ITM at a glance
2017/2018
The ITM School will launch four large department-overarching research initiatives."
Each year, about 10% of all new MSc engineers in Sweden graduate from the ITM School. These graduates constitute our most direct and powerful impact on society. No other Swedish educational establishment has such a large opportunity for impact through industrial engineering. With this comes a large responsibility to ensure that our graduates possess the right knowledge, skills and capabilities for a sustainable future. This is why we in our development plan for the period 2018 to 2023 state that our main mission is to lead the transition towards a zero-emission, adaptable industry for a sustainable society. This is characterized by new product and service designs, new materials, new business models, sustainable energy systems, recycling, reuse and remanufacture.

How to do this? How to lead by example? Well, we believe (and we have said it before) that the major challenges ahead can only be approached and solved through cross-border collaborations and by fostering innovation and entrepreneurship. For the coming four-year period the ITM School will launch four large department-overarching research initiatives defined to support the transition towards a zero-emission, adaptable industry for a sustainable society. This means focused efforts on industrial transformation through digitalisation, renewable energy and circular economy. It also means stronger integration between materials design, components design and additive manufacturing. The efforts also cover research on sustainable energy systems, with both technical and business perspectives. Last but not least we increase our research on innovation eco-systems, innovation management and entrepreneurship. Teamwork across departmental borders is the keyword for these efforts to be successful!

The societal impact through ITM large number of graduates leaves us with a huge responsibility to provide excellent engineering programs supported by up-to-date pedagogics. From January 2018, the Department of Learning belongs to the ITM School. This gives us a strong base in research and development on the pedagogical side which corresponds well with our commitment to educational quality and content.

Jan Wikander
Head of School
In figures

4 000 people visited Södertälje Science week 2018.

5G

Sweden’s first 5G (smart) grid was launched at the Integrated Transport Research Lab at KTH in December 2018.

45 000 Number of calls to Maths Coach Online since the start ten years ago. On average, each call lasted 45 minutes.

50 000 KTH’s MOOCs have more than 50,000 enrolments since the start 2016, and the participants come from about 150 different countries or regions.

436 Master of Science degrees in Engineering of whom 41% are women.

35 million in funding from Vinnova will contribute to the competence center Hero-m 2i improving industrial materials and developing the future’s materials.
In short

**SSES wins award**

The Stockholm School of Entrepreneurship (SSES) – a collaboration between leading universities in Stockholm – was awarded a prize for “Outstanding Contributions to Venture Creation” at the 2018 Global Consortium of Entrepreneurship Centers Conference in Chicago on October 30. “This is yet another example of SSES’s leadership in entrepreneurship and innovation on the world stage”, says Terrence Brown, Associate Professor in Entrepreneurship and Innovation and SSES Centre Director at KTH.

**KTH joins the HYBRIT Initiative for fossil free steel**

During 2018, KTH’s Materials Science and Engineering department joined forces with LKAB, SSAB and Vattenfall in their efforts to reduce the environmental impact of steel production. The initiative is called HYBRIT and is the first of its kind. If the project succeeds, it will contribute to Sweden’s national climate goal – to be fossil-free by 2045.

**Four students in Live-in Lab’s test beds**

KTH Live-In Lab is a platform of multiple testbeds with the purpose of speeding up the pace of innovation for ‘green’ tech in housing and construction. The lab was completed during the summer of 2018 and four students have now spent half a year in the test apartments, being part of R&D in fields like indoor air quality and building automation systems. “The concept of having real apartments has been a great success. The students are very engaged and have helped steer the tests in the right direction”, says Jonas Anund Vogel, Director of KTH Live-In Lab.
Raising awareness about workplace culture

Only about 25 per cent of the students and 20 per cent of the faculty members at ITM are women. To address this gender imbalance, and raise awareness of the issues facing women and minorities in academia, a number of initiatives are now under way.

Professor Sofia Ritzén is head of the department of Machine Design and responsible for gender equality, diversity and equal treatment at ITM.

What causes gender imbalance in engineering, do you think?
“Engineering has traditionally been a typical male activity and women remain largely under-represented. It’s our goal to try to turn that around and reach a better balance between male and female students and employees at ITM. In addition, it’s as important to create an equal environment, which is only partly achieved by adjusting the numbers of men versus women. For that to happen, we also need to address a number of other issues. I believe that one key to this is to raise awareness. We need to bring issues of both numbers and culture up for discussion. All too often we stop at an ambition to increase numbers without even knowing what discrimination in our environment looks like. I definitely think that we need to speed things up and this is something that the whole ITM Management is clearly behind.”

Can you tell us about some of your concrete activities?
“To start with, we will educate all our managers in gender equality, diversity and equal treatment. It’s a managerial responsibility to develop our organisation and to make sure that everyone has the same opportunities, which is why we choose to make an extensive training effort in this area. The training encompasses four full days and includes a closer look at workplace culture. Based on this, participants will formulate their own action plans. We will also support formation of gender equality, diversity and equal treatment groups at every department. It is an important part of nurturing the forces of change that already exist in the organisation. We will also review how we inform new employees about our multicultural environment, and how we communicate our values to make sure that everyone sees it as a natural part of working at ITM.”

Read more about KTH’s work on gender equality on www.kth.se
To start with, we will educate all our managers in gender equality.”
How will tomorrow’s children become eager storytellers and conquer the written word? Together with Berättarministeriet (The Ministry of Storytelling), KTH’s Stefan Stenbom studies how digital technology can encourage children to tell stories.
Getting children in socioeconomically under-privileged areas to express themselves by mastering the written word is the mission of Berättarministeriet. The foundation arranges writing workshops for school classes between ages 8-10 in Stockholm and Gothenburg. In a project together with researchers at KTH, Berättarministeriet now wants to identify creative – digital – methods that encourage storytelling.

“Digitalisation has been the biggest revolution in the field of education during my lifetime. Not only it facilitates learning, it will also develop the role of a teacher,” says Stenbom, one of the involved researchers from Digital Learning at KTH.

Berättarministeriet is particularly keen to support children who do not have parents that can back them up in school. In areas with high unemployment rates digital knowledge gap is the most evident. Stefan Stenbom believes that everyone has different learning abilities hence digital technology can be very helpful in storytelling.

According to new directives from the government, the school system has a responsibility for developing children’s digital skills. The first step in the collaboration between KTH and Berättarministeriet involves interviewing teachers at primary school level about their views on digitalising the school system.

“We’ve asked how teachers are using digital tools today and their notion of what ‘digital competence’ is. It’s clear that many people are doing exciting things, but they are also concerned about how to implement digitalisation, and what this means.”

The interview-based study will result in a list of clear needs. Afterwards Berättarministeriet will be able to help out in improving Swedish tuition for both teachers and students. According to Stenbom, it is yet impossible to predict the results, technically it can be anything at all.

“Digitalisation has been the biggest revolution in the field of education during my lifetime.”

“That’s something we’ll have to develop together with Berättarministeriet. We are responsible for the research’s perspective while they are good at finding suitable activities for children,” says Stefan Stenbom, concluding:

“When I retire in 2047. I’d like ‘digital learning’ to be like electricity – we don’t think about it, it’s just there. It’s ‘learning’, full stop.”

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KTH and Berättarministeriet

**Project:** “Technology supported storytelling for engaged student learning”.

**Participants:** KTH (The Department of Learning in Engineering Sciences) and Berättarministeriet

**Funder:** Marcus and Amalia Wallenberg Foundation.

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Virtual room for Math studies

As a spin-off of the success of Maths Coach Online, Digital Learning at KTH has developed a platform, TalkMath, a software program for students and teachers that makes it easy to study along with others without having to meet IRL.

“It’s like a digital version of students’ study group in a library. The platform is open to everyone and could in principle work for any subject, but now we’ve built it for Mathematics because we’re at KTH,” says Stefan Stenbom from Digital Learning.

In a virtual study room you can for example, chat with each other (anonymously if you wish), share a whiteboard, or program together using an embedded programming simulator.

Have a try at: [www.talkmath.org](http://www.talkmath.org)
On 5 December 2018, the MOBiLus consortium was named the winning Innovation Community on Urban Mobility by the European Institute of Innovation and Technology (EIT). EIT Innovation Communities are public-private partnerships whose objective is to find solutions to major societal challenges in areas with high innovation potential – in this case urban mobility.

The aim of EIT Urban Mobility is to strengthen European competitiveness, improve access to mobility and increase attractiveness of cities. KTH researcher Martin Vendel has been appointed Interim Educational Director at EIT Urban Mobility:

“If we look at the numbers for global population growth and urbanization, we need to build a million-citizen city every week, every year, until 2050. That means a demand for solutions which address transportation of people, goods and waste in growing cities all around the globe. European cities are often thought of as role models for future urban spaces. One explanation of their attractiveness is probably that most of our cities in Europe were built before the introduction of cars.”

The EU will contribute with a funding of around €400 million for seven years, making the project one of the world’s largest for urban mobility. “In addition to the funding, the initiative means that KTH and ITM become a part of a large and strong network, which further improves educational relevance and quality, and makes us even more attractive to international talent”, says Martin Vendel.

“We need to build a million-citizen city every week, every year, until 2050.”
Partners in EIT Urban Mobility

Cities:
Amsterdam, Barcelona, Copenhagen, Eindhoven, Hamburg, Helmond, Helsinki, Istanbul, Milan, Munich, Prague, Stockholm, Tel Aviv.

Universities and Research centres:
Aalto University, Amsterdam Institute for Advanced Metropolitan Solutions, Budapest University of Technology and Economics, CARNET, CTAG, Czech Technical University, ENEA, École Polytechnique Fédérale de Lausanne, Eindhoven University of Technology, Fraunhofer Society, Institute of Information Theory and Automation, KTH Royal Institute of Technology, NFF, Polytechnic University of Catalonia, Technical University of Denmark, Technical University of Munich, Technion - Israel Institute of Technology, University College London.

Industry:
Sustainability is critical to all of us, but it’s still a word that can have no substance. Those of us who educate and conduct research in the field of sustainable production must make the concept tangible so that we can contribute to the necessary transformation,” says Monica Bellgran, one of KTH Södertälje’s three new professors in Production.

“Those who will graduate from our campus will have sustainability in their DNA, regardless of whether they develop products, processes or new production technology. With climate as our biggest global challenge, engineers are a part of the solution.”

Just over a year has passed since KTH’s new campus in Södertälje was officially inaugurated. Research under the three professorships has taken off, and doctoral students and senior researchers are starting to take their places. The common theme in Södertälje is “sustainable production”. As the term suggests, the idea is to use education and research to make manufacturing industry more sustainable.

“What attracts me to Södertälje is the opportunity to build something completely new and to work in close collaboration with Scania, Astra-Zeneca and other companies in the region on production research. For me,
it’s motivating to see industrial needs becoming industrial benefits,” says Monica Bellgran.

There is plenty of production in Södertälje and sustainability is something no company can afford to overlook. Everyone wants to produce their products more efficiently, more energy- and resource-effectively and with a higher quality – a good foundation for KTH’s ambitions.

The idea of a campus in Södertälje is also about securing the supply of skilled labour for the two world-leading companies AstraZeneca and Scania – both masters in production and with a substantial focus on sustainability in their business models. The companies have more than 20,000 employees in Södertälje.

“Together they account for 5-10 per cent of Sweden’s exports. It goes without saying that it will be important for the entire Swedish economy that these companies can recruit competent employees if they are to continue to be competitive.”

Lean Centre (Leancentrum) in Södertälje also operates under KTH’s umbrella. It is a competence centre that collaborates with and educates small and large companies as well as municipalities and county councils in their ‘Lean’ concept and in other production-related courses. The Lean Centre’s activities attract all industries – Sandvik, Rosendals Trädgård, Stora Enso, Distriktsveterinärerna and Saltå Kvarn are just a few examples of their clients since the start.

“The courses are very much appreciated and a good showcase for KTH. We can package our knowledge and get it out quickly via the Lean Centre. It is yet another way of working closely with our local and regional communities.”

With a new international master’s programme in sustainable production development and the launch of combined education of graduate engineers/teachers in the autumn, additional pieces of the puzzle are falling into place in the expansion of KTH’s Södertälje initiative. “There is a very positive pioneering spirit in Södertälje that I like. Everyone involved wants it to succeed and understands the importance of strengthening both the area itself and contributing to the long-term supply of competence for the industrial sector. It is crucial both for the region and Sweden.”

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Sustainable habits

Name: Monica Bellgran

Work: Professor in Industrial Production Management at KTH Campus Södertälje

How I try to be sustainable: Conducting research and teaching with a focus on sustainable production. I am a part of the government’s delegation for Circular Economy. As an individual, I try to make decisions that are as climate-smart as possible in my everyday life. Sometimes it’s difficult, but you have to think that every step in the right direction counts.

Campus Södertälje

KTH Södertälje is a partner of Södertälje Science Park, an international collaboration environment for research, innovation and education.

Professors in Södertälje:

Monica Bellgran
Production Management

Magnus Wiktorsson
Production Logistics

Andreas Archenti
Industrial Dependability
**Finances**

### Income sources

- **Basic education funding**: 305,676
- **Vinnova**: 54,431
- **Faculty funding**: 198,382
- **The Swedish Energy Agency**: 33,673
- **Grants from external funders**: 197,186
- **Other income**: 48,845
- **Revenues from charges and other fees**: 23,098
- **Financial income**: 97

All amounts reported in thousand SEK*

### External grants

- **Swedish Research Council**: 8,068
- **Vinnova**: 54,431
- **Wallenberg**: 12,668
- **EU Framework Programme**: 32,665
- **The Swedish Energy Agency**: 33,673

All amounts reported in thousand SEK*
Paving way to digitize lubrication

Lubrication is an age-old, but growing issue, as we strive towards ever more reliable, efficient and sustainable solutions. Tribotronics brings active control to lubricated contacts by manipulating both mechanical components and the physical and chemical behavior of fluids and materials. In other words: tribotronic technology transforms lubrication from passive to active and strengthens its connection to the Internet of things. KTH is at the forefront of this development.

Read the entire article here:
kth.se/itm

infomaster@itm.kth.se