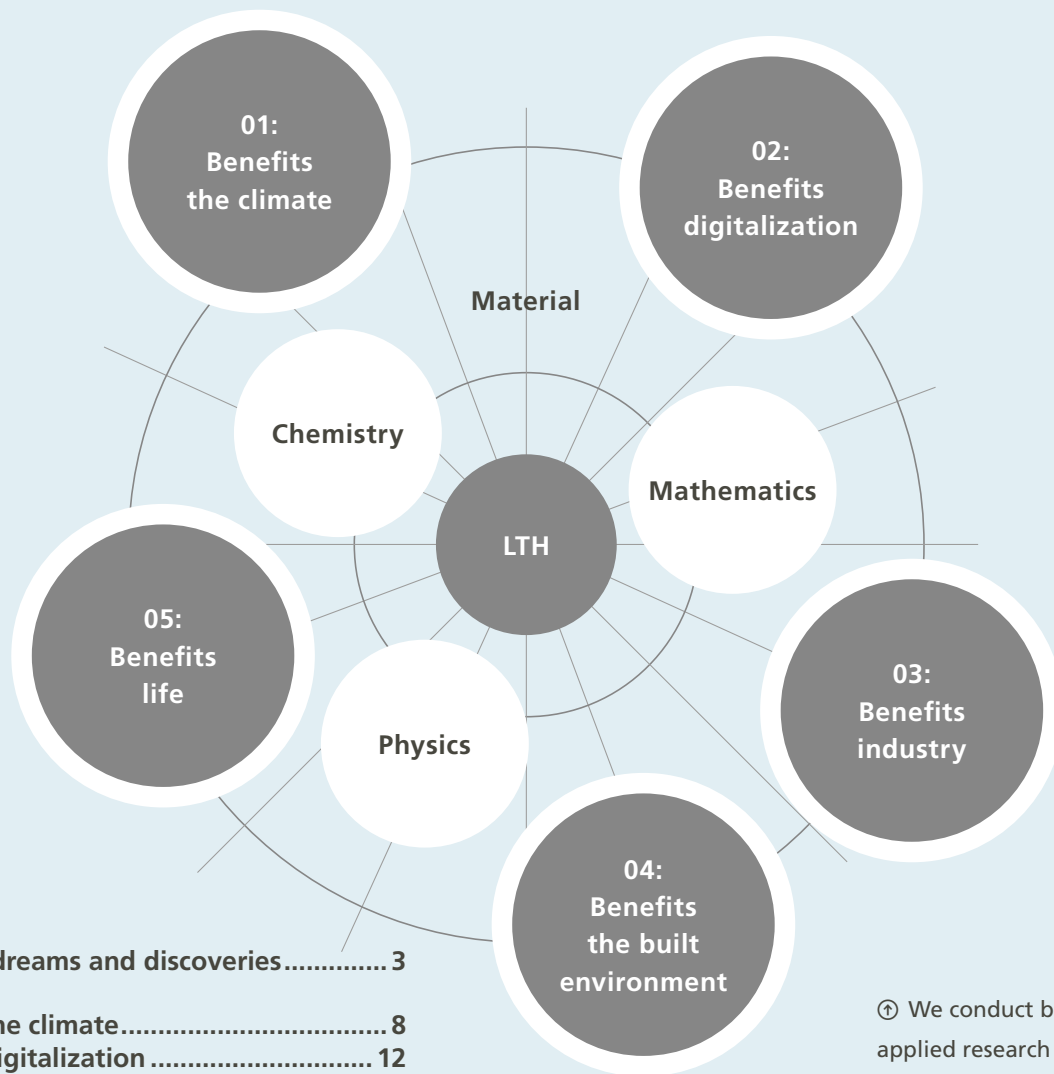




Dreams & Discoveries

LTH / FACULTY OF ENGINEERING / LUND UNIVERSITY





Content:

A place for dreams and discoveries..... 3

To benefit the climate..... 8

To benefit digitalization 12

To benefit Industry..... 16

To benefit the built environment20

To benefit life 24

Materials and opportunities28

LTH in brief32

Study at LTH36

Innovations from LTH39

LTH Campus Lund.....44

Contacts 46

⊕ We conduct basic and applied research in five core areas. Our research is based on strong and solid knowledge in chemistry, mathematics, and physics. Within all three disciplines, we drive the development of new materials.

Together
we explore
and create –
to benefit
the world.

⌚ THE LTH VISION

A PLACE FOR DREAMS AND DISCOVERIES

LTH is a place for dreams and discoveries – where there is scope for brilliant research and inspiration for the creative development of technology, architecture and design. Over 1 000 researchers at LTH work hard to create good living conditions for people and promote more careful use of the Earth's resources.

Every year we publish about 100 theses and 1 700 research findings that pave the way for scientific discoveries and new innovations that bring improvements for society.

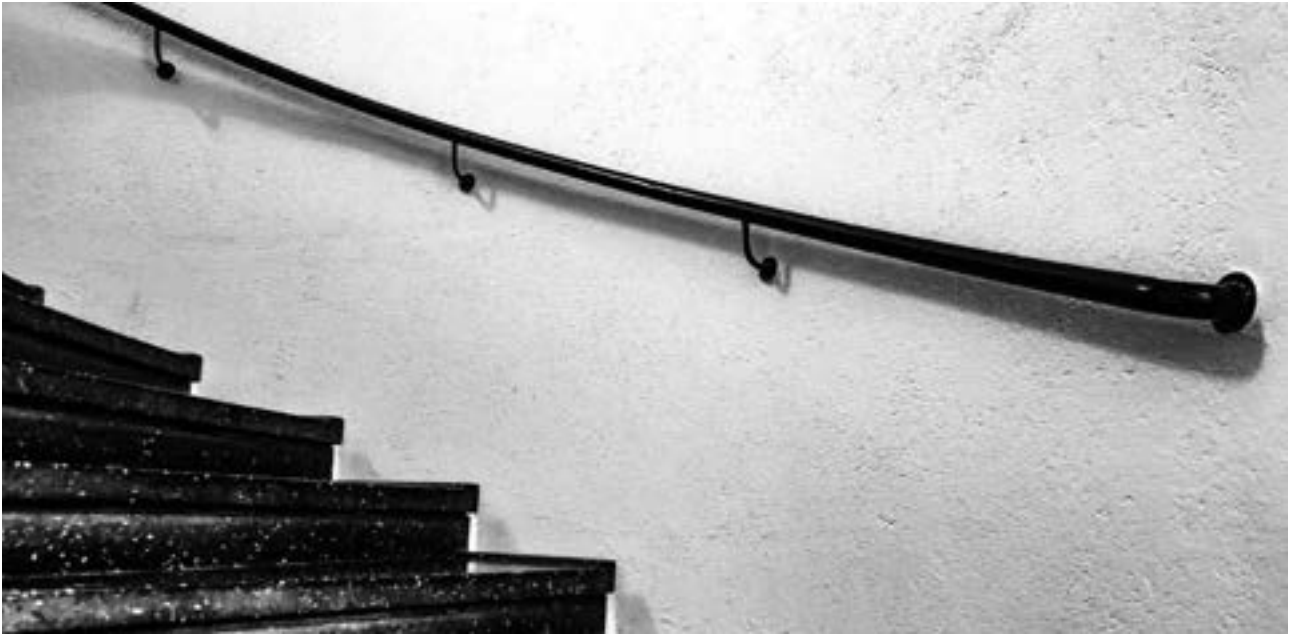


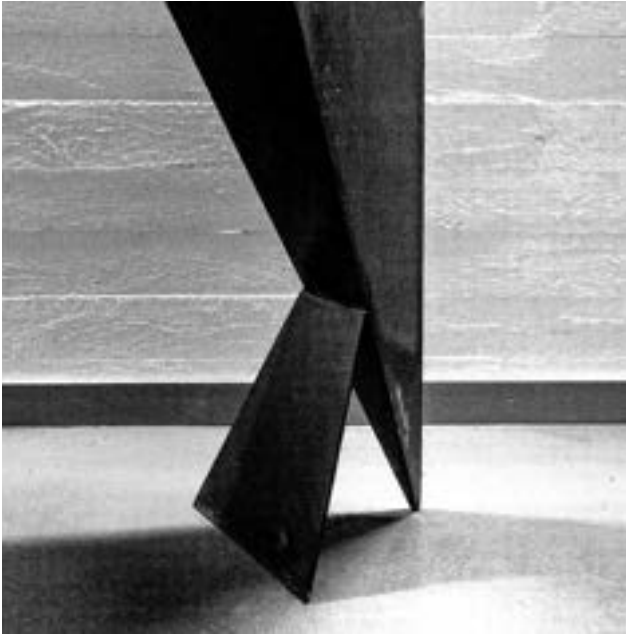


A world record in 5G technology, solar cell-driven water purification, early cancer diagnosis, nanotechnology for more efficient solar panels and a health-promoting oat drink are just some of the innovations developed at LTH.

LTH is a part of Lund University. This association gives us the opportunity to operate on a broad front and across boundaries as we work together to explore and innovate for the benefit of the world.







TO BENEFIT

THE CLIMATE



Climate change that arises as a result of human activity must be stopped, and time is running out. Decision-makers, manufacturers and consumers – everyone is affected when society switches to a circular and bio-based economy.



01:



Climate-related research at LTH often concerns smarter and more careful use of the Earth's resources. Some of our researchers are transforming waste material from forestry and agriculture into hydrogen gas, biogas and bioethanol. Others are perfecting microorganisms that can be used as food, animal feed or cosmetics. A number of researchers are looking for new ways to produce plastics – including a plastic that can consume carbon dioxide during its own manufacturing process.

Transportation of people and goods has a major impact on the climate. Many LTH researchers are working on the development of cleaner engines, while others are investigating possibilities to develop an infrastructure for electric roads or identifying innovative ways to achieve zero emissions in critical industries.

Our housing also affects the climate. Research at LTH examines how cities and roads can be optimally planned, and this calls for smart

energy solutions for new design or renovation of residential areas. LTH conducts research at the nano level to develop super-efficient solar cells and energy-efficient electronics. Our researchers are looking for ways to reduce energy consumption by using information and communication technology.

Another challenge is to ensure accessibility to clean air and water. Several water experts at LTH are developing drinking water purification techniques that provide environmental savings. We have a number of researchers who are experts on the air around us. They examine the effect of particles on the climate and the complex interactions between air quality and climate issues.

LTH researchers also look at overall contexts. We know how manufacturing processes can be made more resource and energy efficient – and we balance climate gains against each other in system and lifecycle analyses. ■





TO BENEFIT

DIGITALIZATION

Digitalization is rapidly changing the world. When things, cities and people are connected, it creates tremendous possibilities – but also new risks.



02:



In a connected world, computations must be understood and redone from scratch – new types of complex system need to be programmed. At LTH there are researchers who are ensuring that the Internet of Things sensors being placed in our houses, cities and bodies become faster and more secure.

Many researchers are taking new approaches to mathematical problems and creating algorithms for facial recognition, computer vision and ground-breaking graphics. Some researchers are maximising the benefits of big data and tailoring computations that increase knowledge about our immune system or visualise 3D maps in real time.

There are researchers who are building multi-tasking antennas, developing tomorrow's 5G technology or shrinking the size of the smallest components in electronics. Others are participating in the creation of super-efficient com-

puters that carry out parallel computations – in quantum computers or using muscle protein in biological computers.

Artificial intelligence, machine learning and autonomous systems are hot fields of research, not least at LTH. We have researchers who are developing sighted and self-correcting industrial robots, while others are designing organic changeable software. Our IT researchers are developing solutions that enrich the lives of the elderly and the disabled. On the LTH campus are labs used to test and develop both virtual reality and augmented reality.

Digitalization is changing our society fundamentally – which is why LTH collaborates with researchers throughout the University on how working life, economic models and legislation need to be updated so that we can benefit from the great possibilities of digitalization to create a better society. ■



**TO BENEFIT
INDUSTRY**



Industry is in an adjustment phase as globalisation, digitalization and climate change sweep across the world. As an exporting nation, Sweden can benefit from increasingly exacting requirements for sustainable manufacturing.



03:



Research in close cooperation with industry is essential for an institute of technology. At LTH, this includes projects on smart electricity networks, emission-free engines, electric roads that can power also heavy vehicles and making connected industry fast and secure. Energy savings and consideration for the environment is the aim of many research projects – from developing concrete with greater durability and less environmental impact to examining how industries can achieve zero emissions.

LTH conducts broad and advanced research in robotics. Mathematicians are developing robots that can see, analyse and act accordingly. Control technicians are equipping industrial robots with the ability to correct imperfect movements. Computer scientists are making robots easier to control with the help of speech and touch.

Several researchers are giving industry a boost by looking for durable materials for the tools

that are the basis for modern industrial manufacturing, while others are developing 3D printing for smarter production.

Some LTH researchers are examining processes that reduce costs and provide better utilisation of resources. One research strand is highlighting the complexity and potential of bio-based power and heat production. Our researchers are also trying to optimise pharmaceutical production, so that patients worldwide receive the right medicine at a reasonable price.

At LTH, logistics researchers are identifying changing consumption patterns and design-changing proposals for new supply chains. Several of them are focusing on how heavy goods transportation can be regulated to reduce environmental impact. Our researchers know how packaging can be designed to become more eco-efficient, cost-effective and user-friendly. ■



TO BENEFIT THE

BUILT ENVIRONMENT

The urbanisation taking place around the world entails social and environmental challenges. In many places, there is a need for more housing and an end to segregation. Cities are to withstand a more capricious climate and provide good conditions for everyone.



04:



LTH conducts research in all areas associated with the concept of the built environment – design, architecture, surveying, infrastructure, energy-smart technology and transport. This breadth promotes an exchange of perspectives and the quality of research.

Researchers are looking for solutions for the housing and workplaces of tomorrow – they are experts on everything from zero-energy buildings to climate-smart concrete. They provide assessments on materials and structures that stand the test of time and show how construction processes can be improved. Particular areas of expertise concern how we can build in an energy-efficient, damp proof and fireproof way – and how lighting and architecture affects people.

Among LTH's researchers are those investigating how rising sea levels, increased wind exposure and torrential rain impact on the built environment. They can show which measures are needed in order to prevent cities from being

flooded and coastal areas being engulfed by the sea, but also how to plan and build so infrastructure and buildings withstand a changed climate.

At LTH we have civil engineers who focus on the design of roads, public transport systems and cycling infrastructure – as well as safe traffic environments for the elderly and the disabled. There are architects researching the flexible spaces of the future, and surveyors with in-depth knowledge on the conflicts of interests associated with the use of land. A number of researchers are adopting new approaches in trying to create sustainable and attractive environments in cities that are becoming increasingly densified, while others are examining how digital processes and new production methods are changing architecture and the architect's role.

There are also computer scientists at LTH who are ensuring that connected units in the smart city work properly and can be secured against hacking. ■



TO BENEFIT

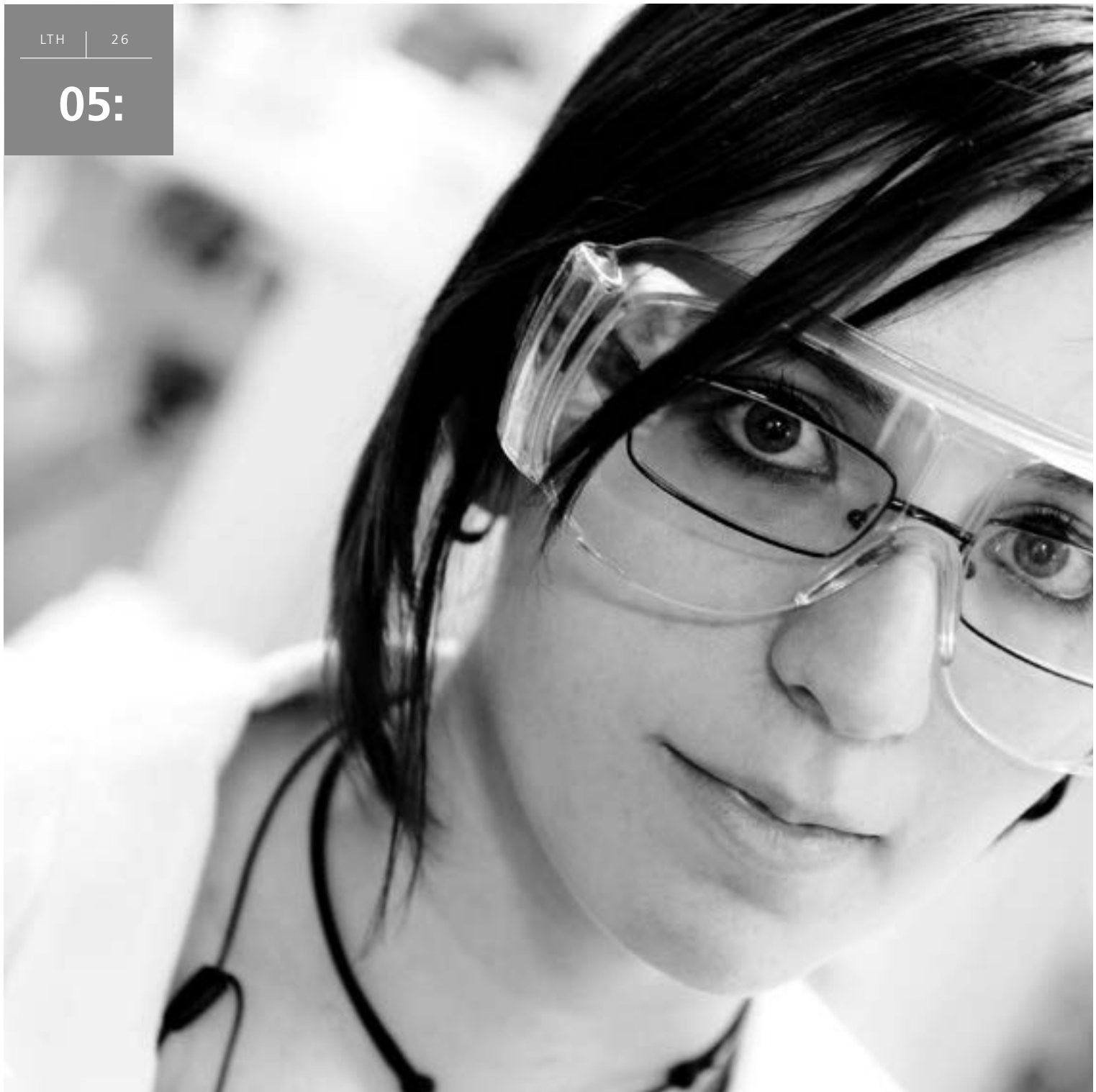
LIFE



We are facing a global challenge as the population grows, lives longer and changes lifestyle. The art of engineering provides hope that more people around the world will get enough to eat and have access to the right medicines.



05:



A wide range of medical technology research is carried out at LTH. Proximity to one of Sweden's largest medical faculties and the Skåne University Hospital contributes to research successes that benefit people.

Many of our researchers are developing new methods that can identify diseases far earlier than is possible today. There are researchers who customise biomarkers that can alert us to cancer and other diseases. Some are developing new concepts for identifying cancer cells or bacteria in blood, while others are tracking angina and atrial fibrillation using new ultrasound methods.

Mathematicians are making it easier for doctors to detect tumours on X-ray plates due to better algorithms. LTH's biotechnology researchers are developing super-sensitive sensors with the

ability to spot difficult-to-detect viruses. Prebiotics and probiotics under development will be beneficial for the stomach and immune system. Nanotechnicians can repair damaged nerves – other researchers are looking in detail at how strain affects the skeleton and tissue.

LTH also possesses considerable knowledge about how different particles in the air affect our health. Our research covers everything from ventilation that reduces the spread of infection to the connection between preeclampsia and exposure to air pollutants in a country such as Ethiopia.

Food researchers at LTH are showing that the right food can act like medicine. They design techniques and processes for new foods, and develop creative ways to make food from unexpected raw materials and leftovers. ■



Two world-class research facilities – ESS and Max IV – are under construction a stone's throw from LTH, which, of course, is participating in the journey and contributing to make the initiatives beneficial for research, industry – and society as a whole.



MATERIALS AND

OPPORTUNITIES

The range of materials research at LTH is unique. Here, researchers improve materials, such as wood, concrete, ceramics and plastic, and develop completely new ones, which can be superhard, biocompatible, energy-efficient, electroactive or adapted for extreme environments. Colleagues examine the innermost components of pharmaceuticals and living materials.

All this research gets a helping hand from our new neighbours.

There is already an extensive range of outstanding and unique research infrastructure at LTH and the University as a whole. Several of these facilities are open to visitors and other researchers, who can prepare or complement their investigations at ESS and Max IV.

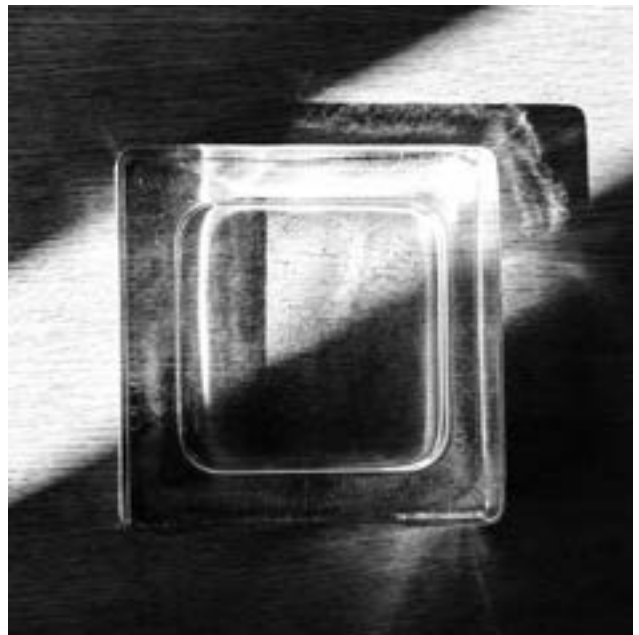
ESS and Max IV need suppliers of leading-edge technology. Some of LTH's experts are involved in the design of this technology. Others assist the manufacturing industry on the practical aspects of making components for accelerators.

In addition, the University tailors graduate schools, PhD courses and Master's programmes to train a young generation in the art of studying the smallest building blocks of matter – regardless of whether they are revealed with the help of neutrons or synchrotron light.

A site for research, development and innovation – Science Village Scandinavia – is being built between ESS and Max IV. It will become the workplace for a number of LTH's researchers. ■







LTH IN BRIEF

VISION: TOGETHER WE EXPLORE AND CREATE – TO BENEFIT THE WORLD.

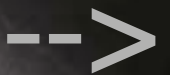
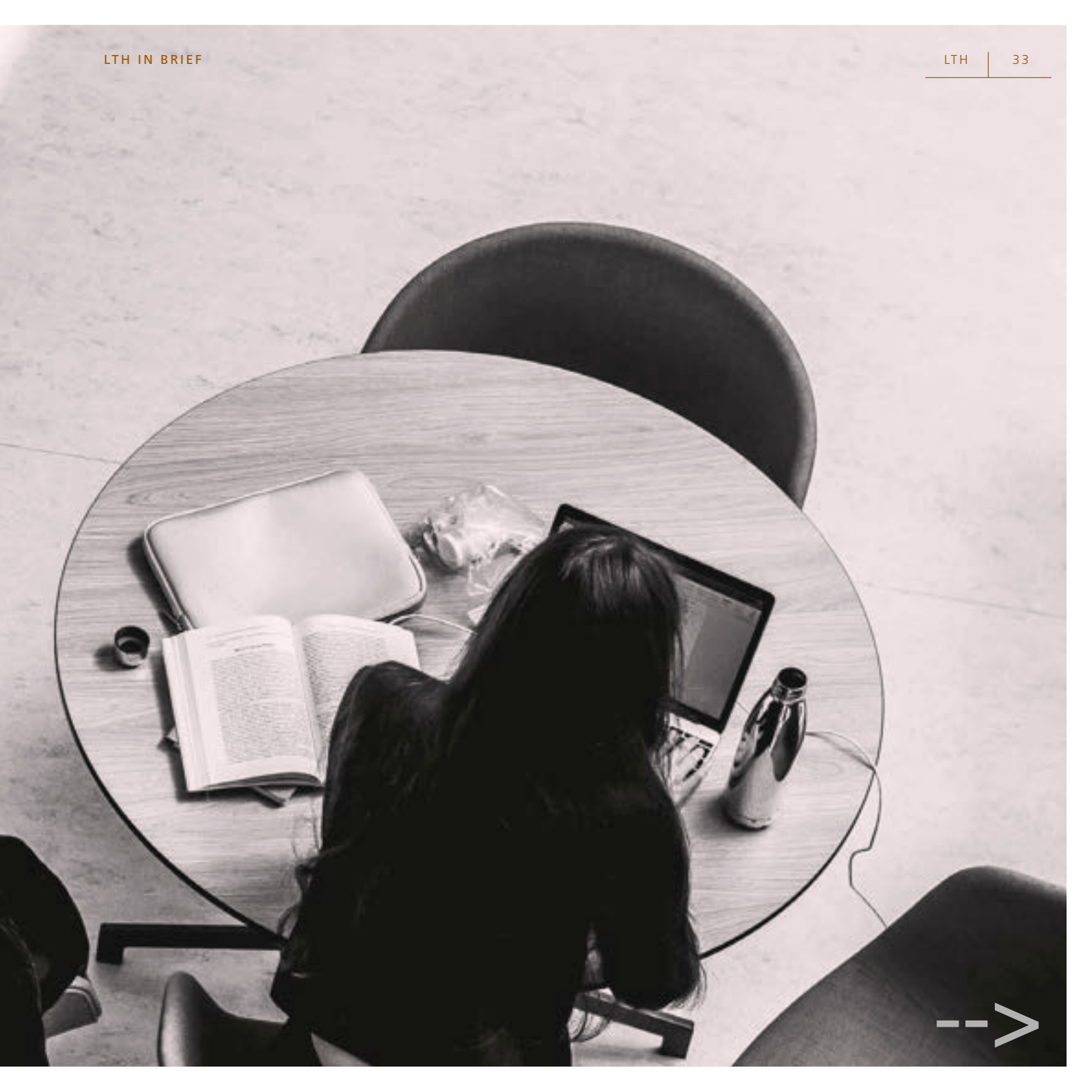
FOUNDED IN 1961

- A part of Lund University since 1969
- 19 departments
- 10 000 students
- 700 doctoral students per year
- 1 700 employees per year

STUDY PROGRAMMES

- Architecture programme
- Bachelor programmes – Industrial Design, Food Technology, Commercial Pilot Training
- BSc in Engineering – 5 programmes
- Engineering foundation year
- Fire Protection Engineering programme
- Freestanding courses

- International master's – 20 programmes (two within Erasmus +)
- MSc in Engineering – 16 programmes
- 30% of LTH's students, study part of their education abroad
- 10% international students
- 150 partner universities all over the world
- 1 300 issued degrees per year





RESEARCH

LTH's research accounts for 15–20% of the total technology research at Swedish universities and higher education institutions

- 75 subject areas
- 100 doctoral degrees per year
- 1 700 research publications

EMPLOYEES

- A total of 1 700 (38% women, 62% men)
- Lecturers 5% (41% women, 59% men)
- Career-development positions 8% (37% women, 63 % men)
- Senior lecturers 16% (27% women, 73% men)
- Professors 12% (21% women, 79% men)
- Other teaching and research staff 12% (30% women, 70% men)

- Technical and admin. staff 21% (64% women, 36% men)
- Doctoral students 26% (36% women, 64% men)

FINANCES

Turnover:

- Total turnover approx. SEK 2 billion
- First and second-cycle education 34%
- Research/third-cycle education 62%
- Commissioned services 4%
- Approx. 65% of LTH's research is externally financed
- Largest funding bodies for LTH in 2019 (income, SEK million):
- Swedish Research Council 127,8
- EU 92,0
- Swedish Energy Agency 83,5
- The Knut and Alice Wallenberg Foundation 83,8
- Vinnova 62,2

A black and white photograph of three students. On the left, a young man with glasses is looking towards the center. In the middle, a young woman with long blonde hair is smiling and looking at a tablet held by a young woman on the right. The woman on the right has her glasses on her head and is also smiling. They appear to be in a classroom or study area.

STUDY AT

LTH

At LTH, we take good care about our special LTH community with its unique student life and flexible programmes. From us, students take with them a meaningful degree that paves the way for an in-demand career, but also invaluable memories and experiences.

↓ **Programmes open for students with upper secondary qualifications from Sweden (or equivalent):**

- BSc in Computer Engineering
- BSc in Electrical Engineering
- BSc in Civil Engineering – Architecture
- BSc in Civil Engineering – Railway Construction
- BSc in Civil Engineering – Road and Traffic Technology
- BSc in Fire and Protection Engineering
- Bachelor in Aviation as Pilot in Airline Operation
- Bachelor in Food Science
- Engineering foundation year
- Master of Architecture

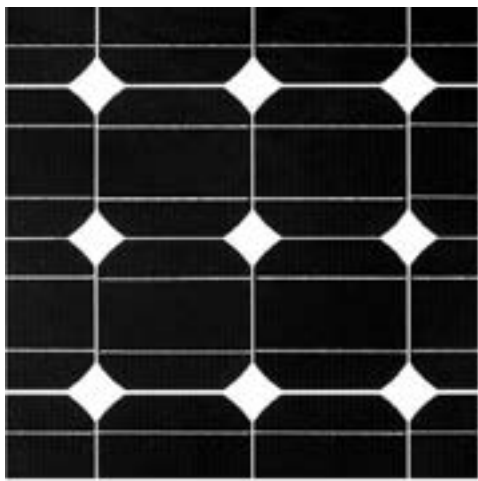
↓ **MSc in Engineering:**

- Biomedical Engineering
- Biotechnology
- Civil Engineering
- Chemical Engineering
- Computer Science and Engineering
- Environmental Engineering
- Electrical Engineering
- Engineering Physics
- Engineering Mathematics
- Engineering Nanoscience
- Industrial Management and Engineering
- Information and Communication Engineering Technologies

- Surveying and Land Management
- Mechanical Engineering
- Mechanical Engineering with Industrial Design
- Risk Management and Safety Engineering

↓ **Master's programmes in English (open for international admissions):**

- Architecture
- Biotechnology
- Disaster Risk Management and Climate Change Adaptation
- Embedded Electronics Engineering
- Energy-efficient and Environmental Building Design
- Sustainable Urban Design
- Fire Safety Engineering (Erasmus +)
- Food Innovation and Product Design (Erasmus +)
- Food Technology and Nutrition
- Industrial Design
- Logistics and Supply Chain Management
- Machine Learning, Systems and Control
- Nanoscience
- Pharmaceutical Technology: Discovery, Development and Production
- Photonics
- Production and Materials Engineering
- Sustainable Urban Design
- Virtual Reality and Augmented Reality
- Water Resources Engineering
- Wireless Communication



INNOVATIONS FROM LTH

Research is to provide benefits – this applies to all the innovations and companies that have emanated from LTH and make the world a little bit better.

Acconeer --> radar sensor

AcouSort --> sorts and manages cells using ultrasound

AlignD Systems --> medical biosensors of semi-conducting nanowires

AlixLabs --> manufactures semiconducting nano-structures for the electronics industry

Alligator Bioscience --> new technology for developing cancer drugs

Ange Optimization --> support for planning and decision-making in logistics

BeammWave --> digital antennas to improve connectivity in society

Bioextrax --> technology for extracting bioplastics etc

Biofuel-Solution --> converts glycerol into renewable fuel and chemicals

Bioinvent --> develops antibody drugs against cancer

Bioprocess Control --> optimises biogas plants

BrainLit --> combines knowledge of LEDs and human-centric lights for indoor lighting

Camurus --> controls release of medicines in the body

CapSense --> traces very small concentrations in liquids

Carbiotix --> prebiotic, individually adapted diet products

Cellevate --> technology for 3D cell cultivation

Cognibotics --> increased precision of robot control

Cognimatics --> image analysis and software for camera surveillance

Cyclicor --> non-toxic polymers for plastics production

Enza biotech --> new surfactant for the cosmetic and pharmaceutical industries

Erghis Tech --> touch-free technology

FaunaPhotonics --> laser and radar monitoring of the biosphere

Galecto --> medicine against pulmonary fibrosis (acquired by Bristol-Myers Squibb)

Gasporox --> quality measurement of food packaging, and medical gas analysis

Gedea Biotech --> antibiotic-free treatment of vaginal infections

Genovis --> enzyme for characterising antibodies

GLO --> energy-efficient light-emitting diodes

Glucanova --> liquid oats ingredients

Goalart --> software for troubleshooting in complex technical systems

GoodIdea --> blood sugar-reducing drinks

Hexagem --> technology for the production of gallium nitride for use in the electronics industry

Hövdning --> an invisible cycle helmet

Immunovia --> early cancer diagnosis

Inkjet printer

iTaCiH --> digital operational support for healthcare

MagComp --> induction heating systems and high-efficiency inductors

Mapillary --> crowdsourced street-level images





↓ GLO

LTH is home to one of the world's leading nano-technology research environments. The company Glo is one of several to be hived off from the NanoLund centre with Google as part-owner. The innovation that gave rise to Glo was nanowires, which enabled the creation of microscopic light-emitting diodes at least ten times more power energy-efficient than filament bulbs. Micro-LEDs are expected to become part of telephones, watches and VR headsets with individually controlled red, green and blue-emitting diodes. The same technology can generate human-centric lighting, which enhances concentration and well-being.

↑ PROVIVA

In the 1980s, patients who had undergone major but successful operations were dying unexpectedly. Strong antibiotics were killing good gut bacteria while tube-feeding made the intestines redundant, causing them to leak bacteria that attacked vital organs. LTH's food technologists investigated the bacteria culture in healthy guts and found the lactic acid bacteria *Lactobacillus plantarum* 299v, which prevents intestinal leakage. Oats fermented with Lp 299v proved to be a success: patients with organ collapse who underwent operations recovered thanks to the drink, which was given the name Proviva.





↓ ACCONEER

Researchers in nanoelectronics have developed the first radar that combines low energy consumption and high precision using a minimal component (0.3 cm²). With less than one milliwatt of power consumption, Acconeer's radar can detect several objects simultaneously and calculate their speed. With millimetre precision, it can measure distance to a margin of error of tens of micrometres and can even recognise different materials. Are you scared that someone is hiding in your wardrobe? Then don't open it! Acconeer's radar is so sensitive that it can detect whether something with a pulse is behind the door.

↑ COGNIBOTICS

Life as a manufacturing robot used to be heartless. Workers who had lost their precision due to wear and tear or faulty construction lost their jobs to newer and more expensive replacements. In the best case scenario, a worn-out robot served as spare parts for a colleague. This was before LTH's research in the field of productive robotics restored the precision of industrial robots. Algorithms produced in RobotLab LTH form the basis of the company Cognibotics. They make industrial robots aware of their deviations, thus enabling them to compensate for mechanical failures that would previously have sent them to the melting pot.



Modelon Dymola and the Modelica language

--> simulations of technical systems

Modcam --> sensor/camera for computer vision

Mometric --> computer vision algorithms for competitive swimmers

Nocturnal Vision --> algorithm for night vision in cameras

NordAmps --> energy-efficient transistors made of nanowires for mobile telecommunications, among other uses

Oatly --> oat drink

Obducat --> nanoimprint technology

Opsis --> measurement system for air quality

OptiFreeze --> fresh vegetables after deep freezing

Orbital Systems --> water-efficient shower

PainDrainer --> AI-based self-management of chronic pain

Polar Rose --> advanced image analysis and facial recognition (acquired by Apple)

Phase Holographic Imaging --> technology for digital holography mainly for medical research

Pneumatic hybrid --> halving fuel consumption for inner city buses

PPC (Partially Premixed Combustion) --> reduced fuel consumption and emissions from combustion engines

Precise Biometrics --> fingerprint recognition

Probi --> research company within functional food

Proviva --> fruit drink with lactic acid bacteria

Qlucore --> pattern recognition of genetic data

Quantafuel --> converts unsorted plastic waste into new plastic

Relay auto-tuner --> product for automatic setting of regulators

Reosurf --> carrot instead of fat in low-calorie sausages

SARomics --> development of future substances for medicines

Senzagen / Genomic Allergen Rapid Detection

--> allergy testing of chemicals that replaces animal testing

SITA – Swedish Interactive Thresholding Algorithm

--> fast and reliable visual field examinations

Solve --> characterises material on a nanoscale

Spectracure --> cancer diagnosis and treatment

Speximo --> natural substances for skincare products

Spiideo --> app for analysing training runs and competitive races

SunCarbon --> biofuel from the forest industry by-product, lignin

Swiftfoot Graphics --> algorithms and software for rapid 3D computer graphics (acquired by Intel)

Switchcore --> circuits for fast computer networks (closed down)

Take Good Care Communications --> new communication channels: care recipient – caregiver

Tendo --> robot-controlled gripping tool for rheumatics etc

Unified Remote --> use a mobile phone as a remote control for a computer

Urban open water --> better swimming water using DNA tracing of pathogenic bacteria

Veg of Lund --> omega 3 drink made from rapeseed and potatoes

Vevios --> wireless security alarm

ViscoSens --> estimating the GI of bread

Xenergetic --> technology for digital memory

Ximantis --> traffic forecasts

Watersprint --> water treatment using UV light

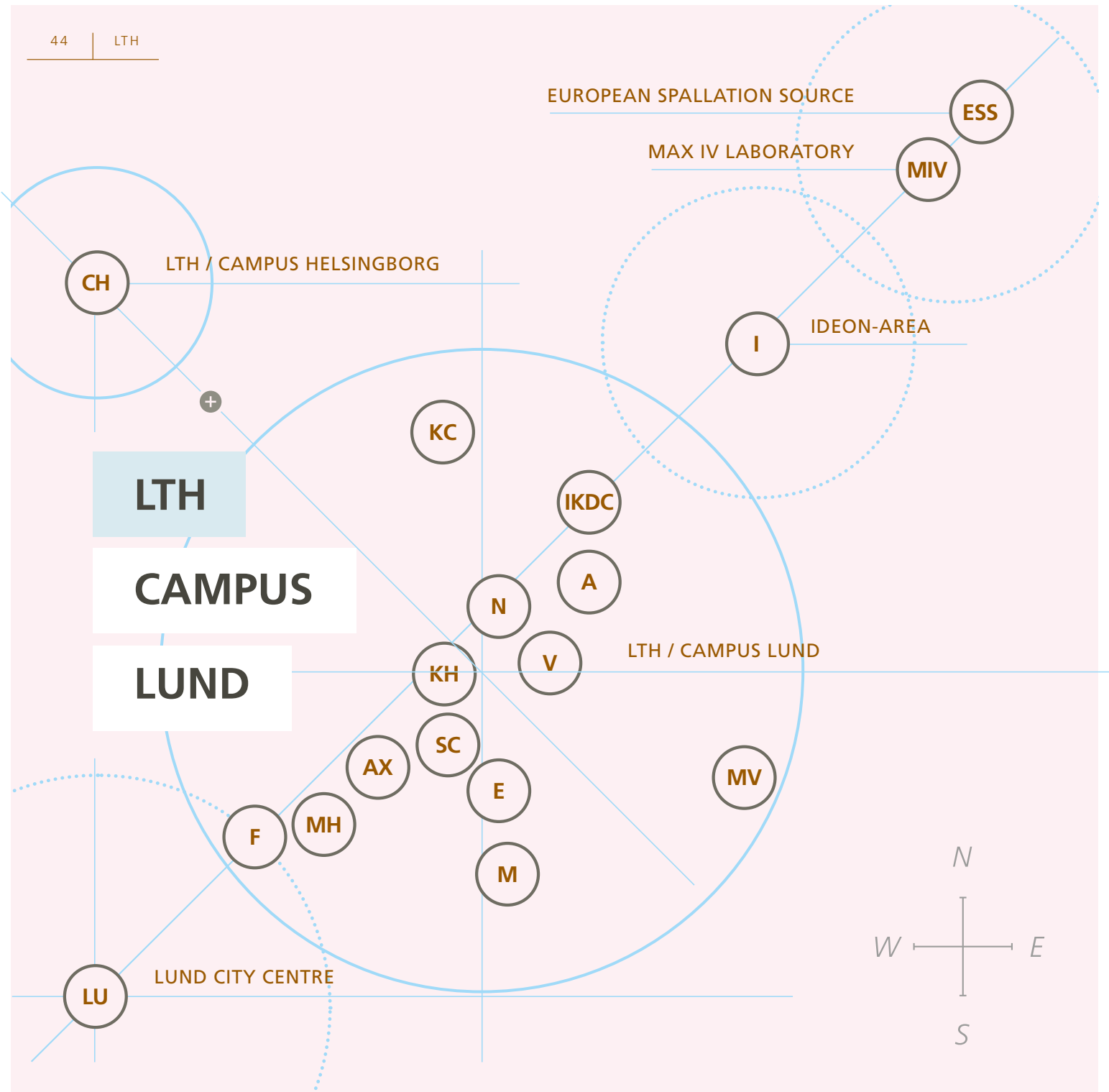
→ Innovations arise in many places. In addition to the list above – which does not claim to be exhaustive – it can be noted that several companies founded by alumni have developed in cooperation with LTH, such as Axis. And many companies work closely with researchers: Ericsson's collaboration with LTH in the development of Bluetooth technology is a well-known example.

→ Several innovations have been developed with researchers from other disciplines and faculties.

→ Researchers and students can receive support from Lund University's innovation hub:

www.innovation.lu.se





LTH / CAMPUS LUND

- A --> A-Building** Architecture and Built Environment, A-Building Library
- AX --> The Annex (Annexet)** Lecture Halls / Exam Halls
- E --> E-Building** Real Estate Science / Computer Science / Biomedical Engineering / Electrical Measurement Technology / Electrical and Information Technology / Education Services / E-Building Library / E-Building Printing Services
- F --> Fysicum** LTH's divisions > Atomic Physics / Solid State Physics / Combustion Physics / Nuclear Physics / Mathematical Physics / Physics and Astronomy Library
- IKDC --> Ingvar Kamprad Design Centre** Design Sciences / Café & Restaurant
- KC --> Chemistry Centre** Chemical Engineering / Food Technology / Department of Chemistry / Chemistry Centre Library / Café
- KH --> Student Union Building** LTH Administration / Student Union at the Faculty of Engineering (Teknologkåren) / Restaurant
- M --> M-Building** Automatic Control, Energy Sciences, Industrial Management and Logistics, Industrial Electrical Engineering and Automation, Mechanical Engineering, Solid Mechanics
- MH --> Mathematics Building** Mathematical Sciences / Mathematics Library
- MV --> Medicon Village** Immunotechnology
- SC --> Study Centre** Library / Café/Restaurant / Information Desk / Study Places
- V --> V-Building** Building and Environmental Technology / Construction Science / Measurement Technology and Industrial Electronics / Technology and Society / Vattenhallen Science Centre / V-Building Library
- N --> Navet** Tech. support and janitorial services

LTH / CAMPUS HELSINGBORG

- CH --> Campus Helsingborg** LTH's programmes in: Building Technology / Computer Science / Electrical Engineering / Energy-efficient and Environmental Building Design

Contacts

LTH / FACULTY OF ENGINEERING / LUND UNIVERSITY

At LTH we educate people, create knowledge for the future and work hard to develop society. We create scope for brilliant research and inspiration for the creative development of technology, architecture and design. Close to 10 000 students study here. Every year our researchers publish around 100 theses and 1 700 research papers. Together we explore and create – to benefit the world.

Dean: Annika Olsson

→ annika.olsson@lth.lu.se

Deputy Dean: Heiner Linke

→ heiner.linke@lth.lu.se

LTH's Reception

→ phone: +46 46 222 72 00

→ e-mail: info@lth.se

→ visiting address: Studiecetrum (Student Centre), John Ericssons väg 4, 223 63 Lund

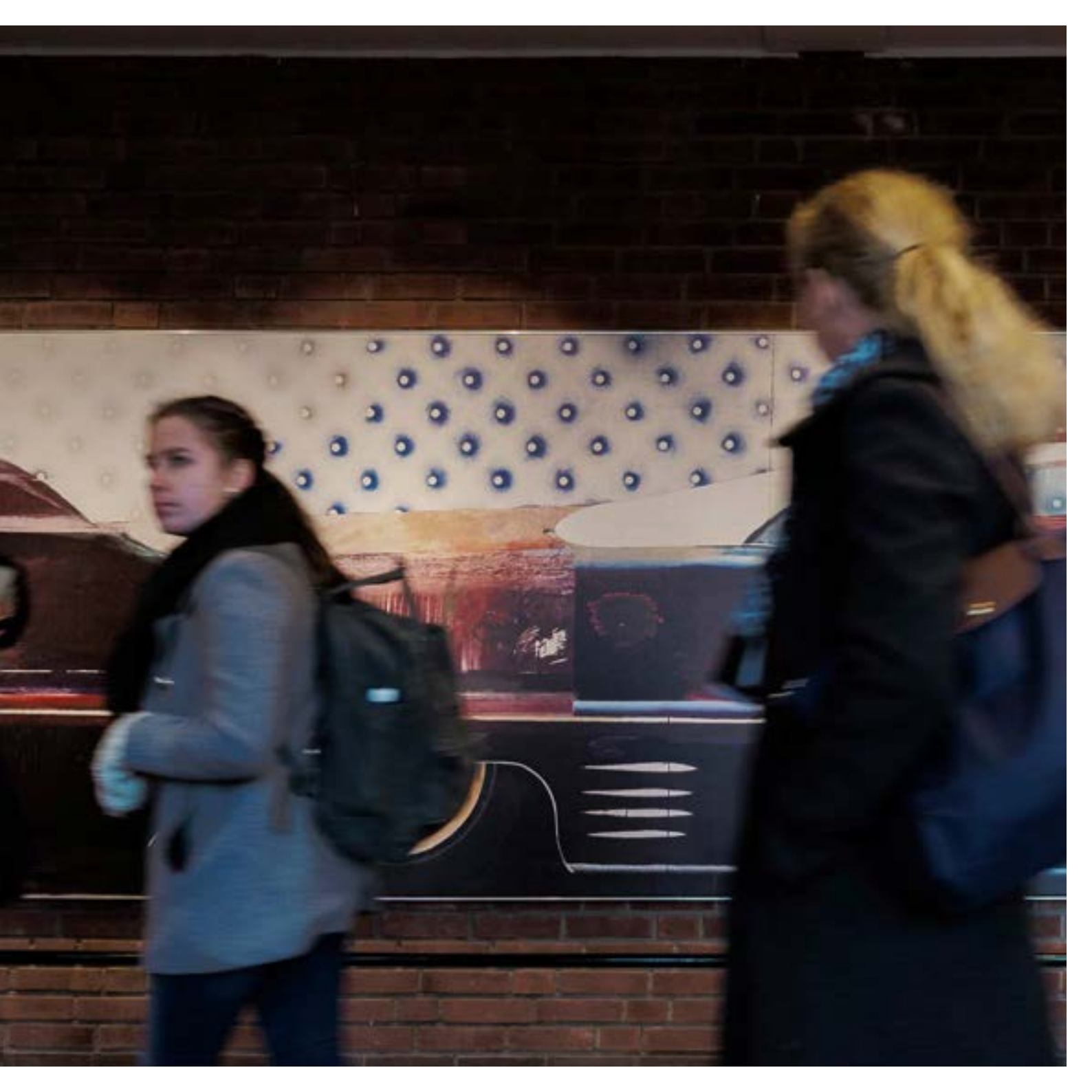
→ www.lth.se/english

Lund University

→ phone: +46 46 222 00 00 (switchboard)

→ www.lunduniversity.lu.se

Graphic production and design: Bergström & Co. Lund (bco.se) · Project leader: Johanne Elde and Kristina Lindgärde.
Images: Magnus Bergström: 1:1, 4:6, 6, 7, 27:2, 30, 31 · Namiroz: 1:2 · Relaxfoto: 1:3 · Kamisoka: 1:4 · Håkan Rödger: 2, 11:1, 34:1, 47 · Oleh Slobodeniuk: 10 · Charlotte Carlberg Bårg 4:4, 15:2, 18, 19:1, 23:1 · S Yamagata: 16, 4:5 · Chalabala: 8, 4:7 · Dima Pridannikov: 12, 4:3 · Kennet Ruona: 1:4, 4:2, 4:8, 11:1, 11:2, 14, 15:1, 18, 19:2, 22, 23:2, 26, 27:1, 32, 34:2 · Johan Persson: 15:2, 36 · Johan Båvman: 19:2 · Gorodenkoff: 23:1 · Renee Jones: 20, 4:3 · Jesse Xu: 24, 4:9 · Salar Haghghatafshar: 29 · Anders Frick: 34:2 · Pojoslaw: 40:1 · GrapeImages: 40:2 · Cognibotics: 41:1 · Lightspruch: 41:2. Printed by Danagård Litho, 2021. Printed on environmentally friendly paper using environmentally friendly methods.





LUND
UNIVERSITY

LTH

**FACULTY OF
ENGINEERING**

LTH
Faculty of Engineering
Lund University
Box 118
221 00 Lund / Sweden
Tel. +46 46 222 00 00
www.lth.se/english