to the premises being renovated and built in the northern core in Södertälje. In the new premises, KTH’s activities will also become a neighbour of the newly formed Södertälje Science Park. Through proximity to Södertälje Science Park, there is potential for further collaboration with industry and society. Work is already under way on a regional fund project linked to the area of Sustainable food in Södertälje Science Park and KTH is involved here mainly through the Lean Centre, but also through student projects in the innovation and design specialisation in the Bachelor of Science in Mechanical Engineering programme in Södertälje.

**Science for Life Laboratory (SciLifeLab)**

SciLifeLab is a national centre for life science research in the subject area of molecular bioscience operated jointly by KTH, Karolinska Institutet, Stockholm University and Uppsala University. The mission is to offer Swedish researchers access to advanced technical analyses of samples, support for data analysis and special expertise in molecular bioscience. With the research infrastructure as the bases, SciLifeLab created an active multidisciplinary research environment that has a wide span, both scientifically and geographically. Since January 2016, SciLifeLab has also strengthened and expanded its service at six Swedish universities outside the host universities.

The government investment in SciLifeLab amounted to SEK 410 million in 2016, divided between SEK 206 million for national infrastructure, SEK 22 million for pharmaceutical development and SEK 122 million in strategic research funding. In 2016, extensive work was conducted to develop operations. Previously, external evaluations of the whole centre and a self-initiated evaluation of the research infrastructure has led to a reorganisation of management and support function to create a clearer division of responsibilities and to improve the national coordination of SciLifeLab’s research and infrastructure. Moreover, extensive work was done to reorganise the infrastructure and clarify what is to be offered in technology and service in the future.

SciLifeLab’s largest investments are in DNA analysis (genomics) and pharmaceutical development. The strength
of SciLifeLab’s operations is, however, in the breadth of service offered, which comprises proteomics, single-cell analyses and bio imaging, which strengthens international competitiveness.

Among SciLifeLab’s most important results in 2016 is the Swedish gene atlas of the entire genome that is now available in a public database. The gene atlas provides a unique opportunity for researchers and clinics to know how common genetic variants are in the Swedish population, and thereby easier to understand what variants may contribute to disease.

Within pharmaceutical development, the number of projects continued to increase and today, 19 are under way. Noteworthy examples are a partnership with an international pharmaceutical company and a project that has been approved for clinical studies.

SciLifeLab’s facilities have produced data and analyses in 3,718 projects, which are led by researchers throughout Sweden, which in 2016 generated 681 publications. To coordinate the large amounts of data produced in SciLifeLab and make them available and traceable, a special unit, the Data Office, was established.

In 2016, a total of 688 publications were produced by researchers tied to SciLifeLab’s scientific environment. The penetration of SciLifeLab’s publications, i.e. the citation rate, is well above the global average. Of SciLifeLab’s publications, 73 per cent are international co-publications.

SciLifeLab collaborates with many different organisations in industry, healthcare and the authorities. A collaboration coordinator was employed in 2016 to work out a strategy for SciLifeLab’s continued operations with various actors.

The platform for diagnostics expanded its activities and is now tied to the university hospitals in Gothenburg, Lund, Stockholm and Uppsala. In 2016, large-scale genetic analyses were used as a complement for diagnosing more than 1,000 patients with hereditary diseases. The technology has also been applied for refined diagnostics, risk grouping and decisions on treatment with new targeted cancer medications for more than 1,500 patients.

More information on the activities at SciLifeLab is available in the separate annual report that KTH submits to the government.

Research platforms
The five research platforms (energy, information and communication technology, materials, life science technology and transport) are connected with KTH’s strategic research areas. They aim to facilitate and stimulate the coordination of inter-school activities and complex and multidisciplinary/interdisciplinary initiatives. This activity is now in its seventh year and has become an integral part of KTH’s research structure.

The platform organisation has been one of the conditions for the work being done with the approved application for the strategic innovation programme Smart Sustainable Cities. The platform organisation also meets the initiatives on the global social challenges that both national and EU financing are based on, such as health and life sciences, efficient energy consumption, smart green transports, the climate challenge, digitalisation and sustainable urban planning.

The platforms have prepared strategies for 2016–2020 according to which work is now being done. The overall objectives are to stimulate, facilitate and initiate multidisciplinary research activities, increase external financing through successful research applications, to create and retain external and internal relationships, monitoring their fields, participating in strategic planning of research structures and investments in future faculty, and increasing KTH’s visibility and recognition. Each of the platforms shall work in the best way to achieve the objectives.

Activities in the form of platform days that address external and/or internal participants have been carried out by all platforms. The possibility of co-financing of the work with large research applications is offered by some platforms as well as help with the financing of new centres in the build-up phase. The platforms also take extensive responsibility for the relationships with external collaborative partners in terms of research collaboration, both KTH’s strategic partners and other actors. Among other things, the platforms worked actively during the year to lay the foundation for closer collaboration within Horizon 2020 projects with KTH’s strategic collaboration partner.

European Institute of Innovation and Technology (EIT)
KTH is a main partner in four of EIT’s five Knowledge and Innovation Communities (KIC), in the areas ICT (EIT Digital), energy (EIT InnoEnergy), raw materials (EIT Raw Materials) and health (EIT Health). Digital and InnoEnergy have been under way since 2010 while Raw Materials and Health were established in 2015.

The involvement in the EIT KICs is strategic for KTH and an important tool to promote the networks of KTH researchers and cooperation with European research teams and industry partners. It also enables a greater capacity for strong EU applications and a higher degree of financing for KTH.

The EIT KICs are operated in close collaboration between academia and industry at a European level and is coordinated through regional nodes. The activities build on three main branches: research, education and business development. KTH is one of the parties that has been most active in the EIT KICs ever since the beginning.

A common issue for all KICs is planning of the transition to more self-sustaining activities. A clear trend is to develop the parent organisation for the KIC towards greater independence, which is done at the expense of the direct influence of partners over the activities. In pace with this, the regional nodes are being established one by one as independent legal entities under the parent organisation and formally independent from their KIC partners. This overall development is being driven by both EIT and the European Commission. KTH, together with several other Swedish partners (ABB,
Ericsson, SICS, Uppsala University), has strongly questioned the new model and noted that this development has led to a dramatic decrease in the incentive to participate in the KIC work. For KTH, this means that the financial grant from EIT KICs is decreasing as the possibility of influencing KIC activities and the interest in participating in new projects decline. This was already noticeable in 2016 and in the forecast for 2017.

Despite this decrease, KTH is still altogether a very active partner and participates in educational programmes, innovation projects and support activities linked to business development and startups.

Within EIT Digital, the innovation projects have been restructured in four new sub-programmes: Digital Cities, Digital Industry, Digital Well-being and Digital Infrastructure where KTH had its largest involvement in 2016. The projects have been focused on fewer and larger projects. On the education side, KTH took over an ever larger part of the coordination of the master’s school, at the KTH names master’s programme ICT Innovation. In business development, KTH’s involvement decreased since focus was moved from early phases to more mature small and medium-sized enterprises and scale-ups. In 2016, KTH and other Swedish partners participated when the Swedish node arranged a successful even linked to the Swedish Internet days.

Within EIT InnoEnergy, the number of innovation projects with Swedish main partners, including KTH, decreased. KTH is still involved in some 15 innovation projects of which only one was added in 2016. EIT InnoEnergy offers seven master’s programmes, of which KTH participates in five. In the business development branch, there are several good examples of startups that have gone on in their development and gained attention nationally and internationally. One example is the company Foreseeti AB, which was established by KTH researchers linked to InnoEnergy. Foreseeti AB was named by Affärsvärlden and Ny Teknik as one of Sweden’s 33 most promising young companies (the 33 list). Foreseeti AB was also awarded Almi Invest’s so-called “peephole investment” for a unique product based on world-leading KTH research. Another example is Greenely, a startup company in InnoEnergy Highway Ventures. The company was started by some KTH students with support from KTH Innovation. Greenely received several national awards and it has succeeded in establishing development cooperation with Stanford University in the U.S. Greenely received additional international attention in connection with the company’s CEO being nominated by Forbes as one of Europe’s 30 most promising younger entrepreneurs under 30 years old.

EIT Health and EIT Raw Materials are both at the beginning of their operations, but in 2016 have been able to start a number of activities and projects in both innovation and education, as well as business development. KTH’s commitment is limited as yet, but the hope is that it will be able to grow in time and in pace with the KIC activities in these areas becoming more known and established. In 2016, KTH signed agreements on five projects each in EIT Raw Materials and EIT Health. KTH has also begun an internal discussion on how to better use EIT Health to finance the development of new education initiatives, especially of a MOOC nature.

External changes
Both internationally and nationally, there is greater focus on collaborative research and research focused on addressing major societal challenges. In both cases, it is expected to provide results that can contribute to affecting the surrounding society to a greater extent. The research bill presented in November sheds light on the significance of being better able to handle the major societal challenges that Sweden and the world are facing, and the importance of collaboration to resolve them and get research results to benefit society. Collaborative research, between the university and actors in the surrounding society, between different areas of research and on an international level are emphasised in the government’s new initiatives. The research financiers are also expected to collaborate more in the formulation of programmes and calls for proposals. Through strategic investments in broad senior lectureships and broad research, KTH has extensive opportunities to further deepen the research based on the efforts made both nationally and internationally.

Research infrastructures
The universities will need to take greater responsibility for financing their research infrastructure according to the Swedish Research Council’s new model for prioritisation, financing and organisation of national and international research infrastructure that replaced earlier handling a year ago. Applications regarding new or extended grants for national infrastructure must be supported by at least three universities or organisations, which must regulate responsibility and costs, among other matters, in consortium agreements. Among the first infrastructure applications approved after the system change is the SNIC (National Research Infrastructure for Large-scale Calculation and Data Storage) where KTH is participating in the consortium because the Parallel Computer Centre (PDC) constitutes part of the national infrastructure.

To meet the extensive demand that exists and will arise, it is necessary to make strategic choices with regard to which infrastructure consortia KTH should be a part of and thereby contribute to with its own financing. The efforts made on ESS, MAX IV and SciLifeLab will all generate data in an amount that has not happened before, which both motivates investments in e-science research infrastructures and enables new research areas. The build-up of these three international research infrastructures in Sweden motivates KTH to strategically plan for research that can utilise the possibilities they entail. The universities are also expected to make their other research infrastructure available to other users to a higher extent.
Changes in external research financing

In recent years, there has been greater focus on financing of applied research where the results will more quickly be able to be taken up and used for greater competitiveness. Collaborative research often contributes to the problem formulation being more relevant to end users and thereby achieving a greater social benefit. This can be exemplified nationally by the addition of strategic innovation programmes (SIP), where companies, organisations and institutes are included in both the broader association that identifies needs within the sector and in the Programme Committee where the calls for proposals are prepared. Calls for proposals are financed by government financiers and the parties. The collaborative projects that are financed generally have a high TRL level. The effort in the 2016 research bill on strategic innovation programmes further strengthens this development. KTH was already a part of the programme committee for Infra-Sweden and the programme committee for the Smart Sustainable Cities programme approved in 2016.

In parallel, research funding bodies increasingly want research to lead to an impact on society. It also becomes an evaluation factor for research projects that are not financed as collaborative projects. The importance of interdisciplinary and intersectional collaboration is emphasised to include perspectives in research projects that can otherwise be lost.

The collaboration through establishment of centres has increased in significance to KTH for many years. Research initiatives that grew forth through contacts between KTH’s Development Office and private individuals or companies are often channelled to centre initiatives. One example is the KTH Centre for the Future of Places established in 2016, with principal financier the Axel and Margaret Ax:son Johnson Foundation.

With the new financing instrument of competence centres, Vinnova intends to finance fewer, but larger centres. The addition of the Industrial Research Centres that will be financed by the Swedish Foundation for Strategic Research may possibly contribute to the number of centres at KTH that have long-term financing remaining at the same level as before. The applications for these calls for proposals are currently being prepared.

Export control

KTH is the first university in Sweden to produce and develop an export control programme. Because of external changes, it has become increasingly relevant to illustrate and handle issues in the field of export control. On the basis of current legislation, KTH must determine whether research projects can lead to products with a second area of use, such as war materials, or whether they affect the university’s compliance with sanctions.

In 2016, an export control programme has been adopted. The program includes organisation and division of responsibilities regarding the work with export control related issues. The work will need to be developed further in the next few years, particularly when more regulatory changes are expected moving ahead. Competence development of KTH’s own personnel has meant that one research officers is now a so-called export control manager.

More than 40 projects have been covered by export controls in 2016, in the form of various kinds of investigations which is a certain increase over the previous year. During the year, KTH also sought export permits for cooperation with Australia.

Honorary doctors

KTH’s Faculty Council appointed honorary doctors in autumn 2016 with the following motivations:

Manfred Lindner, Professor at the Max-Planck-Institut für Kernphysik, Heidelberg, Germany.

Professor Manfred Lindner is the initiators or and one of the originators behind one of the most widely used simulation tools in phenomenological neutrino physics. As a particle physicist, he is active in both theory and experiments. Manfred Linder’s commitment and work in particle physics has been of crucial significance to the research in particle and astroparticle physics at the Department of Theoretical Physics at KTH. The collaboration has generated a number of joint publications.

Claire J Tomlin, Professor at University of California, Berkeley.

Professor Claire J. Tomlin is an exceptional teacher and inspirer. She has a large international engagement and a genuine drive as a research group leader and visionary – not least in the area that concerns the increased use of information technology to improve environment and health. As an internationally prominent teacher, researcher and leader, Claire J. Tomlin has promoted KTH’s activities through various collaborations in hybrid control systems, cyber physical systems and nearby areas in information and communication technology and software. These important research collaborations have generated several joint publications. In 2009, Tomlin was awarded the Tage Erlander visiting professorship. This meant that she spent a rewarding period at KTH during 2009–2010.
Collaboration

The objective of long-term investment in strategic collaboration is that the efforts should contribute to higher quality and relevance in education and research. KTH has now worked for six years to establish and develop a systematic approach for collaboration through central support functions consisting of expertise in alumni relations, fund raising, strategic partnerships, collaboration with small and medium-sized enterprises and regional players.

Strategic partnerships
Under KTH’s development plan, KTH has worked on the establishment of strategic partnerships with companies and organisations. A new partnership was established with Stora Enso in 2016. There are already partnerships with ABB, Bombardier, Ericsson, Saab, Sandvik, Scania, Skanska, Stockholm County Council, the City of Stockholm and Vattenfall. The target for the period 2013–2016 was 12 partnerships and KTH achieved 11.

Each partnership is monitored every year by KTH’s management, together with operational management at the respective partner. The work is headed by the Vice President for Collaboration and the university administration assists with partner managers for each partnership.

As a part of sharing and exchanging experience in collaboration between the academic community and industry, KTH arranged a high level meeting in Brussels in collaboration with the Stockholm Region’s European Office where KTH’s strategic partners participated. The meeting was well represented by different trade associations in Brussels with participation by several Directorate Generals. The starting point for the discussions was the growing Stockholm region’s challenges and the possibilities of digitisation.

Personal mobility
An important part of KTH’s strategic collaboration takes the form of personal mobility between academia and the community. KTH has extensive experience of collaboration with companies, research institutes, authorities, municipalities and county councils. Common forms of personal mobility are through adjunct professors, affiliated faculty, teachers, researchers and doctoral students. In recent years, KTH has actively worked to make it easier for people and personnel categories that move between KTH and the rest of the world. For example, the Professional Licentiate of Engineering (PLEng) can be mentioned, see the section on Education.

At the end of 2016, there were 63 adjunct professors, 9 women and 54 men (2015: 64, 12 women and 52 men). The number of persons in the affiliated faculty category is 29, 7 women and 22 men (2015: 28, 7 women and 21 men). These are not employees of KTH and so are not included in the staff summary in the annual report.

At KTH, there are also affiliated professors. The intention of them is mainly to strengthen KTH’s international contact network by affiliating well-renowned foreign research colleagues with KTH. There are 24 affiliated professors, 4 women and 20 men.

Development projects and effect follow-up
Projects for development and methods for effect follow-up were conducted under own management during the year (Impact 3C) and with external parties in the Knowledge and Learning About Strategic Collaboration Academy Out (KLOSS AKUT).

Impact 3C is a development project that Vinnova co-finances. 3C stands for Create, Capture, Communicate. Through the systematic work, Impact 3C has continued to strengthen KTH’s impact on the surrounding world through collaboration. In 2016, impact managers at KTH’s schools formed the core of the work. School-specific strategies for impact were developed and prioritised activities connected to them are carried out at the schools. In addition to this, joint activities were conducted for experience exchange and joint development.

KLOSS AKUT is a national development project with KTH as the initiator. The project is a continuation of KLOSS, which was concluded in 2015. KLOSS AKUT is partially financed by Vinnova. The steering committee included representatives at management level from the participating universities (Umeå University, Uppsala University, the Swedish University of Agricultural Sciences, Stockholm University, KTH, Mälardalen University, Linköping University, Jönköping University, Chalmers University of Technology, University of Gothenburg and Lund University). KTH has been responsible for management and coordination of the project during the year.

The project KLOSS AKUT means that teachers and researchers have the possibility to regularly spend time in an external organisation for a period. In 2016, six KTH teachers participated in the project of which three are Vinnova financed and three are KTH financed. In total, 40 such stays were conducted in the scope of the project. In June 2016, an experiential exchange was carried out for KLOSS AKUT participants, where 54 people from participating universities and external organisations participated. The project was completed in January 2017 with a closing conference at KTH.

Since 2012, Vinnova has had the government assignment of developing a model for collaboration assessment. A model was developed and tested in two pilot studies which the university expressed its interest in participating in. KTH chose to participate in both pilot studies and also participated in the reference group for the formulation of collaboration assessment for pilot 2. Pilot 1 was conducted in 2015 and focused on the university’s collaboration strategies and implementation of them. KTH received the highest possible rating for pilot 1. Pilot 2, which was about activities and results, and also included a collaboration assessment, was conducted in 2016. KTH received the highest rating in this assessment as well.
Arenas for collaboration

**Digital Demo Stockholm** is a collaboration where KTH is involved together with Ericsson, City of Stockholm, ABB, Scania, Skanska, Vattenfall and Stockholm County Council (SLF). The objective of Digital Demo Stockholm is to secure an inclusive and sustainable Stockholm where new information technology is integrated. The programme is based on the needs and challenges of the Stockholm region. Digital Demo Stockholm is intended to help 1) strengthen Stockholm’s attractiveness and so attract people and companies to the region, 2) develop and demonstrate the opportunities that exist in digital technology and study the consequences of the connected society for citizens and the city and 3) enable inter-industry system solutions for Stockholm’s needs to increase the region’s attraction.

**OpenLab** is a challenge-driven innovation environment for collaboration between bodies such as the City of Stockholm, Stockholm County Council, County Administrative Board of Stockholm, Karolinska Institutet, Stockholm University, Södertörn University and KTH. The aim of the activity is to work with other organisations, companies and citizens to find new ways of contributing to societal innovations in the Stockholm Region. During the year, activities have been developed to comprise, besides interdisciplinary master’s courses, contract education, workshops and other activities where various actors meet to prepare proposals on the challenges faced by the region under new formats and methods. The methodology used is design thinking that is relevant for supporting the innovation capacity of the participants. OpenLab participated in international development work during the year and was tied to several research projects in, for example, Mistra Urban Future and EIT Health (Knowledge and Innovation Community in the scope of the European Institute of Innovation and Technology).

**Dome of Visions** is a temporary building on campus the purpose of which is to be a visionary and inspiring public meeting place for talks on a sustainable future. As of September 2015 to December 2016, research results and innovations were presented and activities conducted in the form of exhibitions, debates, seminars and artistic events. In 2016, Dome of Visions would have had around 45,000 visitors and 350 activities. The project is being carried out in collaboration between NCC and KTH as a result of a learning initiative from the KTH School of Architecture. Other partners include OpenLab, IVL Swedish Environmental Research Institute, the City of Stockholm and Stockholm University of the Arts. The transparent design is an experiment where materials and technologies are tested for Stockholm’s climate zone. The dome creates a passively heated room that follows the seasonal changes and utilises surplus heat from technical equipment and visitors. The project is continuously documents with regard to indoor climate and use. The building will remain on the KTH Campus until autumn 2017.

**Innovation Power Stockholm** is a coordinating and collaborative initiative in the region that is headed by the County Governor. During the year, KTH continued the work in dialogue with the County Administrative Board of Stockholm and other active participants in Innovation Power Stockholm. For KTH, focus has been on an extended dialogue and collaboration with the municipalities in the Stockholm region and the smaller companies established in the municipalities. Both municipalities and smaller companies (SMEs) should gain greater awareness of the possibilities of collaborating with the universities and benefiting from the laboratories, testing and demonstration facilities that are within KTH and other universities. During the spring, interviews were held with 16 companies and five municipalities to increase the contacts and identify improvement areas regarding SME collaboration support. The companies were contacted through directors of labs and infrastructure at KTH and through the KTH Industry Collaboration. The interview series was presented at a meeting to which the municipal commercial directors and participating companies were invited and at a breakfast meeting with Innovation Power Stockholm. The final report was presented to KTH’s management in September. During the autumn, a follow-up quantitative questionnaire study was conducted with the help of the analysis company YouGov.

**The EU’s regional structural fund** partnership in Stockholm is the organisation that distributes the regionally-linked funding that is channelled from the EU to the Stockholm region via the Swedish European Social Fund Council (Social Fund) and the Swedish Agency for Economic and Regional Growth (Regional Fund). Increased connection with the region’s seats of learning is in demand and is the reason for KTH’s collaboration here. Since the beginning of 2015, KTH’s Vice President for Research is in the structure fund partnership. During the year, KTH and partners were granted SEK 30 million from the European Regional Fund in the Green Home project.

Collaboration with small and medium-sized companies

According to KTH’s development plan, collaboration with small companies shall be developed. KTH’s strategy for collaboration with SMEs means that KTH will make contact with several small companies and be able to contribute knowledge to meet the development needs and challenges of SMEs. This form of cooperation is emphasised in the EU framework programme Horizon 2020, which means that good relations and collaboration with small and medium-sized companies are necessary for KTH to remain successful in obtaining research funds in competition with other European organisations. Today, there is a developed collaboration with IVL Swedish Environmental Research Institute and Stockholm Cleantech.

The Green Home project (see the above under the KTH’s strategy here. Since the beginning of 2015, KTH’s Vice President for Research is in the structure fund partnership. During the year, KTH and partners were granted SEK 30 million from the European Regional Fund in the Green Home project.

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to contribute innovative, environmentally friendly products and services to these collaborations.

KTH provides a digital platform, on www.kth.se called the KTH Degree Project Portal, with the aim of making it possible for KTH’s students and employers to make contact with each other. There, companies, organisations, institutes and institutions can at no charge post suggestions of degree projects, project assignments, trainee positions, placement positions and extra and seasonal jobs aimed at students. In 2016, around 1,200 student assignments were posted of which more than 800 degree projects, which is an increase by more than 200 in 2016.

In connection to the KTH Degree Project Portal, there is a digital business sluice that received around 600 inquiries in 2016 from companies and organisations that want to come into contact with KTH for degree projects or other forms of collaboration. In 2016, four newsletters were directed at KTH’s collective industry contacts.

**Contract education and continuing professional development**

KTH provides a number of continuing professional development courses in the ordinary government funded activities. During the year, KTH has also offered specially designed contract education. Courses are provided in various areas with the aim of broadening or deepening expertise, primarily for professionally active engineers and architects. Courses are also offered for teachers in need of skills development.

The number of fte in KTH’s continuing professional development amounted to 149 (99) in 2016. The number of annual performance equivalents amounted to 94 (109).

The number of fte in credited contract education amounted to 42 (42) in 2016. Around 450 people participated in the contract education courses. The revenues for the contract education totalled SEK 13 million compared with SEK 29 million in 2015. The courses that had the most participants are in the property area, telecom and information and communication technology, as well as the government’s Teacher Improvement effort.

From September 2016, KTH’s schools have the responsibility for the contract education in their respective areas. A central function exists for managing external inquiries for contract education.

**Alumni relations and KTH Opportunities**

KTH Alumni create relevant meeting places for continued exchange between alumni, students and faculty. This activity is intended to show the impact KTH’s former students have on business and society, develop collaboration so as to create added value for today’s students and facilitate the alumni’s continuing commitment. The network of KTH alumni currently consists of approximately 78,000 (69,000) individuals, of whom more than 19,000 (16,000) are outside Sweden.

In 2016, two new alumni associations were formed outside Sweden, known as KTH Alumni Chapters, one in Spain and one in Brazil. New networks were introduced in Mexico, Hong Kong and Egypt. In total, there are 27 (24) networks globally and formalisation of the network in Brazil means that KTH now has established Alumni Chapters in all prioritised regions.

In autumn 2016, a pilot project was carried out where students bound for the U.S., Spain, Switzerland and Singapore were given the opportunity to be matched with a local alumni mentor. Some 70 alumni and students participated in the pilot and the outcome was very positive. The programme will be developed further in 2017.

Alumni commitment for KTH and its students is gathered in the scope of KTH Opportunities. This includes mentorship, guest lectures, advice and feedback, international leadership and financial donations. During the year, around 300 alumni have either donated time or donated financially. The result for financial donations was lower in 2016 than 2015, largely due to the year’s phone campaign focusing on re-establishing contact with alumni who do not receive KTH’s digital communication and not on raising financial support. In spite of this, around SEK 200,000 was received by the KTH Opportunities Fund through monthly donations or individual donations. Support from the fund was provided to 15 student and researcher projects.

To ensure a positive future development of the collaboration between KTH and our alumni, work was begun during the year to get feedback and obtain greater understanding of how alumni want to get involved in the activities. Consequently, a digital focus group survey was conducted in the spring for the first time that was followed up with individual meetings. A questionnaire study was sent at year-end.

**Innovation Office**

Since the beginning of the Innovation Office in 2010, KTH has had close cooperation with other universities in the region, mainly Mälardalen University (MDH) and Stockholm University. This collaboration has been deepened during the year and for 2016, KTH was allocated funding to provide services to universities in the region especially to MDH, the Stockholm School of Economics (HHS) and the Swedish School of Sport and Health Sciences (GSH). With these universities, KTH reached collaboration agreements in 2016 regarding the provisioning of services for innovation development and the transfer of funding to build up recipient expertise and own innovation support at the respective university. Services in innovation development include support and advice in business development, financing, patents and recruitment.

Together with the three universities, KTH has prepared an action plan for activities and efforts that aim to strengthen innovation support locally. KTH has opened up its innovation supporting activities to individual researchers and students at the three universities and given individual support to researchers and students. Other efforts in the scope of the
collaboration include, among other things, an idea competition at GIH where KTH Innovation contributed to the structure, judged contributions and supported idea bearers.

KTH has also reached a collaboration agreement with the Royal College of Music (KMH). Both KTH and KMH work actively to strengthen Sweden’s position in the music industry. There are many concrete projects where technology and music are met and where the Innovation Office’s courses can contribute to more innovations reaching the market.

Since its establishment, the Innovation Office at KTH has also had close cooperation with Uppsala University in patent support and actively participated in other experiential exchange with other innovation offices.

**Innovation-supporting activities**

KTH Innovation works to ensure that research results and business ideas from researchers and students at KTH are developed and encounter the market.

The overall objectives for KTH Innovation are to:

- increase the number of ideas and results from KTH’s researchers and students that hit the market and become successful innovations
- ensure an effective support process, in an international perspective, (with the right networks and conditions) to support the ideas’ path to the market in the best possible way
- enable the creation of a strong system for innovation support of internationally top class at KTH

The strategy for 2016 has been to maintain high inflow of ideas, while resources have been given to activities so as to achieve a qualitative and quantitative increase in the outflow.

In 2016, KTH Innovation received 333 new ideas, relatively evenly divided between researchers and students. This is an increase of 15 per cent over 2015. The commercialisation project supported by KTH Innovation has altogether received approximately SEK 41 million in financing, including from the Vinnova-financed Verification for Growth (VFG) programme handled by KTH Holding AB at KTH. During the year, 33 companies were formed, seven student companies, 70 commercial agreements were signed with customers based on KTH research, 53 patent applications were submitted and 22 patents were granted. During the year, three companies were included in the Sting business incubator and four in other Swedish, European and American incubators. Pre-incubation at KTH Innovation was provided to 25 projects.

KTH Innovation and KTH Holding AB have a very close collaboration which resulted during the year in the holding company investing in three new companies from KTH.

During the year, the activities in Student Inc., KTH’s student incubator, were restructured. In the latter part of 2015, a few research-based pilot projects were accepted to the student incubator with very good results. This experience led to the pre-incubator programme in 2016 being broadened to also comprise researcher projects. The name Student Inc. was thereby removed and the activities are now called KTH Innovation Pre-incubator. The programme and process within the pre-incubator have also been updated and, as of spring 2016, admission takes place three times a year. Prior to admission in October 2016, 42 applications were received and 13 new companies admitted, of which ten were research-based. The next round of admissions is planned for beginning of 2017.

In addition to these efforts, a number of inter-partnership activities have been performed. Examples of these include the exchange of information and the programme Brighter Startup 2016, a tailor-made development programme for those with ideas that are judged to have potential for the American market. The programme is open to those with ideas from universities within the Innovation Office (KTH, MDH, HHS and GIH) with the aim of increasing the participants’ knowledge of entrepreneurship in an international context, among other things.

In 2016, Bicky Chakraborty, entrepreneur and owner of Elite Hotels, donated SEK 5 million to KTH to strengthen the entrepreneurial mind set among students and researchers at the university. The Bicky Chakraborty Entrepreneur Programme will run for five years under the management of KTH Innovation and focus on highlighting entrepreneurs with ideas that have a focus on growth in Sweden. The programme, which offers financing, coaching, tailor-made courses and mentorship, began with seven entrepreneurs in autumn 2016 and another five to seven persons a year will be admitted.

KTH Innovation previously developed expert competency in process-oriented innovation development. Within the scope of the Innovation Office, active work has been conducted to share prepared processes, tools and models primarily with innovation offices and incubators. Of particular note are the Readiness Level models (a designation for a technology’s degree of maturity and associated technology risk), which are now also being digitalised and the structured process for evaluation and transfer of projects to incubators. The interest from the surrounding work remains extensive and discussions are being conducted with several innovation-oriented companies and foreign universities to strategically spread the developed models and processes.

Also within recruitment of expertise to innovation projects, KTH Innovation has developed expert competence that is distributed to the other innovation offices. By means of collaboration between the incubator Sting and KTH Innovation, commercialisation projects have been enabled to recruit competence through Sting’s Search for Talents. In 2016, 28 recruitments were initiated or conducted, which contributed to strengthening the projects’ market potential.

A new project has been started at KTH Innovation that aims to increase the number of women who receive innovation support at KTH. Statistics show that the percentage of women who develop their ideas together with KTH Innovation is low compared with the percentage of women who work and study at KTH. Focus for the project is to find the
factors that affect whether or not women receive innovation support and then change and improve the innovation support process in that direction. The project is being conducted considering that experiences, insights and approaches will be able to be transferred to the other innovation offices.

That a number of companies in 2016 went on to incubation is due in part to long and varied lead times in the development of innovation projects. The effect of this is annual differences in how many companies are in the right phase for incubation. Additional contributing factors are changes in the surrounding innovation system, where access to early capital and expertise has increased. A growing number of private investments were made in 2016 in newly started companies from KTH Innovation, which means that they received resources and have less need of incubation. In addition, the teams in companies are supplemented with external entrepreneurs and key people to a greater extent today (such as through recruitment efforts). A team that is more complete at an early phase with, for example, a more experienced CEO and access to early investment capital has less need for continued support through incubation.
Quality work

The KTH quality policy, Quality through continuous improvement, contains principles and priority activities for quality management. The quality policy has an associated action plan. Quality management is largely controlled by the goals of KTH’s development plan for the period 2015–2016. The plan was extended in 2016 to also apply to 2017.

The starting point for quality work at KTH is the idea that responsibility for quality lies with every student, teacher and staff member in their everyday work. In addition, a formal division of responsibilities and an administrative support organisation are in place for quality activities. The Faculty Council, headed by the Dean, is the collegiate body with overall responsibility for the quality of (first, second and third cycle) education, research and interaction with society at large. At each school there is a member of the faculty in charge of education at first and second cycle, called Director of First and Second Cycle Education, and one responsible for third cycle studies called Director of Third Cycle Education. Each education and doctoral programme has a Programme Director.

The KTH quality policy and action plan are based on the areas of education, research, competence supply and collaboration. The work performed in these areas in 2016 is largely described under each section. The main part of the quality assurance work takes place continuously in operations. In addition, joint strategic initiatives are made.

Overall quality assurance work

Faculty Council
During the year, several quality issues were discussed in the Faculty Council which then led to continued preparation and activities in the faculty staff and other parts of the operations. Research misconduct, KTH’s programme structure in the first and second cycle, quality assurance of education and implementation of sustainability objectives in education are examples of issues that have been addressed.

The Faculty Council has conducted significant work updating and developing KTH’s ethical policy. Work was begun with support documents on the ethical policy, as well as activities to support the work on ethical issues in the operations. KTH regularly holds education and quality seminars, the theme of which has been how KTH educates doctoral students in research ethics. Examples of other themes highlighted during the year are fully trained engineers’ language skills, the effects of a course that keeps the programme together and Erasmus Mundus-wide programmes.

In addition, four open lectures were held with around 70–200 participants per session on the topics of the building blocks of life, megatrends in the transport industry, environmental research with obstacles and a more secure Internet. A KTH talk on the theme of the wireless communication of the future was held with around 100 participants.

In 2016, the Faculty Council appointed a Resource Allocation Committee to follow up and propose changes to the current resource allocation system. An important objective is that the faculty should be able to be offered more long-term and stable conditions for the financing of one’s own employment. In order for KTH to continue to be able to compete for the most competent teachers and researchers, the faculty’s financing terms need to be strengthened and the resource distribution systems strengthened. In the short term, this situation presupposes that the preparation of new faculty appointments is always preceded by a careful analysis of long-term financing conditions through the basic government funding.

In autumn 2016, the Resource Allocation Committee prepared a proposal on financing of quality assurance work in the doctoral programmes. The proposal has been worked into the budget for 2017. The committee is continuing to work on the issue of long-term financing conditions for the faculty and in the long term, alternative resource allocation systems based on internal, international and national examples.

Student influence
In April 2016, the University Board decided that the KTH Student Union (THS) would continue to have the position of a student union for all of KTH as of 1 July 2016 to 30 June 2019. KTH and THS have long had collaboration where KTH’s students, through THS, are represented in all decision-making bodies and in virtually all preparatory groups and work groups. Noteworthy here are the University Board, the Faculty Council, the President’s Strategic Council, the President’s Management Council, the Education Committee, the Appointment Committee, the Disciplinary Board, the schools’ Strategic Councils, Recruitment Committees and work groups for various investigations. KTH’s experience is that THS chooses students who represent various parts of KTH and also, to the fullest possible extent, reflect social, ethnic and cultural diversity.

An important student activity that KTH and THS collaborate on is the reception of new students. The reception is organised by older students and staff in charge. The reception activities take place in collaboration with the students in the sections of the student union. In recent years, particular effort has been devoted to developing the reception of international students.

Rankings
Rankings measure excellence in research, education and collaboration. The significance of visibility and placement on rankings for example for student recruitment, recruitment of international researchers, international collaboration, funding possibilities and influence on various policies, efforts on excellence and expressions of national prestige have increased in recent years. Several advocates, including the European Commission, see rankings as an incentive to improve quality in research and higher education. The ranking results can be seen as a measure of value of a university’s international competitiveness.

In 2016, KTH performed well overall, even if it dropped
somewhat. In the QS World University Rankings, KTH dropped from a ranking of 92 to 97. KTH’s international reputation, both among employers and academicians, remains strong. In the THE World University Rankings, KTH dropped from a ranking of 155 to 159. KTH was awarded better ratings in educational reputation than the previous measurement, but has otherwise been roughly the same or somewhat worse than before, at the same time that other universities advanced their positions. It is noteworthy that KTH in both the QS and THE rankings dropped in terms of citation rate.

KTH continued to perform well in subject area and subject rankings. In THE’s subject area ranking for Engineering and Technology, KTH was ranked as the 36th best university in the world, which is an improvement of six places since 2015. In the corresponding QS ranking, the university was ranked as the 36th best. In the QS subject ranking, KTH is represented with 14 subjects, of which five are among the top 50. The highest ranking was for electrical engineering with a ranking as number 17.

KTH’s foremost strengths in this kind of evaluation are a very high production of publications per teacher and researcher and a very high percentage of joint publication with researchers from other international universities and with industry. KTH has a high percentage of international researchers, teachers and students. The university also has a high percentage of revenues from industry and is successful in obtaining research funding from other external financiers. KTH is relatively strong in reputation ratings and performs better than other Nordic technical universities.

KTH’s reputation is stronger than what the university achieved in the bibliometric indicators. KTH’s weakness is the ratings in indicators that measure the research’s impact and excellence. This is shown as the relatively low field-normative citation rate, where KTH is only ranked 307 according to the THE World University Rankings, and indicates a weakly declining trend. As to the proportion of publications, which are among the 10 per cent most cited within the same subject area, there is an improvement potential. In addition, KTH has relatively few highly cited researchers and relatively few articles in High Impact Journals.

**Quality work within education**

**Quality assurance system**

During the year, KTH continued the work of developing and clarifying its quality assurance system. A clearer analysis identified deficiencies associated with Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), above all point 1.9 (Continuous follow-up and regular review of education) at all levels. KTH has placed emphasis on continuous follow-up, review and development of the quality of education with regard to the previously identified deficiencies. A process for continuous programme follow-up and development has been presented and shall be implemented in 2017. The work has also continued with the development of procedures and processes around courses, including course plans, course evaluations and course analyses. In addition to the work on the development and reinforcement of KTH’s internal quality system, preparations have also been under way prior to the upcoming Higher Education Authority evaluations.

At the beginning of 2016, the Education Committee appointed a working group that was given the task of continuing work on procedures for quality follow-up of the doctoral education based on the earlier report Internal continuous and regular review of KTH’s educational programmes. This work has resulted in a proposal on a model for continuous quality assurance work that will form the basis of the continued quality work within doctoral education.

In connection with the doctoral education effort, FUS 2014–2015, it came forth that the qualitative targets for doctoral education were not generally known within KTH. This led to a general review of doctoral subject study plans during the year which will continue in 2017. The work of updating and revising the subject study plans will not only lead to clearer study plans, but also greater knowledge of the qualitative targets and how the education should support the individual doctoral student in achieving the targets.

**Educational development**

The previously prepared proposal on an educational programme for KTH was discussed further in 2016. Ideas and recommendations from the programme shall become and be a natural part of the internal quality process. A proposal on objective-related grading criteria has been prepared and tested by a number of programmes at KTH. Discussions and implementations of the target-related grading criteria are continuing in 2017.

Since 2014, KTH has conducted a project with educational developers at KTH’s schools, which has been financed with targeted central first-cycle education funding. Through the project, collegial experiential exchange increased for example with workshops in educationally important areas. A course evaluation system has been implemented and a cyclical course improvement process has been developed. The project was concluded in 2016 and led to several proposals for continued educational quality work. The network of educational developers has, among other things, been encouraged to remain and a coordinator has continued the task of coordinating and supporting the work on educational development in general.

In order to increase the knowledge of what the connection between research and education looks like in practice at KTH, an investigation was carried out on behalf of the Faculty Council. The results show that the connection between research and education is alive at KTH and deemed to be an indispensable part of higher education. The investigation also shows that it is perceived to be easier to have strong connection to research in the second cycle than the first cycle. In
addition to this, the report provides several proposals and recommendations that form the basis of continued work in both KTH’s various committees and schools in 2017.

**Programme structure**

An investigation of KTH’s programme structure in the first and second cycle was completed in 2016. The investigation focused on how the programme structure can become clearer and how KTH’s programmes can be developed towards higher quality, better student completion and greater examination. It proposes a developed validation process for the preparation of new programs. In addition to this, the programme structure is screened from an equality and diversity perspective and from society’s needs for engineering expertise. The investigation forms the basis of continued dialogue and work.

**E-learning**

As a part of further developed quality in e-learning, KTH has begun the implementation of a new learning platform in 2016 with a continuation in 2017. In addition, KTH has conducted development work on MOOC courses and, from a quality perspective, a discussion on procedures to ensure the assessment of the quality of MOOC courses that may be a part of the degree.

**Teaching in higher education**

KTH works with credited higher education teaching courses that are given to KTH’s teaching teachers, researchers and doctoral students. The higher education teaching activities strive to follow newly adopted recommendations from SUHF (REC 2016:3) and work to benefit a quality-driven development of KTH’s current and future educational forms and environments. In 2016, both basic courses and continuation courses are provided in the higher education teaching area. During the year, the higher education teaching courses had a total of 408 (478) participants (teachers and doctoral students), of which 131 (132) women and 277 (346) men.

In spring 2016, a council was formed for the higher education teaching activities. The council consists of representatives from academic staff, the Education Committee, the student union and teachers in higher education teaching courses. An external member is also affiliated with the council who has good knowledge in the higher education teaching field. The discussions that have been conducted to-date concern course development and course material in Challenge-Driven-Education with a focus on e-learning, higher education teaching for international collaborative partners and ideas on courses in how to carry out course assessments linked to one of KTH’s course evaluation and analysis tools (LEQ).

**Follow-up of students**

KTH carries out regular surveys directed at students and alumni: the starting survey, the intermediate year survey, the career survey and the doctoral student follow-up. The surveys are included in KTH’s quality management system and are carried out cyclically, which means that it is possible to follow the development over time. In 2016, KTH followed up the results of the starting surveys and intermediate year surveys, which were carried out in 2015.

**Starting survey**

A survey was handed out to the students who were admitted to the five- and three-year programmes in the autumn semester 2015. Of the survey responses, it is clear that the students largely come from the Stockholm region and a majority of the newly admitted students are 21 years old or younger. The women account for 34 per cent of the population. Of the total population, 27 per cent had studied at another university before they began their studies at KTH. More than one out of four who had been admitted to one of the five-year programmes do not have student financing that covers their whole education. This may have a negative impact on the student completion in the programmes.

The students primarily applied to KTH thanks to the programme’s and university’s good reputation, interest in science and technology and good career opportunities, as well as the fact that the university is highly ranked. The survey responses also show that 43 per cent of the students at some time hesitated in choosing a technical programme. Most of those in doubt were among the women, where slightly more than one out of two was uncertain. The foremost reasons for doubt, for the students as a whole, were uncertainty about whether their professional life afterwards would fit, difficult mathematics, uncertainty over handling the rate of study and uncertainty over their own interest in technology.

**Intermediate year surveys**

The intermediate year surveys are distributed in collaboration with Statistics Sweden to the students who have come about half way in their education. The purpose of the follow-up is to examine how the students perceive their study environment, their education and their study situation at KTH.

The survey responses show that the majority of the students thrive at KTH and feel that they receive a qualitatively good education. It is mainly men who are studying to earn a Master or Bachelor of Science in Engineering who are satisfied. Women and students with a different mother tongue are somewhat less satisfied, which is problematic and can lead to less diversity at KTH. The fact that they feel somewhat less satisfied is largely due to the feeling of not belonging in the surroundings at KTH. The KTH student generally does well and there is a small percentage that quits or takes a break in their studies. It is more common among women and older students to take a break in studies and the reasons are often finances or family. It is also women, older students and to some extent students with a mother tongue other than Swedish, who to a greater extent feel a sense of stress, anxiety and negative special treatment. These are important issues for KTH to continue working on.
Quality assurance work in research
KTH has a high percentage of externally financed research and in 2016 demonstrated continued strong competitiveness nationally and internationally. Among other things, KTH is the university in Sweden that has the most approved project grants in Horizon 2020. Major research projects with strong elements of industrial collaboration and interdisciplinary issues are organised at KTH, usually through centre formations. In 2016 and 2017, several of them are facing changed conditions when earlier financing from Vinnova, among others, is expiring. At the same time, several new centres have been added. To clarify the image of KTH’s centre formations, an internal investigation was conducted and an inventory was done. In 2016, administrative capital was allocated for ten centrally decided projects for development and strengthening of new research areas and collaboration within KTH.

KTH has five research platforms that tie into KTH’s strategic research areas. They facilitate the inter-school and interdisciplinary collaborations and strengthen the external communication on KTH’s expertise in these areas. In 2016, the platforms worked out strategies for 2016-2020 where the platforms’ target descriptions are presented together with the activities to be implemented to achieve these targets.

In addition, KTH contributed to the development of new processes and tools for quality assurance, analysis and follow-up in connection with the initiation and implementation of research projects. Among other things, KTH was the first university in Sweden to prepare a programme for export control in connection with new research projects or research collaboration. For Vinnova, a new visualisation tool was prepared by master’s students at KTH that enables analysis and comparisons between countries and universities with regard to EU-funded research. For more information, see the section on Research.

Quality assurance work in competence supply
In 2016, KTH worked to further develop, strengthen and quality assure the process for the recruitment of teachers. The process has among other things obtained stronger management procedures for making references and background checks.

An analysis of discontinued appointment cases was conducted to increase the knowledge of what the causes were of the discontinuation. In addition, a special analysis was done of the 2015 recruitments of assistant professor with a focus on equality. All 16 assistant professors that took offices in 2015 were men. The analysis provided important information for continued work on qualitatively strengthening the process for recruitment from an equality perspective and also constitutes a basis for necessary prevention work. A central effort for the recruitment of new assistant professors was concluded in 2016 with a good outcome with regard to equality. Of ten newly recruited assistant professors six are women and four are men. The quality of the recruitment process has been strengthened by the members in the recruitment committees receiving training in recruitment issues and equality issues.

In 2016, KTH prepared a new appointments procedure for teaching posts. Duties and the basis of assessment were clarified and criteria for e.g. academic leadership at the professor level and scientific skill at the lecturer level were emphasised. For more information, see the section on Staff.

Quality assurance work in collaboration
Impact 3C is a development project that Vinnova co-finances. 3C stands for Create, Capture, Communicate. In 2016, the project was deepened by impact managers at KTH’s schools forming the core of the work. School-specific strategies for impact were developed and prioritised activities connected to them are carried out at the schools. In addition to this, joint activities were conducted for experience exchange and joint development.

An example of other collaborative projects that may lead to higher quality in KTH’s activities is KLOSS AKUT, which has meant that teachers and researchers have had the opportunity to regularly spend time in an external organisation during a period.

To qualitatively strengthen KTH’s training and research, among other things, KTH collaborates with strategic partners. The strategic partnership contributes to more and qualitative contact between education, research and society. The partnership is followed up annually through management dialogues.

Through alumni, KTH receives regular support and feedback to the activities. They also contribute a national and growing international network. To strengthen and develop the relationship with KTH’s alumni, work has begun that aims to increase the understanding of how alumni want to get involved and contribute to KTH’s education and research. An example of what alumni contribute to strengthen KTH’s internationalisation is that exchange students who travelled to the U.S., Spain, Switzerland or Singapore were given the opportunity to be matched with a local alumnus mentor. Some 70 alumni and students participated in the pilot and the outcome was very positive. The programme will be developed further in 2017.

In 2016, a new project was started at KTH Innovation that aims to increase the number of women who receive innovation support at KTH. Statistics show that the percentage of women who develop their ideas together with KTH Innovation is low compared with the percentage of women who work and study at KTH. Focus for the project is to first find the factors that affect whether or not women receive innovation support and then change and improve the innovation support process in that direction. A quality aspect is both men and women being given the same opportunity for the range of services that KTH offers. For more information, see the section on Collaboration.
Environment and sustainable development

The global challenges that society is facing are enormous and sustainability will be an important driver of technical development for many decades to come. As a technical university, KTH plays a key role and has a responsibility in terms of sustainable development. The ambition expressed in KTH’s development plan for 2013–2017 is that KTH shall be one of Europe’s leading technical universities in the environment and sustainable development and have an identity and a brand name that is associated with sustainable development. KTH has many extensive possibilities to influence the development of society in a positive direction by educating, conducting research and collaborating with the surrounding society and by reducing the environmental impact from KTH’s own activities.

KTH’s programmes provide the next generation’s leaders with knowledge and expertise that are needed to address future challenges. KTH therefore has extensive possibilities to quickly, and with new knowledge, affect the development in a positive direction. To be able to contribute to a sustainable society, it is also important that the research that KTH conducts reaches out and is translated into practice. KTH therefore places great importance on the collaboration with important social actors and in highlighting new research results.

Organisation

KTH’s strategic work with the environment and sustainable development is conducted in the KTH Sustainability Office in the university administration. The Vice President for Sustainable Development is responsible for the integration of sustainable development into education, research and collaboration in accordance with the operational plan for 2016–2018. The environmental manager is responsible for the university’s internal environmental work and environmental management systems. This work is conducted based on KTH’s policy for sustainable development and the overall sustainability objectives for 2016–2020.

As a support for the Vice President for Sustainable Development, and as support in the school’s work on integration of sustainability, an academic reference group for sustainable development was appointed. The group consists of one researcher or teacher representative from the respective school, one representative from the Faculty Council, two student representatives, the environmental manager, employees at the KTH Sustainability Office and possibly other people from the operations that are co-opted as necessary.

At all schools, and in the university administration, there are also environmental representatives who together with the school’s management conduct the environmental management work at the respective school, in many cases together with local environmental groups. In addition to this, there are a number of educated internal environmental auditors.

Environmental management system

Since August 2015, KTH is certified according to the international environmental management standard ISO 14001. In 2016, a second external environmental audit was conducted, which showed that the system functions and is being developed. KTH has set overall sustainability objectives that apply to the period 2016–2020. All ten schools and the university administration also have their own detailed objectives that are in line with the overall objectives. For every objective, there is an action programme with activities to achieve the objectives. The overall sustainability objectives 2016-2020 comprise ten areas:

- Education
- Research
- Collaboration
- Work environment (not followed up in the environmental management system)
- KTH’s campus (comprises energy, construction, renovation, outdoor environment, transports and waste)
- Travel
- Procurement and purchasing
- Chemicals management
- Investments of foundation and donation capital
- Organisation and management

The work on the transition to the new standard ISO 14001:2015 was begun in 2016. Needs for changes and efforts for the transition have been identified and a plan was prepared. A stakeholder analysis, including binding requirements, was also done through a number of workshops with the President’s strategic council and through compilation of existing documentation. The work on the transition to the new standard ISO 14001:2015 will continue according to plan in 2017.

Staff training

Various forms of environmental training have been held during the year, such as in the introduction for new employees and in the web-based introduction to a sustainable development for all employees. KTH’s guides also received training in campus development and sustainability initiatives on campus. More specific courses were also held in internal environmental audit, environmental management systems, environmental legislation and chemicals legislation. The teaching course “Learning for sustainable development”, with the aim of helping teachers integrate issues of sustainable development into instruction based on their own subject, has continued to be given during the year.

Education

Within the area of education, the work is continuing of integrating sustainability issues into all educational programmes at KTH at all levels. In 2015, information on goal attainment was compiled and in 2016, the results were pre-
sented at an international conference. New education action programmes for 2016–2018 were prepared at KTH’s schools based on the new sustainability objectives. Courses relevant to the environment and sustainable development underwent quality assurance. The implementation of modules in economic and social sustainability is continuing in various programmes and the web-based learning tool box for sustainable development was updated and will be further developed on a continuous basis. At the master’s level, the KTH Sustainability Office coordinated a seminar on the integration of sustainable development in education for staff and programme coordinators at KTH. Third-cycle courses linked to sustainable development were mapped.

The annually recurring doctoral student dialogue with participants from several universities in the region was coordinated this year together with the Mistra Centre for Sustainable Markets (MISUM) at the Stockholm School of Economics.

Emma Strömberg, Project Manager for Education at the KTH Sustainability Office, was awarded the KTH Pedagogical Prize 2016, in part for her work in support of the implementation of both sustainable development and pedagogical approach in engineering bachelor’s and master’s programmes.

Research
Through networking, and some support in completing applications, the KTH Sustainability Office supports large applications. Since 2012, an annual internal call for proposals has been made, Environment and Sustainable Development across Disciplines, granting funding (up to SEK 100,000) for interdisciplinary initiatives in research, education and collaboration. Six initiatives received support. In 2016, funding was granted to two major programmes that had previously received funding through the call. The first is a strategic innovation programme on pain and sustainable cities that is financed by the Swedish Energy Agency, Formas and Vinnova, and will be led from KTH. The other is the research programme SAMS on sustainable availability and mobility services that was approved by Mistra.

Several of the strategic efforts made at KTH in 2016 with the university’s own government capital have a clear sustainability perspective. This includes an initiative on the circular economy, which, together with two assistants professors linked to the area, provides a potential to build up long-term efforts. In addition, investments are made in the Water Centre and an assistant professor in sustainable urban development.

Collaboration
During the year, KTH Sustainability Office arranged seminars and other meeting places for teachers, researchers and students. A matching meeting has been coordinated for cooperative partners, companies and organisations with KTH’s teachers. The objective of the meeting was to prepare degree project proposals, project assignments or guest lectures with ties to sustainable development in the educational programme. Another meeting with strategic partners was held to discuss what knowledge and skills related to sustainable development that KTH’s students need to be equipped with.

The annual KTH Sustainability Research Day was attended by more than 200 participants. The day consisted of talks, panel debates and more than 30 round-table discussions with researchers and representatives from business and authorities on how the UN’s global goals can be realised and what role KTH has in this development.

During the year, the KTH Sustainability Office partially financed a number of projects that were intended to encourage more collaboration within KTH, in both education and research. Examples of projects receiving funding during the year are the development of a web-based platform and the course Sustainable Development for Problem Solvers, which is a MOOC course and will be launched in March 2017.

KTH’s partnership agreement, focusing on the environment and sustainable development, with the IVL Swedish Environmental Research Institute, Stockholm Environment Institute and Akademiska Hus has continued and been further developed. The follow-up of these collaborative agreements shows that collaboration takes place in several parts of KTH in both research and education. During the year, several seminars and events for both internal and external participants were arranged on the topics of the UN’s global goals, waste, the circular economy, the Arctic and Africa and the new urban agenda.

KTH’s involvement in international networks in the environment and sustainable development has continued and developed. KTH has now upgraded its membership in the International Sustainable Campus Network (iscn) to one of seven co-hosts and among other things has a representative in the Board. KTH will host the network’s annual conference in 2018. Together with the University of Gothenburg, KTH is one of the Swedish partner universities in the Nordic Sustainable Campus Network (nscn), which conducted the Sustainability Literacy Test (sulitest) project that was launched in the Nordic region in autumn 2016.

During the year, an internal newsletter was sent out monthly. The external newsletter, which is aimed at business, decision makers, the authorities and organisations, has been issued four times during the year. Information and compilation of calls for research proposals in the environment and sustainable development have also been sent out to doctoral students and researchers. A media and message training course for women researchers was arranged to encourage media participation in social development. For the KTH Sustainability Office, a communication plan has been prepared. The Vice President for Sustainable Development has continued to blog every week on current and long-term issues with an environmental and sustainability focus with a link to KTH and society in general. To create a stronger
perception of KTH as a prominent organisation in the field, work with a strategy for communication of sustainable development was under way in 2016. The strategy will comprise approaches to highlight KTH’s activities and social impact with a connection to sustainable development.

**Sustainability projects**

The Climate and Economic Research in Organisations (CERO) project was started in cooperation between the KTH Sustainability Office and a researcher at the School of Architecture and the Built Environment. The project includes both economic and environmental analyses of business travel and commuter travel, as well as workshops and results in a concrete action programme. Seminars on travel and research were also arranged during the year, as well as education in alternative meeting forms for travel-free meetings together with researchers and the IT department.

Two waste projects were begun to improve the possibilities of source sorting. A smaller, student-driven project aims to introduce source sorting in all section premises while a larger project aims to introduce uniform possibilities for source sorting in all study environments at KTH. Both of the projects will continue in 2017. A seminar has also been arranged on waste as an unutilised resource of the city.

A cycling day was arranged in connection with Arrival Days for international students with information on bicycle paths and opportunities to test ride an electric bicycle. In the cycling day’s competition, there were ten used and renovated bicycles as prizes, which generated a hundred competition submissions with pictures of cycling students.

In spring 2016, KTH Campus received two beehives. Through a name competition that attracted 10,000 voters, the queen bees were named Bee McBeeface and Beeyoncé. The bees produced 60 kg of honey during the year, which is now available for purchase in KTH’s gift shop. A breakfast seminar on beekeeping was arranged for employees at the project start. A design competition for insect nests was also arranged through the Dome of Visions and was concluded with an exhibition of the ten best submissions.
Staff

KTH is a university where people from different backgrounds and with different experiences work together with a common purpose to manage, innovate and deliver knowledge for the society of today and tomorrow. KTH should be a workplace where the desire for personal development and personal responsibility is stimulated. Presented below is a selection of staff and work environment activities performed during 2016.

Collegiality and leadership

Staff policy for KTH, its guidelines and code of conduct
The staff policy for KTH and its guidelines for collegiality, leadership, work environment, equal opportunity, competence sourcing and wage determination should be revised once a year according to the University Board’s earlier decisions. The staff policy is also KTH’s work environment policy and everyone who is active at KTH has a shared responsibility for the working environment.

In spring 2016, the HR department drafted a code of conduct in collaboration with a reference group and in cooperation with the unions. The purpose of the code of conduct is to create a good work environment and clarify what responsibility is expected of employees and others active at KTH. In autumn 2016, an implementation and communication plan for the code of conduct was drafted.

Leadership development
KTH is investing in leadership at all levels, both academically and administratively. Leadership with personal responsibility is necessary to create an even more attractive workplace. KTH annually offers a leadership programme in three steps. The objective is to develop KTH’s managers into better leaders by providing organisation knowledge for the context they will lead and for personal and strategic leadership. An opportunity is also provided to build relationships and networks through internal experiential exchange. Besides newly established programmes, annual follow-up meetings are under way with earlier cohorts to highlight the importance of networking. Two structured mentor programmes are also organised each year, involving parties from the university sector and industry. Since needs for internal and external mentors differ, the demand for mentors is individually adapted in consultation with the schools. It is KTH’s objective to offer all new managers a mentor to help them develop good leadership in an academic environment. The need for management development varies for KTH’s managers and through advisory talks; they are referred to the right efforts. The centrally financed leadership development activities offered by KTH in 2016 had 116 participants.

Gender equality, diversity and equal opportunity
In 2015, a new process was introduced for the appointment of faculty, which was fully applied during the year. The most important from an equality perspective was highlighting the initial search efforts and placing requirements that lead to well-qualified male and female candidates being identified and applying for employment. The training for members of the recruitment committees continued during the year. Equality and diversity are an important part of this training.

A special investigation on equal recruitment was carried out by the Dean based on the 2015 appointments of assistant professors when only men took these positions. The investigation proposes further measures to ensure open and broad competition in calls and additional strategies to counter the influence of unconscious prejudices. The 2016 appointments of assistant professors have a more balanced gender distribution; six women and four men were employed. The central effort on the appointments of assistant professors conducted during the year has led to an initial analysis of success factors. Characteristic for these recruitments was a centrally coordinated process, clearly communicated equality objectives, broad calls for proposals, attractive terms for announced positions and coordinated advertising.

The work of influencing both content and form in first-cycle education continued in 2016. Talks about a higher education teaching course in gender and equality for teachers have been initiated. The course will be planned in 2017 in collaboration between gender researchers and the School of Education and Communication in Engineering Science. Several workshops have been held with teaching teams for first-cycle programmes. In the mechanical engineering programme, a pilot project to integrate gender and equality was initiated and started in the mission of the Vice President for Faculty Renewal and Equality. In 2016, elements were integrated in the introductory course, which will be followed up with integrated components in future years. Besides the initiative to integrate gender and equality in courses, there are now also a number of elective courses in both the first and second cycles where theory and knowledge of gender and equality are brought up in relation to various areas and subjects.

By government assignment, equality integration shall be done at all universities in Sweden. This means that equality shall be integrated with KTH’s activities. In 2016, this assignment received a coordinator who in the autumn provided information about and discussed the assignment with central groups and functions at KTH, such as the President’s Management Group at the time, future faculty managers, the steering committee for career support, the Faculty Council, the KTH Student Union (THS) and the Network for Women Professors and Docents. The coordinator is also participating in the national meetings that are related to the assignment and arranged by the National Secretariat for Gender Research.

During the year, the action plan for equality, diversity and equal opportunity 2014–2016 was followed up. The follow-up
of the action plan’s targets constitutes a basis for next year’s work on equal opportunities. The annual equal opportunity plan for students was drafted and updated according to the follow-up of the previous plan. This work was done in cooperation with study advisers, Funka (support for students with disabilities) and THS.

The first part of training in gender and equal opportunity was implemented for the staff at the HR department. The objective is to be able to provide relevant support to the operations and the assignment to implement equality integration.

The scope for a wage mapping was worked out and a mapping was carried out with the help of wage analysis and the classification system BESTA (Position Grouping for Statistics in the State).

On behalf of KTH, the Institute of Human Resource Indicators drafted the so-called JÄMIX report. JÄMIX shows what equality looks like and is developed in the organisations. For core operations, the year’s results showed a positive development.

This year, the prize for the equality and diversity work for employees was awarded to Adjunct Malin Åberg Wennerholm, School for Architecture and the Built Environment, for her work to promote greater equality in the education area at KTH.

Competence and career development

Staff development

At KTH, all employees shall have an opportunity to develop and move further in their career. Various kinds of staff training in project management, presentation and workshop techniques and more provide opportunities for career development, not least for administrative personnel. Staff training also refers to such education that is called for by the work of the authority, such as test monitor, administration, safety and working environment courses.

Within the academic career track, the Tenure track, KTH offers career development in the form of networking, support for academic and pedagogical development and leadership training. The aim is to identify what is needed for further qualification as lecturer or professor and to offer support for development in areas that are relevant to a further career at KTH. In 2016, 80 people were comprised of the efforts Partners in Learning (PIL), academic development seminars and management development.

KTH promotes internal and external mobility and strives to provide employees with the possibility of developing their expertise and thereby maintaining their employability. Working at KTH should be an active choice and therefore, employees at KTH are offered the possibility of life and career planning that is available in various variants, includes individual coaching and is financed by local joint transition funding. In 2016, a total of 36 employees underwent life and career planning.

New employees are offered an introduction to thereby strengthen the development of both the individual and KTH. The introduction consists of a website, New at KTH, with a collection of relevant links for the employee to orient him or herself by and a welcome day. The welcome day is an opportunity for the new employees to meet KTH’s management, mingle with the unit managers and network with each other. In 2016, 110 of the new KTH employees participated in the welcome day. During the welcome day, a lecture is provided with group work on our core values and intercultural experiences and perceptions to increase understanding of our similarities and differences. The day is concluded with a campus tour to learn about KTH’s history and see our art treasure.

A longer and more detailed introduction programme for newly appointed administrators was held with 17 participants. The purpose of the programme is to provide new employees the knowledge necessary to be able to quickly get their bearings and work efficiently.

A campus with such an international and multicultural environment as KTH presupposes staff and students being able to communicate with each other. In connection with KTH’s vision 2027 of a bilingual university, KTH is now investing in offering various language development activities to increase the level of knowledge in both Swedish and English. In order to promote greater staff mobility at KTH, job shadowing is organised where possible to stimulate dialogue and collaboration.

KTH also encourages knowledge exchange with the surrounding world and offers teachers and administrative personnel the opportunity to apply for international exchange through Erasmus+. In 2016, 40 administrators were granted compensation for exchange or courses within Erasmus+ and 10 teachers participated in teacher exchanges. The purpose is to strengthen both the development of the individual and KTH’s exchange of knowledge with the outside world.

During 2016, approximately 600 of KTH’s teachers and researchers have taught or researched abroad over a period of at least a week. Similarly, approximately 450 teachers, researchers and postdocs have spent a period of at least a week at KTH to teach or conduct research. KTH’s teachers and researchers participate to a great extent in international collaboration with universities all over the world. Many of KTH’s teachers and professors are also visiting professors at other universities.

Administrative functional training in accounting, HR, IT, law and education administration has been performed by KTH centrally in the form of courses, workshops and seminars. The purpose is to offer activities that maintain and increase competence, so as to continuously maintain relevant and qualified administrative support.

The Faculty Council’s training, Recruitment at KTH – the faculty perspective, for the members of the recruitment committees had 131 participants during the year. The training programme consists of four components: laws and regulations, neutral qualification assessment, educational expertise and interview techniques.
Continued regional collaboration between the universities provides benefits to KTH with expanded networks and is cost-effective. Examples of training provided within this collaboration are project management, administration training and mentorship programmes.

**KTH Relocation**

The purpose of KTH Relocation is to streamline and centralise the reception of all staff KTH recruits from abroad. In 2016, KTH Relocation assisted around 800 people with housing. This is a service offered in the first year at KTH, regardless of what form of financing the applicant has and the degree of the position.

Besides housing, KTH Relocation actively works to increase integration and establishment both at KTH and in society in general. Among other things, courses in the Swedish language are offered where the participant is assigned a Swedish-speaking KTH colleague as a study buddy. Study visits within KTH are also included, aimed at increasing the knowledge about KTH and the sense of belonging in those recruited from abroad.

Once a month, meetings are offered on what applies when one is new at KTH, what the employee’s personal responsibility comprises, what KTH’s responsibility is and what one can expect as a new arrival to the city and the job. Monthly meetings and events are also offered, targeted at those who are new from abroad, with the distinct goal of answering questions regarding such matters as Swedish income tax returns, careers in Sweden, social establishment and looking for housing. On average, around 50 people participate per event and there is large perceived need to meet.

KTH Relocation also takes extensive responsibility for accompanying family members as around 30 per cent of those recruited to KTH have family members accompanying them. For accompanying family members of associate senior lecturers, senior lecturers or professors, a tailor-made career support is offered, comprising three months of individual guidance into the Swedish labour market, regardless of former background and level of ambition. Some ten people received the career support in 2016. All accompanying family members receive a personal e-mail around two months before the estimated move about what they can expect and suggestions of how they can establish themselves both in terms of their career and socially. In collaboration with Stockholms Akademiska Forum, a career-oriented network is offered to all accompanying family members.

**Working environment**

KTH works actively on the systematic work environment efforts with the aim of continuously improving the work environment. As a part of this, all schools annually prepare a work environment plan where activities in both the physical and psychosocial work environment are documented and followed up. This includes highlighting the activities done during the year and preparing a prospective action plan for further improvements. The 2015 update of the procedures for reporting incidents and work-related injuries contributed to a continued increase in received reports from the schools. This is an important part in the systematic work environment efforts and is an instrument for clarifying and addressing potential deficiencies.

During the year, a principal safety representative group was established. The group meets regularly with the aim of improving the communication between the principal safety representatives and improving the dialogue between the principal safety representatives and the employer. During the year, work environment training was provided to managers with staff responsibility. The objective is to provide knowledge about the responsibilities and obligations included in the staff responsibility and their application at KTH. In addition, training in legal matters related to safety representatives was held for safety representatives, as well as training in KLARA (the chemicals management system) for those taking stock.

In spring 2016, KTH conducted an employee survey. This was the fourth time the survey was conducted. The employee survey should be seen as a temperature measurement and strategic instrument for determining what efforts should be carried out in the work environment at KTH. The employee survey is a joint project and it is therefore important for both the employer and the union organisations that as many employees as possible participate. The response rate in 2016 increased to 70 per cent compared with the 2013 survey when the response rate was 64 per cent.

Adjustments in questions from the previous survey were made to make the results comparable with other universities. The results show that the employees have a high degree of commitment and that they feel that their work contributes to the operations. The down side to this, which is also considered an area for improvement, is that there are employees who find it difficult to relax in their free time and recover from the work, which leads to stress. The results during the year were presented at KTH’s workplaces. The schools have prepared action plans that they will continue to work on. Central efforts will also be conducted.

In 2016, KTH continued to offer all employees aged 50, 55, 60 and 64 a health exam. Recurring health, work environment and lifestyle surveys have been done for the schools and the university administration.

In conjunction with the general regulations on the organisational and social work environment entering into effect in 2016, an update was made of the guideline that describes procedures in the report, investigation and actions in the event of discrimination, harassment, sexual harassment and offensive special treatment. A competence network, with the schools’ appointed administrators/contact persons responsible for these issues and an HR specialist from the HR department, met twice during the year for continued training, method development and experiential exchange.
Professors
Visiting professors
Adjunct professors
Associate professors
Assistant professors
Lectures
Guest teachers
Researchers
Postdoctoral
Ph.D. student employment
Technicians
Administrators and library staff
Other

The number of adjunct professors decreased by one person and at year-end was 63 (women decreased by three to nine and men increased by two to six). In FTEs, this corresponds to 15, which is an increase by one over the previous year (women is unchanged at two and men increased by one to 13). The percentage of women measured in numbers decreased by 5 percentage points to 14 per cent. In FTEs, the percentage decreased by 2 percentage points to 14 per cent. During the year, seven people were recruited as adjunct professors (one woman and six men). All adjunct professors are employed by KTH, but have their primary activities located outside KTH. The employment comprises a minimum of 20 per cent and a maximum of 50 per cent of full time and the majority of the adjunct professors receive no salary from KTH.

The number of associate professors increased by four FTE to 287 (women increased by four to 66 and men decreased by one to 220). The percentage of women increased by one percentage point to 23 per cent compared with the preceding year. During the year, 24 new associate professors were appointed (11 women and 13 men). Women accounted for 46 per cent of the new employees.

The number of assistant professors decreased by one FTE to 57 (women decreased by two to 11 and men increased by one to 46). The percentage of women decreased by 2 percentage points compared with 2015 to 20 per cent. During the year, 23 assistant professors were appointed (ten women and 13 men); 43 per cent of the new employees were women.

The number of postdocs increased by six FTE to 128 (women increased by nine to 37 and men decreased by three to 90). The percentage of women is 29 per cent, which is an increase of 6 percentage points compared with 2015. Postdocs have temporary employment of a maximum of two years.

Ph.D. student employment
In 2016, doctoral students with employment decreased by 54 FTEs to 951 (women by eight to 280 and men by 46 to 671). Women accounted for 29 per cent of employed doctoral students, which is unchanged compared with 2015.

Technical and administrative staff
The technical and administrative staff, including the library staff, decreased by 17 FTEs to 1,001 (women decreased by 15 to 627 and men by four to 373). The percentage of women was unchanged at 63 per cent compared with the preceding year.

The reporting of figures below may contain rounding effects.

In 2016, the average number of employees decreased by 55 to 5,178 (2,020 women and 3,159 men), compared with 5,235 in 2015 and 5,157 in 2014. The average is calculated based on measurements each month during the year. When converted to full-time equivalents (FTEs), there was a reduction of 84 to 3,572 in 2016 compared with 3,656 in 2015 and 3,672 in 2014. Measured in FTEs, the proportion of women is unchanged compared with 2015 at 37 per cent.

The number of teachers decreased by one FTE to 809 (women increased by four to 174 and men decreased by five to 635). The group of teachers includes professors, visiting professors, adjunct professors, associate professors, assistant professors, including research assistants, lecturers and guest teachers. Women account for 21 per cent of the teachers, which is unchanged since 2012.

The number of FTEs in the professor group (professors, visiting professors and adjunct professors) increased by five FTEs in 2016 to 310 (women by three to 49 and men by three to 262). Professors increased by eight FTEs to 285 (women by five to 43 and men by three to 242). The percentage of women increased by one percentage point to 15 per cent. During the year, 24 new professors were appointed (seven women and 17 men). Women accounted for 29 per cent of newly appointed professors in 2016.

Visiting professors decreased by four FTEs to ten (women by three to three and men by two to six).

The number of postdocs increased by six FTE to 128 (women increased by nine to 37 and men decreased by three to 90). The percentage of women is 29 per cent, which is an increase of 6 percentage points compared with 2015. Postdocs have temporary employment of a maximum of two years.

Ph.D. student employment
In 2016, doctoral students with employment decreased by 54 FTEs to 951 (women by eight to 280 and men by 46 to 671). Women accounted for 29 per cent of employed doctoral students, which is unchanged compared with 2015.
Premises

KTH disposed over premises comprising around 269,000 square metres of floor space at the end of 2016. The percentage of empty or unused premises at the end of 2016 is lower than the previous year because KTH utilises most of the premises for evacuation. At year-end 2016, there are smaller office units of 50–300 square metres and occasional lab facilities. Altogether, it is around 1,000 square metres spread throughout campus.

Major building projects completed in 2016

- During the spring, the School of Architecture and the Built Environment left its premises in Haninge and moved in to Brinellvägen 22. The building has been renovated and tenant customised for the Department of Constructional Engineering and Design.
- The School of Technology and Health also left Haninge and moved to newly built premises in Flemingsberg in August. The Swedish Red Cross University College also moved into the same building and both universities will cooperate and jointly use some of the teaching premises.

Smaller rebuilding and renovation projects completed in 2016

During the summer period, it is possible to carry out fairly extensive rebuilding and renovation work on classrooms and study areas and in 2016 this affected the following premises:

- Lecture theatre K1 at Teknikringen 56, including lounge, and lecture theatre V1 at Teknikringen 76 and the somewhat smaller rooms B34 and B35 at Lindstedtsvägen 5 were renovated and received new lecture theatre furnishings.
- The AV technology was replaced in six rooms.

Other ongoing building projects

- The construction of the new teaching building at Brinellvägen 26–28 is delayed. Akademiska hus will turn the building over to KTH in June 2017.
- During the year, KTH took over the building at Teknikringen 1, which previously housed the Swedish Red Cross University College. Investigation efforts are under way and a minor tenant customisation is scheduled to begin in spring 2017. Operations moving in in 2017 are KTH Innovation, KTH Industry Collaboration, Research Office, etc.

Next to the existing building at Teknikringen 10, construction is under way of new offices for the Department of Transport Science and the Department of Sustainable Development, Environmental Sciences and Engineering. The building is scheduled for completion and occupancy in autumn 2017.

- At Teknikringen 29–33, School of Electrical Engineering, renovation and tenant customisations are under way.

Most of the tenants have moved to replacement premises. The move back will take place in stages during the spring, summer and autumn of 2017.

- In Snäckviken in Södertälje, renovations and extensions are under way on new premises for the School of Industrial Engineering and Management. Occupancy is scheduled for June 2017.

Student and visiting researcher accommodation

Under a government decision, KTH is allowed to sub-let apartments to students and visiting researchers. KTH currently provides a large number of student rooms and apartments for exchange students, foreign master’s students and visiting researchers. For master’s students and visiting researchers with families, there are also around 35 apartments comprising two or three rooms and a kitchen.

In 2016, KTH was able to provide accommodation to 1,577 students. The rental portfolio comprises 1,200 rooms and apartments. The occupancy rate has been around 85 per cent during the whole year. Maintenance and cleaning of the accommodation is done in the summer.

KTH Relocation mediates housing to visiting researchers. KTH Relocation has a total portfolio of 380 accommodation units all over greater Stockholm. The occupancy rate is 95 per cent. In addition to these units, there is also a boarding house, Matsälfkapet in Solna, with an occupancy rate of around 75 per cent spread over the year. In total, more than 800 visiting researchers and newly employed foreign visiting researchers and doctoral students received their housing through KTH Relocation 2016. In 2016, virtually everyone who contacted KTH Relocation with a housing inquiry received an offer.

The work of constructing student housing on KTH’s campus is continuing. The plans comprise the construction of nearly 700 student apartments on the KTH campus at Valhallavägen, with room for around 960 students and visiting researchers with occupancy in autumn 2017 and during 2018.

For future years, KTH forecasts an increase in international students, which is why the need for further housing will probably grow.
Financial results and changes in capital
The loss for the year of SEK 14 million is less than the previous year when there was a profit of SEK 83 million and is somewhat better than forecast for the year. The forecast for the year was a loss of SEK 31 million. The financial results are distributed over a loss for the operations in first- and second-cycle education of SEK 43 million and a profit for research and the third-cycle education of SEK 29 million.

The profit is affected by KTH being the principal for SciLifeLab. In 2016, KTH received SEK 364 million in funding for the activities at SciLifeLab where the majority is transferred to other participating universities. The grants are deducted in their entirety in connection with the monthly payment to KTH and not allocated to periods. In 2016, SEK 17 million of the grants were not allocated between the participating universities and thereby affected KTH’s earnings positively. The corresponding amount for 2015 was SEK 15 million. During the year, SEK 6 million of the unallocated funding of previous years was transferred or used in KTH, which has a negative impact on the earnings. The amount for 2015 was SEK 10 million. Altogether, the year’s earnings were affected by SEK 11 million in connection with KTH being the principal for SciLifeLab.

Turnover increased by nearly 3 per cent and amounted to SEK 4,908 million, measured as the operating income including funding for financing of transfers. In the past ten years, KTH’s turnover has increased by nearly 73 per cent.

The government capital amounts to SEK 765 million, which still corresponds to nearly 16 per cent of turnover according to the above definition. The long-term objective is that the government capital will amount to 10 per cent of turnover. In 2015, a decision was made on efforts financed with government capital. These efforts were largely begun in the second half of 2016 and affected earnings during the year by SEK -17 million.

Figure 15
Profit/loss

<table>
<thead>
<tr>
<th>(msek)</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>4,426</td>
<td>4,352</td>
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<tr>
<td>Costs</td>
<td>4,445</td>
<td>4,329</td>
</tr>
<tr>
<td>Profit/loss</td>
<td>-18</td>
<td>23</td>
</tr>
<tr>
<td>Profit/loss subsidiaries</td>
<td>4</td>
<td>-1</td>
</tr>
<tr>
<td>Revenues for transfers</td>
<td>482</td>
<td>435</td>
</tr>
<tr>
<td>Grant issued (costs for transfers)</td>
<td>482</td>
<td>435</td>
</tr>
<tr>
<td>Profit/loss</td>
<td>-14</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: Financial system

Figure 16
Earnings and Capital Trend (msek)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First and second level studies</td>
<td>92</td>
<td>-43</td>
<td>35</td>
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<tr>
<td>Purchased courses</td>
<td>11</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Commissioned courses</td>
<td>-4</td>
<td>-3</td>
<td>3</td>
</tr>
<tr>
<td>Research and doctoral studies</td>
<td>654</td>
<td>33</td>
<td>-22</td>
</tr>
<tr>
<td>Commissioned research</td>
<td>12</td>
<td>-3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>765</td>
<td>-14</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: Financial system

Figure 17
Capital development

Source: Agresso

Source: Financial system
**Income**

Operating income increased by nearly 2 per cent and is now SEK 4,426 million, SEK 75 million more than 2015.

**First and second-cycle education**

This income continues to constitute 31 per cent of total revenue and amounts to SEK 1,353 million, which is a decrease of SEK 11 million compared with the previous year.

Income from grants for first- and second-cycle education decreased by just over 2 per cent and amounted to SEK 1,045 million. During the year, KTH had an overproduction in first- and second-cycle education and therefore deducted the entire funding cap. In 2015, KTH also received more than SEK 10 million through quality-based resource distribution. No such allocation was received for 2016.

Income from fees and other compensation increased by 6 per cent and amounted to SEK 237 million. The main explanation for the increase is that income from tuition fees increased by SEK 19 million compared with the previous year and an additional SEK 6 million from rental of student accommodation. During the autumn term 2016, 523 new paying students were registered at KTH, which is an increase of 19 per cent compared with the previous year. Many of the paying students rent accommodation through KTH. For the second consecutive year, the tuition of fee paying students shows a surplus. For 2016, the surplus is SEK 2 million compared with SEK 1 million for 2015. The cumulative deficit on fee-financed education is now approximately SEK 5 million.

**Research and third-cycle education**

This income constitutes 69 per cent of total revenue and amounts to SEK 3,073 million, which is an increase of about 3 per cent compared with the previous year.

The income from funding for research and third-cycle education increased by SEK 38 million compared with 2015, which in addition to the upwards price and wage adjustment is related to KTH having received higher funding of SEK 60 million in SciLifeLab.

Income from fees and other compensation increased by SEK 33 million. The operations in SciLifeLab continue to increase the income within this group.

The income from grants increased by SEK 13 million. The Swedish Research Council, the EU, the Wallenberg foundations, Vinnova, the Swedish Energy Agency and FORMAS continue to be KTH’s five largest financiers. The Wallenberg foundations account for the largest increase with regard to income from grants in an amount of SEK 42 million, which is an increase of 30 per cent. The income from the Swedish Research Council decreased by SEK 27 million in 2016, which is a decrease of 8 per cent.
Costs
Operating costs increased by 3 per cent and now amount to SEK 4,445 million.

First and second-cycle education
These costs also constitute 31 per cent of total costs and amount to SEK 1,396 million, which is an increase of SEK 73 million compared with the previous year. The premises expenses increased by 6 per cent, which is due in part to higher ground leases and the relocation of two operations to new premises.

Research and third-cycle education
These costs continue to constitute 69 per cent of total costs and amount to SEK 3,048 million, which is an increase of SEK 42 million compared with the previous year, just over 1 per cent.

Personnel costs increased by SEK 7 million, which is a lower increase than previous years. During the year, the number of FTEs decreased with regard to the number of doctoral students. The staff structure is described in further detail in the section on Staff.

As in first- and second-cycle education, the premises expenses increased by 6 per cent, which is due in part to higher ground leases and the relocation of two operations to new premises.
KTH currently manages 112 civil law foundations through affiliated management. The foundations were formed through various donations to KTH. The two oldest foundations have their origins in donations from 1866, when they were donated to KTH’s predecessor, the Kongl. Teknologiska Institutet. The donations came from Joh. Michaelson och Wälloffiga Borgeståndet and were intended to create scholarship funds for students without means who had distinguished themselves through hard work, aptitude and honourable behaviour. The former foundation distributed the final foundation funds for its purpose during the year. This means that the foundation lacks assets and has thereby been dissolved and deregistered.

**Purpose management**

The purpose of every foundation is stated in the Foundation Regulations. In 2016, the KTH-affiliated foundations distributed SEK 18 million. The largest group of these foundations, 55 in all, award scholarships to students in the first and second cycle. It was decided to distribute SEK 8 million through 368 scholarships from these foundations. Of these, about SEK 4 million is from the largest foundation that KTH manages, the Foundation Henrik Göransson Sandviken Scholarship Fund. This foundation has assets of SEK 140 million, which shall mainly be invested in securities related to Sandvik AB. 31 foundations distribute travel grants to teachers, researchers and doctoral students. From them, grants of just over SEK 3 million were distributed through 198 scholarships in 2016. Other foundations contribute to research activities at KTH. During the year it was decided to distribute grants totalling approximately SEK 7 million in 84 grants for such activities.

The second largest foundation managed by KTH is the KTH Great Prize Foundation, coming from a donation in 1944. The donor, who wished to remain anonymous, stipulated that the prize should go to a Swedish citizen who had great significance for Sweden through historical discoveries, ingenious applications or artistic effort. The prize was SEK 1.2 million and was awarded in connection with the KTH conferment and inauguration ceremony. In 2016, the prize was awarded to inventor and entrepreneur Stina Ehrensvärd. She is most well-known for Yubikey, a smart solution that makes it possible to safely, quickly and easily log in with a single USB key anywhere on the Internet. The University Board’s motivation stated: “In an age when data trespassing is growing, Stina Ehrensvärd has developed a company with the vision of creating a more secure digital universe. Through genuine entrepreneurial passion and expertise, she has achieved great success in a short time with a pioneering password solution for a secure Internet.”

The foundations pay an annual management fee to KTH for the costs that arise from management. In 2016, this amounted to SEK 1.7 million.

**Asset management**

The assets in the affiliated foundations are managed by two external discretionary asset managers. These managers are entitled to carry out transfers in the KTH portfolio within the framework outlined in the KTH investment policy for these foundations. Total foundation assets at year-end were SEK 700 million (SEK 647 million in 2015).

**Figure 21**

### Size and number of foundations

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Capital MSEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundations, 15–140 MSEK</td>
<td>10</td>
<td>390</td>
</tr>
<tr>
<td>Foundations, 5–15 MSEK</td>
<td>21</td>
<td>190</td>
</tr>
<tr>
<td>Foundations, 1–5 MSEK</td>
<td>44</td>
<td>100</td>
</tr>
<tr>
<td>Foundations, up to 1 MSEK</td>
<td>37</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>112</td>
<td>700</td>
</tr>
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</table>
## Financial Statement

### Operating revenues

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Government grants</td>
<td>1</td>
<td>2,215,352</td>
<td>2,202,935</td>
<td>2,204,918</td>
<td>2,021,228</td>
<td>2,011,781</td>
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<tr>
<td>Revenues from tuition fees and other charges</td>
<td>2</td>
<td>543,086</td>
<td>497,627</td>
<td>426,998</td>
<td>423,844</td>
<td>384,963</td>
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<td>Revenues from grants</td>
<td>1,662,645</td>
<td>1,647,845</td>
<td>1,603,381</td>
<td>1,576,814</td>
<td>1,522,060</td>
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<tr>
<td>Financial income</td>
<td>3</td>
<td>3,114</td>
<td>3,164</td>
<td>7,528</td>
<td>16,236</td>
<td>29,035</td>
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</table>

### Operating costs

<table>
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<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Staff costs</td>
<td>4</td>
<td>2,669,311</td>
<td>2,643,190</td>
<td>2,565,289</td>
<td>2,460,926</td>
<td>2,372,901</td>
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<tr>
<td>Costs for premises</td>
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<td>807,880</td>
<td>761,362</td>
<td>737,816</td>
<td>698,343</td>
<td>643,665</td>
</tr>
<tr>
<td>Other operational costs</td>
<td>731,618</td>
<td>697,741</td>
<td>679,637</td>
<td>684,704</td>
<td>678,153</td>
<td></td>
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<tr>
<td>Financial costs</td>
<td>3</td>
<td>8,552</td>
<td>5,762</td>
<td>4,175</td>
<td>5,527</td>
<td>7,655</td>
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<td>Depreciation</td>
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<td>227,156</td>
<td>220,756</td>
<td>171,463</td>
<td>181,860</td>
<td>188,791</td>
</tr>
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</table>

### Financial Statement per operational area

#### Education at first and second cycle

<table>
<thead>
<tr>
<th>Operating revenues</th>
<th>Not</th>
<th>Total</th>
<th>First and second level studies</th>
<th>Purchased education</th>
<th>Commissioned education</th>
<th>Research and doctoral studies</th>
<th>Commissioned research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government grants</td>
<td>1</td>
<td>2,215,352</td>
<td>1,045,287</td>
<td>0</td>
<td>0</td>
<td>1,170,065</td>
<td>0</td>
</tr>
<tr>
<td>Revenues from tuition fees and other charges</td>
<td>2</td>
<td>543,086</td>
<td>206,064</td>
<td>17,850</td>
<td>13,196</td>
<td>201,886</td>
<td>104,090</td>
</tr>
<tr>
<td>Revenues from grants</td>
<td>1,662,645</td>
<td>69,407</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,593,238</td>
<td>0</td>
</tr>
<tr>
<td>Financial income</td>
<td>3</td>
<td>5,114</td>
<td>1,014</td>
<td>0</td>
<td>44</td>
<td>3,638</td>
<td>391</td>
</tr>
</tbody>
</table>

### Transfers

| Funds allocated from government budget for financing of grants | 5   | 4,059 | 0 | 0 | 0 | 4,059 | 0 |
| Funds allocated from government agencies for financing of grants | 6   | 60,411| 48,465| 53,937| 43,937| 41,288| 34,001|
| Grants made        | 7   | 481,629| 434,516| 393,687| 380,751| 266,478| 0 |

### Changes to capital for year

| Outcome from shares of subsidiary companies and other interests | 5   | 4,059 | -1,011 | -1,806 | 1,337 | 1,091 |
| Outcome of transfers | 6   | 309,729| 257,783| 231,449| 249,144| 131,048| 0 |
| Funds allocated from government agencies for financing of grants | 7   | 60,411| 48,465| 53,937| 43,937| 41,288| 34,001|
| Grants made        | 8   | 481,629| 434,516| 393,687| 380,751| 266,478| 0 |

### Financial Statement per operational area

#### Education at first and second cycle

<table>
<thead>
<tr>
<th>Operating revenues</th>
<th>Not</th>
<th>Total</th>
<th>First and second level studies</th>
<th>Purchased education</th>
<th>Commissioned education</th>
<th>Research and doctoral studies</th>
<th>Commissioned research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government grants</td>
<td>1</td>
<td>2,215,352</td>
<td>1,045,287</td>
<td>0</td>
<td>0</td>
<td>1,170,065</td>
<td>0</td>
</tr>
<tr>
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<td>2</td>
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<td>206,064</td>
<td>17,850</td>
<td>13,196</td>
<td>201,886</td>
<td>104,090</td>
</tr>
<tr>
<td>Revenues from grants</td>
<td>1,662,645</td>
<td>69,407</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,593,238</td>
<td>0</td>
</tr>
<tr>
<td>Financial income</td>
<td>3</td>
<td>5,114</td>
<td>1,014</td>
<td>0</td>
<td>44</td>
<td>3,638</td>
<td>391</td>
</tr>
</tbody>
</table>

### Changes to capital for year

| Outcome from shares of subsidiary companies and other interests | 5   | 4,059 | -1,011 | -1,806 | 1,337 | 1,091 |
| Outcome of transfers | 6   | 309,729| 257,783| 231,449| 249,144| 131,048| 0 |
| Funds allocated from government agencies for financing of grants | 7   | 60,411| 48,465| 53,937| 43,937| 41,288| 34,001|
| Grants made        | 8   | 481,629| 434,516| 393,687| 380,751| 266,478| 0 |

### Financial Statement per operational area

#### Research and education at third cycle

<table>
<thead>
<tr>
<th>Operating revenues</th>
<th>Not</th>
<th>Total</th>
<th>First and second level studies</th>
<th>Purchased education</th>
<th>Commissioned education</th>
<th>Research and doctoral studies</th>
<th>Commissioned research</th>
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</thead>
<tbody>
<tr>
<td>Government grants</td>
<td>1</td>
<td>2,215,352</td>
<td>1,045,287</td>
<td>0</td>
<td>0</td>
<td>1,170,065</td>
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<tr>
<td>Revenues from tuition fees and other charges</td>
<td>2</td>
<td>543,086</td>
<td>206,064</td>
<td>17,850</td>
<td>13,196</td>
<td>201,886</td>
<td>104,090</td>
</tr>
<tr>
<td>Revenues from grants</td>
<td>1,662,645</td>
<td>69,407</td>
<td>0</td>
<td>0</td>
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<td>1,593,238</td>
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</tr>
<tr>
<td>Financial income</td>
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<td>1,014</td>
<td>0</td>
<td>44</td>
<td>3,638</td>
<td>391</td>
</tr>
</tbody>
</table>

### Changes to capital for year

| Outcome from shares of subsidiary companies and other interests | 5   | 4,059 | -1,011 | -1,806 | 1,337 | 1,091 |
| Outcome of transfers | 6   | 309,729| 257,783| 231,449| 249,144| 131,048| 0 |
| Funds allocated from government agencies for financing of grants | 7   | 60,411| 48,465| 53,937| 43,937| 41,288| 34,001|
| Grants made        | 8   | 481,629| 434,516| 393,687| 380,751| 266,478| 0 |
## Balance Sheet

### ASSETS

<table>
<thead>
<tr>
<th>Not</th>
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<th>2015-12-31</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Intangible fixed assets</strong></td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Capitalised expenditure for development</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Intellectual rights and other intangible assets</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>II. Tangible fixed assets</strong></td>
<td>10</td>
<td>728,949</td>
</tr>
<tr>
<td>Improvements to non-owned real estate</td>
<td>236,666</td>
<td>215,476</td>
</tr>
<tr>
<td>Machines, inventory items, installation etc.</td>
<td>463,079</td>
<td>479,319</td>
</tr>
<tr>
<td>Construction in progress</td>
<td>29,204</td>
<td>11,048</td>
</tr>
<tr>
<td><strong>III. Financial fixed assets</strong></td>
<td>11</td>
<td>27,355</td>
</tr>
<tr>
<td>Interests i wholly and partially-owned companies</td>
<td>27,265</td>
<td>21,731</td>
</tr>
<tr>
<td>Other investments held as fixed assets</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td><strong>VI. Receivables</strong></td>
<td>12</td>
<td>117,088</td>
</tr>
<tr>
<td>Receivables – customers</td>
<td>34,833</td>
<td>25,251</td>
</tr>
<tr>
<td>Receivables – other government agencies</td>
<td>80,530</td>
<td>98,271</td>
</tr>
<tr>
<td>Other receivables</td>
<td>1,726</td>
<td>2,399</td>
</tr>
<tr>
<td><strong>VII. Cut of items</strong></td>
<td>13</td>
<td>602,344</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>206,949</td>
<td>157,646</td>
</tr>
<tr>
<td>Accrued grant revenues</td>
<td>393,640</td>
<td>342,760</td>
</tr>
<tr>
<td>Other accrued revenues</td>
<td>1,755</td>
<td>4,204</td>
</tr>
<tr>
<td><strong>VIII. Settlement with Government</strong></td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Settlement with Government</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>X. Cash and cash equivalents</strong></td>
<td>15</td>
<td>1,460,144</td>
</tr>
<tr>
<td>Balance and interest-bearing account at Swedish National Debt Office</td>
<td>1,355,339</td>
<td>1,274,169</td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>104,804</td>
<td>90,248</td>
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</table>

**TOTAL ASSETS**

2,935,880

2,722,611

### CAPITAL AND LIABILITIES

<table>
<thead>
<tr>
<th>Not</th>
<th>2016-12-31</th>
<th>2015-12-31</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Agency capital</strong></td>
<td>16</td>
<td>764,614</td>
</tr>
<tr>
<td>Government Capital</td>
<td>23,467</td>
<td>22,521</td>
</tr>
<tr>
<td>Outcome from shares of/in subsidiary companies and other interests</td>
<td>281</td>
<td>871</td>
</tr>
<tr>
<td>Changes to capital brought forward</td>
<td>755,127</td>
<td>732,366</td>
</tr>
<tr>
<td>Changes to capital according to Financial Statement</td>
<td>-14,261</td>
<td>21,750</td>
</tr>
<tr>
<td><strong>III. Provisions</strong></td>
<td>20</td>
<td>12,477</td>
</tr>
<tr>
<td>Provisions for pensions and similar commitments</td>
<td>25,447</td>
<td>23,914</td>
</tr>
<tr>
<td><strong>IV. Liabilities etc.</strong></td>
<td>19</td>
<td>1,032,032</td>
</tr>
<tr>
<td>Loans from Swedish National Debt Office</td>
<td>534,976</td>
<td>524,441</td>
</tr>
<tr>
<td>Accounts payable – other government agencies</td>
<td>100,996</td>
<td>81,468</td>
</tr>
<tr>
<td>Accounts payable – suppliers</td>
<td>140,143</td>
<td>69,965</td>
</tr>
<tr>
<td>Other accounts payable</td>
<td>208,836</td>
<td>183,645</td>
</tr>
<tr>
<td>Deposits</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td><strong>V. Cut-off items</strong></td>
<td>25</td>
<td>1,148,352</td>
</tr>
<tr>
<td>Accrued expenses</td>
<td>97,816</td>
<td>89,390</td>
</tr>
<tr>
<td>Unutilised grants</td>
<td>1,032,032</td>
<td>952,499</td>
</tr>
<tr>
<td>Other prepaid revenues</td>
<td>18,504</td>
<td>9,389</td>
</tr>
</tbody>
</table>

**TOTAL CAPITAL AND LIABILITIES**

2,935,880

2,722,611

### Contingent liabilities

<table>
<thead>
<tr>
<th>Not</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government guarantees for loan and credits</td>
<td>None</td>
</tr>
<tr>
<td>Other contingents liabilities</td>
<td>None</td>
</tr>
</tbody>
</table>
Licentiate Theses

Degrees awarded during 2016

BIOLOGICAL SCIENCES

Biological Physics

Lundberg, Linnea
Dispersion Corrections at Planar Surfaces

CHEMICAL ENGINEERING

Chemical Engineering

Olsson, Alexander
An evaluation of solar powered irrigation as carbon offset projects

Fibre and Polymer Science

Henschel, Jonatan
Bacterial adhesion to polyelectrolyte modified materials based on nanocellulose

SVÄRD, ANTONIA
Extraction of polymeric rapeseed straw hemicelluloses for renewable films

CHEMICAL SCIENCES

Chemistry

Fuertes Casals, Nuria
Use of local electrochemical techniques for corrosion studies of stainless steels

Zhou, Nian
Influence of grinding operations on surface integrity and chloride induced stress corrosion cracking of stainless steels

CIVIL ENGINEERING

Civil and Architectural Engineering

Abbasverki, Roghayeh
Analysis of underground concrete pipelines subjected to seismic high-frequency loads

Döse, Magnus
Ionizing Radiation in Concrete and Concrete Buildings – Empirical Assessment

Gasch, Tobias
Concrete as a multi-physical material with applications to hydro power facilities

Gustafsson, Marcus
Energy efficient and economic renovation of residential buildings with low-temperature heating and air heat recovery

Mohammadimohaghegh, Ali
Use of Macro Basalt Fibre Concrete for Marine Applications

Prästings, Anders
Aspects on probabilistic approach to design – From uncertainties in pre-investigation to final design

Wang, Cong
Optimal Design of District Energy Systems – A Multi-Objective Approach

Veganzones Muñoz, José Javier
Bridge Edge Beams – LCFA and Structural Analysis for the Evaluation of New Concepts

Geodesy and Geoinformatics

Preplieean, Adrian Corneliu
Capturing travel entities to facilitate travel behaviour analysis – A case study on generating travel diaries from trajectories fused with accelerometer readings

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Engerstam, Sviatlana
Apartment price determinants – A comparison between Sweden and Germany

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The Winding Road to Sustainable Mobility: Institutional Conditions for Planning for Sustainable Mobility in the Stockholm Region

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Energy Savings by Using Daylight for Basic Urban Shapes – With a Case Study of Three Different Street Types

Umair, Shakila
Informal Electronic Waste Recycling in Pakistan Real Estate and Construction Management

Armerin, Fredrik
Waiting in real options with applications to real estate development valuation

Donner, Herman
Two Essays on Sales of Distressed Real Estate

Granath Hansson, Anna
Institutional Prerequisites for Housing Development – A comparative study of Germany and Sweden

Zahra, Ahmadi
Market orientation and public housing companies in the Swedish declining market

Transport Science

Deng, Qichen
Heavy-Duty Vehicle Platooning – Modeling and Analysis

Ghafooriroozabehang, Ehsan
Investigation of asphalt compaction in vision of improving asphalt pavements

Onifade, Ibrahim
Development of a Morphology-based Analysis Framework for Asphalt Pavements

Warg, Jennifer
Timetable evaluation with focus on quality for travellers

COMPUTER AND INFORMATION SCIENCE

Human-computer Interaction

Bohne, Ulrica
Exploring the intersection of design, reflection and sustainable food shopping practices – the case of the EcoPanel

Grünlöh, Christiane
To Share or Not to Share? – Expectations of and Experiences with eHealth Services that Allow Users Access to their Health Information

Johansson, Stefan
Towards a framework to understand mental and cognitive accessibility in a digital context

Information and Communication Technology

Awan, Ahsan Javed
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Bogdanov, Kirill
Reducing Long Tail Latencies in Geo-Distributed Systems

Ghanbari, Amirhossein
Cooperation for Mobile Service Provisioning – Is it about infrastructures, services or both?

Katsikas, Georgios
Realizing High Performance NFV Service Chains

Peiro Sajjad, Hooman
Towards Unifying Stream Processing over Central and Near-the-Edge Data Centers

Turull Torrents, Daniel
Network virtualization as enabler for cloud networking

ECONOMICS AND BUSINESS

Business Studies

Vass, Susanna
An Organizational Perspective on the Business Value of BIM

ELECTRICAL ENGINEERING, ELECTRONIC ENGINEERING, INFORMATION ENGINEERING

Electrical Engineering

Adalio, Antonio
Event-triggered control of multi-agent systems: pinning control, cloud coordination, and sensor coverage

Babu, Sajeesh
Reliability Evaluation of Distribution Architectures Considering Failure Modes and Correlated Events
Platooning through look-ahead control
Fuel-efficient and safe heavy-duty vehicle
Turri, Valerio
Energetic ions in toroidal plasmas
The dynamics of Alfvén eigenmodes excited by
deposition processes and characterisation of dust
particles
Westerlund, Per
Condition measuring and lifetime modelling of
electrical power transmission equipment
Electronic and computer systems
Liu, Ming
Analysis and synthesis of boolean networks

ENVIRONMENTAL ENGINEERING
Land and water resource engineering
Annaduzzaman, Md.
Chitosan biopolymer as an adsorbent for drinking
water treatment – investigation on arsenic and uranium
Nickman, Alireza
The role of roads on hydrological response
modeling and assessment for swedish watersheds
Pang, Xi
Modelling trade-offs between forest bioenergy and
biodiversity
Wu, Mousong
Water, heat and solute processes in seasonally
frozen soil – experimental and modeling study

HEALTH SCIENCES
Technology and health
Wramsten Wilmar, Maria
Managers in healthcare organizations and their
interactions with the media

INDUSTRIAL BIOTECHNOLOGY
Biotechnology
Skogs, Marie
Antibody-based subcellular localization of the
human proteome
The, Matthew
Statistical and machine learning methods to
analyze large-scale mass spectrometry data

MATERIALS ENGINEERING
Engineering mechanics
Afzal, Md
Numerical modelling and analysis of friction
contact for turbine blades
Canton, Jacopo
Numerical studies on flows with secondary motion

Dijkstra, Erik
Constrained optimization for prediction of posture
Fornari, Walter
Suspensions of finite-size rigid spheres in different
flow cases
Hillergren, Alexandra
Simulations of turbulent boundary layers with
suction and pressure gradients
Na, Wei
Frequency domain linearized Navier-Stokes
equations methodology for aero-acoustic and
thermoacoustic simulations
Sundström, Elias
Centrifugal compressor flow instabilities at low
mass flow rate

Materials science and engineering
Akbarnejad, Shahin
Experimental and mathematical study of
incompressible fluid flow through ceramic foam
filters
He, Shuang
Interactions and phase stability in Ni-rich binary
alloys
Hou, Ziyong
Study of precipitation in martensitic Fe-C-Cr alloys
during tempering experiments and modelling
Thiyam, Priyadarshini
A study of finite-size and non-perturbative effects
on the van der Waals and the Casimir-Polder forces
Yang, Annika
Evaluation of iron losses during desulfurization of
hot metal by modern reagents

Solid mechanics
Lagerblad, Ulrika
A fixed-lag smoother for solving joint input and
state estimation problems in structural dynamics
Mansour, Rami
Development of efficient and accurate methods for
reliability-based design optimization
Motamedian, Hamid Reza
Robust formulations for beam-to-beam contact

MATHEMATICS
Applied and computational mathematics
Lindholm, Love
Calibration and hedging in finance
Rios, Felix
Bayesian structure learning in graphical models
Mathematics
Goodarzi, Afshin
On face vectors and resolutions
MECHANICAL ENGINEERING

Aerospace Engineering

Lokatt, Mikaela
On a Viscous-Inviscid Interaction Model for Aeronautical Applications

Energy Technology

Xylia, Maria
Is energy efficiency the forgotten key to successful energy policy? Investigating the Swedish case

Machine Design

Häggsström, Daniel
On synchronization of heavy truck transmissions

Production Engineering

Rahatulain, Afifa
Towards a Holistic Development Approach for Adaptable Manufacturing Paradigms – A Case Study of Evolvable Production Systems

Vehicle and Maritime Engineering

Lundberg, Eva
Micro-Structure Modelling of Acoustics of Open Porous Materials

Peerlings, Luck
Methods and techniques for precise and accurate in-duct aero-acoustic measurements – Application to the area expansion

Zea Marcano, Elias
Single layer near-field acoustic imaging in space-invariant reflective environments

PHYSICAL SCIENCES

Physics

Elgammal, Karim
Density Functional Theory Calculations of Graphene based Humidity and Carbon Dioxide Sensors

Fu, Jie
Developing semi-empirical ab initio based potentials in materials modeling

Ismail, Heba Asem
Synthesis of Polymeric Nanocomposites for Drug Delivery and Bioimaging

Moosavi, Per
Interacting fermions and non-equilibrium properties of one-dimensional many-body systems

Sidebo, Edvin
Charged particle distributions and robustness of the neural network pixel clustering in ATLAS
## Doctoral Theses

Degrees awarded during 2016

### ARTS

**Architecture**

* Aghaei Melbod, Mania  
  Generative Design Exploration – Computation and Material Practice

* Burroughs, Brady  
  Architectural Flirtations: A Love Story

* Minoura, Eva  
  Uncommon Ground – Urban Form and Social Territory

### BIOLOGICAL SCIENCES

**Biological Physics**

* Chen, Han  
  Characterization and optimization of silicon-strip detectors for mammography and computed tomography

* Liu, Xuejia  
  Characterization and Energy Calibration of a Silicon-Strip Detector for Photon-Counting Spectral Computed Tomography

* Venkataraman, Abinaya Priya  
  Vision Beyond the Fovea: Evaluation and Stimuli Properties

* Wennberg, Christian  
  Computational modeling of biological barriers

* Xu, Hao  
  Fluorescence Properties of Quantum Dots and Their Utilization in Bioimaging

* Yoluk, Özge  
  Elucidating the Gating Mechanism of Cys-Loop Receptors

### CHEMICAL ENGINEERING

**Chemical Engineering**

* Barrientos, Javier  
  Deactivation of cobalt and nickel catalysts in Fischer-Tropsch synthesis and methanation

* Burks, Terrance  
  Application of Nanomaterials for the Removal of Hexavalent Chromium and their Biological Implications

* Hu, Lan  
  Molten Carbonate Fuel Cells for Electrolysis

* Kortsdottir, Katrin  
  The Impact of Hydrocarbon and Carbon Oxide Impurities in the Hydrogen Feed of a PEM Fuel Cell

* Mahmoudzadehzarandi, Batoul  
  Solute Transport through Fractured Rocks: The Influence of Geological Heterogeneities and Stagnant Water Zones

* Norberg Samuelsson, Lina  
  Isoconversional analysis for the prediction of mass-loss rates during pyrolysis of biomass

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**Chemistry**

* Axelsson, Karolin  
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* Liu, Dongming  
  Polyethylene – metal oxide particle nanocomposites for future HVDC cable insulation: From interface tailoring to designed performance

* Olsson, Kristina  
  Thiol-Ene Chemistry and Dopa-Functional Materials towards Biomedical Applications

* Pallon, Love  
  Polyethylene/metal oxide nanocomposites for electrical insulation in future HVDC-cables: Probing properties from nano to macro

* Pourrahimi, Amir Masoud  
  The synthesis, surface modification and use of metal-oxide nanoparticles in polyethylene for ultra-low transmission-loss HVDC cable insulation materials

* Torron Timhagen, Susana  
  Sustainable synthetic pathways towards the formation of bio-based polymeric materials

* Xu, Huan  
  Graphene Oxide Technology to Advance the Stability of Molecules in Metallic Junctions

* Yang, Xi  
  Strategies for Utilizing Biobased and Recycled Resources for Polylactide Plasticization

### CIVIL ENGINEERING

**Civil and Architectural Engineering**

* Ferdos, Farzad  
  Internal Erosion Phenomena in Embankment Dams – Throughflow and internal erosion mechanisms

* Karami, Peyman  
  Robust and Durable Vacuum Insulation Technology for Buildings

* Li, Hai  
  Energy Quality Management for Building Clusters and Districts Using a Multi-Objective Optimization Approach

* Lundborg, Lina  
  Electroplating and Corrosion of Stainless Steel in Simulated Food Contact

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  Theoretical Studies of Protein-Ligand Interactions

* Li, Xin  
  Theoretical studies on electronic structure and x-ray spectroscopies of 2D materials

* Eneh, Lynda Kirie  
  Oviposition cues as a tool for developing a new malaria control strategy

* Gao, Jiajia  
  Electrolyte-Based Dynamics: Fundamental Studies for Stable Liquid Dye-Sensitized Solar Cells

* Heydarihamedani, Golrokh  
  Toward Anti-icing and De-icing Surfaces: Effects of Surface Topography and Temperature

* Hjalmarsson, Nicklas  
  Ionic Liquids: The solid-liquid interface and surface forces

* Li, Fusheng  
  Design of Water Splitting Devices via Molecular Engineering

* Mazinanian, Neda  
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* Li, Hai  
  Energy Quality Management for Building Clusters and Districts Using a Multi-Objective Optimization Approach
Sadrizadeh, Sasan  
Design of Hospital Operating Room Ventilation using Computational Fluid Dynamics

Spross, Johan  
Toward a reliability framework for the observational method

Wang, Qian  
Low-Temperature Heating in Existing Swedish Residential Buildings – Toward Sustainable Retrofitting

Wersäll, Carl  
Frequency Optimization of Vibratory Rollers and Plates for Compaction of Granular Soil

Geodesy and Geoinformatics

Abrehdary, Majid  
Recovering Moho parameters using gravimetric and seismic data

Haas, Jan  
Remote Sensing of Urbanization and Environmental Impacts

Xiang, Deliang  
Urban Area Information Extraction from Polaremetric SAR Data

Infrastructure

Irumba, Richard  
Modeling of Construction Safety Performance and Housing Markets in Kampala City, Uganda

Strömgren, Per  
Modelling of Traffic Performance for Swedish Roads and Motorways

Wabineno, Lilian Mono  
A Real Property Register to Support the Property and Credit Market in Uganda

Planning and Decision Analysis

Aguilar Borges, Luciane  
Stories of Past and Futures in Planning

Boholm, Max  
Risk, language and discourse

Hasselström, Linus  
The monetary value of marine environmental change

Little, Helene  
Planning Practices of Greening – Challenges for Public Urban Green Space

Millutenko, Sofia  
Consideration of life cycle energy use and greenhouse gas emissions for improved road infrastructure planning

Wallhagen, Marita  
Environmental Assessment Tools for Neighbourhoods and Buildings in relation to Environment, Architecture, and Architects

Real Estate and Construction Management

Bonde, Magnus  
Green Buildings – Exploring performance and thresholds

Borg, Lena  
Procurement Contracts, Innovation and Productivity in the Construction Sector: Five Studies

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Property management and maintenance in the multifamily housing sector in Sweden

Transport Science

Endrayana, Dimas Bayu  
The complexity and variability of individuals’ activity-travel patterns in Indonesia

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Prediction-driven approaches to discrete choice models with application to forecasting car type demand

Hailesilassie, Biruk Wobeshet  
Morphology Characterization of Foam Bitumen and Modeling for Low Temperature Asphalt Concrete

Kordnejad, Behzad  
Evaluation and Modelling of Short-haul Intermodal Transport Systems

Liu, Chengxi  
Understanding the Impacts of Weather and Climate Change on Travel Behaviour

Whitehead, Jake Elliott  
Energy Efficient Vehicle Policy: Lessons Learnt

COMPUTER AND INFORMATION SCIENCE

Azizpour, Hossein  
Visual Representations and Models: From Latent SVM to Deep Learning

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Structure-Dynamics relationship in basal ganglia – Implications for brain function

Gholami, Ali  
Security and Privacy of Sensitive Data in Cloud Computing

Hang, Kaiyu  
Dexterous Grasping – Representation and Optimization

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Correlations of Higher Order in Networks of Spiking Neurons

Lindahl, Mikael  
Computational Dissection of the Basal Ganglia – functions and dynamics in health and disease

Mahmudi, Muhammad Owais  
Probabilistic Reconciliation Analysis for Genes and Pseudogenes

Palmas, Gregorio  
Visual Analysis of Multidimensional Data for Biomechanics and HCI

Sahlin, Kristoffer  
Algorithms and statistical models for scaffolding contig assemblies and detecting structural variants using read pair data

Stork, Johannes Andreas  
Representation and Learning for Robotic Grasping, Caging, and Planning

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Probabilistic Models for Species Tree Inference and Orthology Analysis

Wang, Yuquan  
Reactive Control and Coordination of Redundant Robotic Systems

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Robotic manipulation under uncertainty and limited dexterity

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Structured Representation Using Latent Variable Models

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Engineering through Designerly Conversations with the Digital Material

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Interaction as existential practice – An explorative study of Mark C. Taylor’s philosophical project and its potential consequences for Human-Computer Interaction

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Chen, Tingsu  
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The Active University – Studies of Contemporary Swedish Higher Education

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Application-Oriented Input Design and Optimization Methods Involving ADMM

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