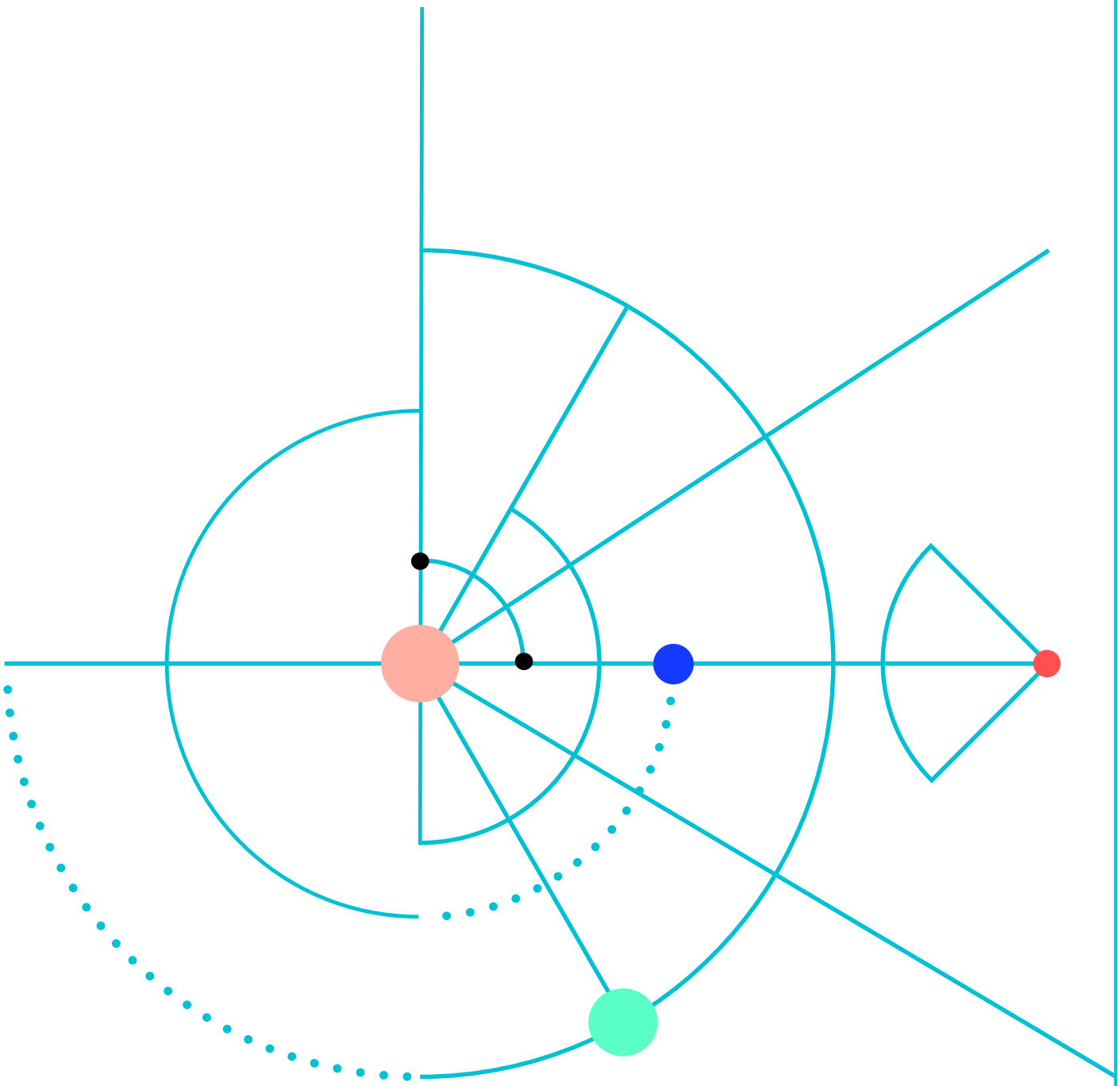
HAMBURG
UNIVERSITY OF
TECHNOLOGY

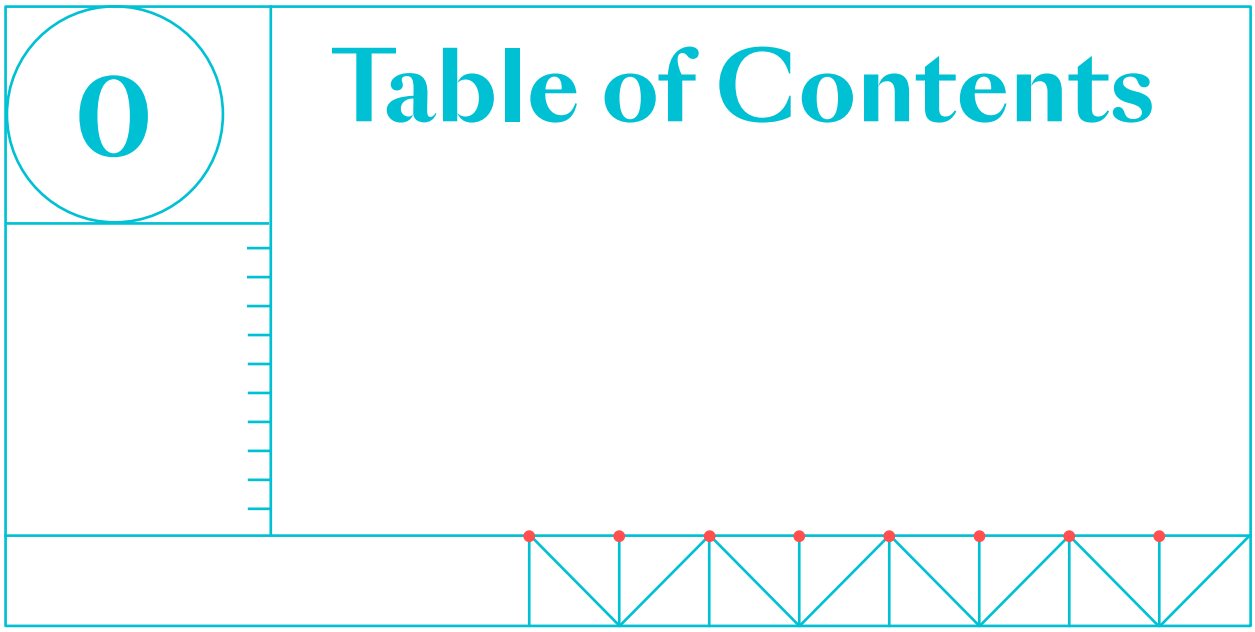


ANNUAL REPORT
2019

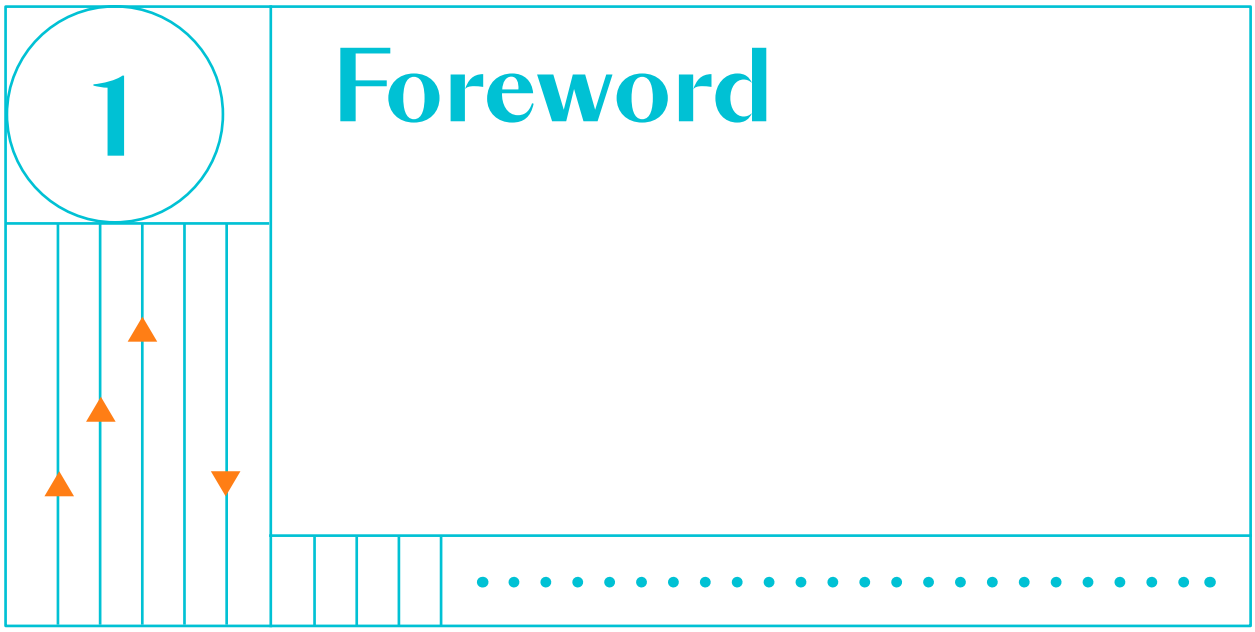
ANNUAL REPORT BY THE EXECUTIVE BOARD

2019

HAMBURG
UNIVERSITY OF
TECHNOLOGY



0 Table of Contents



1 Foreword

Dear TU Hamburg members, dear friends,
dear companions of our university,

Work at our University of Technology in 2019 continued to be anything but static. Full of dynamism we set out to fill with life the growth course on which we have embarked, be it by means of building works, new appointments or a large-scale advertising campaign to attract new students.

The most visible sign of this ongoing dynamism in 2019 was surely the move into the Hamburg Innovation Port One building in Harburg's Inner Harbor. Characteristic of the growing TU Hamburg's future site is a mixture of science, startups and port enterprises of long standing—a vibrant place where the TU Hamburg is spearheading very fast district development. There have been changes on the "old" TU Hamburg campus too: the new *Zentrum für Studium und Promotion* (Center for advanced studies and doctoral education; Building B) was topped out, and we will in future have more space there for our core business of training students and young scientists and promoting research.

By acquiring two new endowed professorships, by renewing or newly creating cooperation agreements and in intensive cooperation talks with our partners the German Aerospace Center (DLR), the Helmholtz Center Geesthacht (HZG), the University Medical Center Hamburg-Eppendorf (UKE), the Fraunhofer Society (FhG) and the German Electron Synchrotron (DESY) the TU Hamburg is networking in the Hamburg research landscape. Joint professorships, joint projects and exchanges of doctoral students and researchers characterize trusting partnerships. These successes are reflected in the large number of approved projects funded by third parties such as, at state level, the HamburgX projects or the joint acquisition with the University of Hamburg of a German Research Foundation (DFG) Research Training Group. Another success was the acquisition of eleven tenure-track professorships as part of the federal and state government program to promote young scientists.

The foundation of the ECIU University in the fall of 2019 was a further milestone. The fundamental European idea of collaborating across borders on the same objectives is being implemented by the establishment of a first university by the European Consortium of Innovative Universities (ECIU). In a pilot project the ECIU universities, including the TU Hamburg, are pioneering a new form of education at the European level. The three-year project is based on new modules (micro-courses) and teaching content from which qualifications can be gained in relation to individual needs and interests rather than by strict reliance on defined degree structures. This project is the groundwork for many years of cooperation on a European scale.

Interesting more qualified students in an engineering study program at the TU Hamburg was one of our constant, ongoing tasks last year. Last summer a large-scale marketing campaign very swiftly achieved a high level of visibility in the social networks and on the university's website, bringing a breath of fresh air to the TU Hamburg's presence. It is being maintained and extended this year.

That is not the only way in which the TU Hamburg will continue to profile itself in the emerging science location. It will further extend its important, unique role as a mediator between basic research and the area of societal application. Our university will continue to be sustained not only by friends, sponsors and companions all over the country but above all by its highly committed staff and our ambitious present students. We thank them all most cordially for the work they have done and for the support they have given us as we endeavor to maintain the pace of our development.

We must now go further, plan steps, assess, implement, and grow. We will shape and make use of the opportunities that come our way.

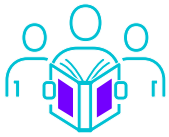
Prof. Dr. Hendrik Brinksma
President

2 The TU Hamburg at a Glance

MISSION STATEMENT

TU Hamburg is a competitive entrepreneurial university focussing on high-level performance and high quality standards. TU Hamburg is dedicated to the principles of Humboldt (unity of research and education). TU Hamburg has a strong international orientation and also focusses on its local environment. It does so by contributing to the development of the technological and scientific competence of society, by aiming at excellency at the national and international level in its strategic research fields and by educating young engineers and academics within demanding programmes using advanced teaching methods.

2.1
KEY FIGURES 2019

	**STUDENTS** 7,698	**FRESHMEN** Bachelor (B. Sc.): 1,124 Master (M. Sc.): 591
	**DEGREES** 1,276	**DOCTORATES** 95
	**PROFESSORS** 94	**ACADEMIC EMPLOYEES** 638.6 (FTEs, incl. third party funded employees)
	**PERCENTAGE OF WOMEN STUDENTS** 26.9 % (FTEs, incl. third party funded employees)	**PERCENTAGE OF WOMEN ACADEMIC STAFF** 23.8 % (FTEs, incl. third party funded employees)
	**INTERNATIONAL[1] PERCENTAGE STUDENTS** 25.4 % (FTEs, incl. third party funded employees)	**INTERNATIONAL[1] PERCENTAGE ACADEMIC STAF** 11.8 % (FTEs, incl. third party funded employees)
	**TOTAL EXPENDITURE** 142,838 (in EUR '000)	**THIRD-PARTY FUNDING** 45,368 (in EUR '000) including Tutech Innovation GmbH)
	**BUILDINGS** 32	**MAIN USABLE AREA** 68.661 sqm of which Campus 54,964 sqm of which Inner Harbor 10,175 sqm

[1] *Persons of non-German nationality*

2.2
ORGANIZATIONAL STRUCTURE OF TU HAMBURG

2.2.1
STRUCTURE OF SELF-ADMINISTRATION

ACADEMIC SELF-ADMINISTRATION		
ADVISORY BOARD		
1 chair + 4 members		
SENATE		
11 members		
Senate committees		
EXECUTIVE BOARD		
President	2 Vice-Presidents	Chancellor
SCHOOLS OF STUDY, RESEARCH CENTERS		
Heads	Spokespersons	

STUDENT SELF-ADMINISTRATION	
STUDENT PARLIAMENT	
25 members	
STUDENTS' UNION (ASTA)	
Executive Committee	Subject Specialists
8 FACULTY COUNCILS	

2.2.2
INSTITUTIONAL STRUCTURE

6 SCHOOLS OF STUDY / 1 STUDY AREA 80 Institutes / Work Groups
6 CENTRAL FACILITIES
1 DFG COLLABORATIVE RESEARCH CENTER
2 DFG RESEARCH GROUPS (PARTICIPATION)
3 DFG PRIORITY PROGRAMS (HEAD)
3 DFG GRADUATE COLLEGES

2.3 OVERVIEW OF TEACHING PROGRAMS

SCHOOL OF CIVIL ENGINEERING (B)

Bachelor (B.Sc.)

- Civil and Environmental Engineering

Master (M.Sc.)

- Civil Engineering
- Environmental Engineering
- Joint Master in Environmental Studies
- Water and Environmental Engineering

SCHOOL OF ELECTRICAL ENGINEERING, COMPUTER SCIENCE AND MATHEMATICS (E)

Bachelor (B.Sc.)

- Computer Science
- Electrical Engineering
- Computer Science and Engineering
- Technomathematics

Master (M.Sc.)

- Computer Science
- Electrical Engineering
- Computer Science and Engineering
- Information and Communication Systems
- Microelectronics and Microsystems

SCHOOL OF VOCATIONAL SUBJECT EDUCATION (G)

Teacher Training (Cross-University)

- Vocational Education/Technology
- Building and Wood Technology
- Electrical Engineering/Computer Science
- Media Technology
- Metal Technology

SCHOOL OF MANAGEMENT SCIENCES AND TECHNOLOGY (W)

Bachelor (B.Sc.)

- Logistics and Mobility

Master (M.Sc.)

- Global Innovation Management
- Joint Master Global Technology and Innovation Management & Entrepreneurship (G-TIME)
- International Industrial Engineering
- Logistics, Infrastructure and Mobility

SCHOOL OF MECHANICAL ENGINEERING (M)

Bachelor (B.Sc.)

- Mechanical Engineering
- Naval Architecture

Master (M.Sc.)

- Energy Systems
- Aircraft Systems Engineering
- Joint Master in Ship and Offshore Technology
- Materials Science: Multiscale Materials
- Mechatronics
- Mechanical Engineering and Management
- Medical Engineering
- Product Development, Materials and Production
- Naval Architecture and Ocean Engineering
- Theoretical Mechanical Engineering

SCHOOL OF PROCESS AND CHEMICAL ENGINEERING (V)

Bachelor (B.Sc.)

- Bioprocess Engineering
- Process Engineering

Master (M.Sc.)

- Bioprocess Engineering
- Chemical and Bioprocess Engineering
- Renewable Energy
- Process Engineering

INTERDISCIPLINARY ENGINEERING SCIENCES AND TECHNOLOGIES (FIT)

Bachelor (B.Sc.)

- Allgemeine Ingenieurwissenschaften
- Energy and Environmental Engineering
- General Engineering Science
- Mechatronics

Master (M.Sc.)

- Energy and Environmental Engineering

NORTHERN INSTITUTE OF TECHNOLOGY MANAGEMENT (NIT)

Master (MBA/M.A.)

- Technology Management

OVERARCHING

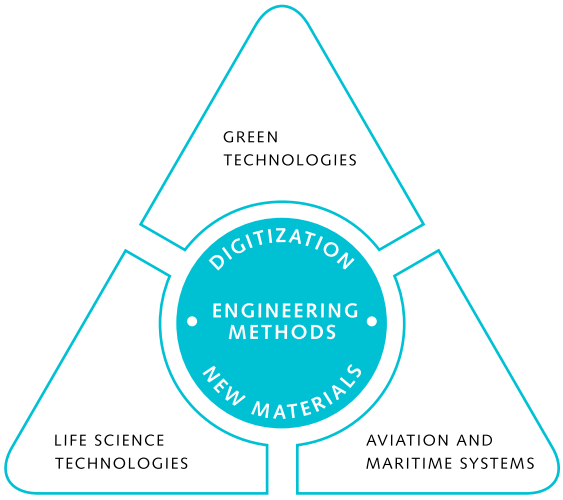
- Orientation Studies

EUROPEAN CONSORTIUM OF INNOVATIVE UNIVERSITIES (ECIU)

- ECIU-University

2.4
OVERVIEW OF RESEARCH

TU HAMBURG AREAS OF EXPERTISE AND INTERDISCIPLINARY FIELDS



GREEN TECHNOLOGIES

- Renewable Energy Research Area
- Systems – Storage – Networks Research Area
- Water and Environmental Engineering Research Area

LIFE SCIENCE TECHNOLOGIES

- Medical Technology Research Area
- Biomaterials Research Area
- Bio- and Chemical Process Engineering Research Area

AVIATION AND MARITIME SYSTEMS

- Aeronautics Research Area
- Logistics and Mobility Research Area
- Maritime Systems and Structures Research Area

DFG COLLABORATIVE RESEARCH CENTER

- Tailor-made Multi-Scale Materials Systems – M^3 (SFB 986)

DFG RESEARCH GROUPS (WITH PARTICIPATING TU HAMBURG SCIENTISTS)

- Nanoporous gold - A prototype for a rational design of catalysts (FOR 2213)
- Memristive Devices for Neural Systems (FOR 2093)

DFG PRIORITY PROGRAMS

- 1679: Dynamic Simulation of Interconnected Solids Processes - DynSim-FP
- 1740: Reactive Bubbly Flows
- 2240: Bioelectrochemical and Engineering Fundamentals to Establish Electro-Biotechnology for Biosynthesis – Power to Value-Added Products (eBiotech)

DFG GRADUATE COLLEGES

- Processes in Natural and Technical Particle-Fluid Systems (PintPFS) GRK 2462
- Tailor-Made Multi-Scale Materials Systems – Collaborative Research Center SFB 986
- Modeling, Simulation and Optimization of Fluid Dynamic Applications (joint application with the University of Hamburg) GRK 2583

TU HAMBURG RESEARCH CENTERS

- Integrated Biotechnology and Process Engineering
- Climate-Protecting Energy and Environmental Technology
- Regeneration, Implants and Medical Technology
- Maritime Systems
- Aeronautics
- Product-oriented Materials Development
- Logistics and Mobility for Sustainable Value Creation
- Digital Production, Logistics and MRO

TU HAMBURG I³-LABS[1]

- Business Analytics – Optimization Potential and Strategic Risks for Maritime Logistics Systems
- HELIOS Hamburg Electronics Lab for Integrated Optoelectronical Systems
- Model-based Machine Learning for Soft Tissue Modeling in Medicine
- Smart Reactors
- Structural Integrity by Vibroacoustic Modulation to Extend the Lifetime of Civil Infrastructure
- Cyber Physical Energy Systems – Sustainability, Resilience and Economics
- Novel Products from Maritime Resources

STATE RESEARCH FUNDING

- CIMMS – Center for Integrated Multiscale Materials Systems – funding line HamburgX
- *Innovative luftgestützte urbane Mobilität (i-LUM) – Förderlinie HamburgX*
- Center for Data and Computing in Natural Science (CDCS) – funding line HamburgX
- *Simulationsbasierte Entwurfsoptimierung dynamischer Systeme unter Unsicherheiten*

PROMOTION OF YOUNG ACADEMICS

- TU Hamburg Graduate Academy for Technology and Innovation
- Graduate School of the Center for High-Performance Materials (ZHM) – Helmholtz Center Geesthacht (HZG)
- Data Science in Hamburg (DASHH) Graduate School – Helmholtz Graduate School for the Structure of Matter

TECHNOLOGY TRANSFER

- Tutech Innovation GmbH
- Startup Dock
- Hamburg Innovation

[1] *The acronym I3 stands for Interdisciplinarity, Engineering Sciences (Ingenieurswissenschaften) and Innovation. These are structures in which research activities characterized mainly by interdisciplinary and innovative ap-proaches in TUHH research areas are bundled. The I3 elements that are funded are chosen by means of a competitive process. Interdisciplinary research labs consist of at least four professors and are funded for a four-year term*

EXZELLENZKOLLEG

CURRENT JUNIOR PROFESSORSHIPS	PARTNER
smartPORT	Hamburg Port Authority
Structure optimization in lightweight construction (SOL)	Airbus
Molecular dynamic simulation of soft material	Helmholtz-Zentrum Geesthacht
Multiscale simulation of solid systems	Glatt Ingenieurtechnik GmbH
Development and modeling of novel nanoporous materials	BASF

RESEARCH PARTICIPATION AND COOPERATION

- Deutsches Elektronen-Synchrotron (DESY)
- German Aerospace Center (DLR)
- Energy Research Network (Helmut Schmidt University, University of Hamburg, Hamburg University of Applied Sciences, HafenCity University Hamburg)
- Hamburg Electronics Lab for Integrated Optoelectronical Systems (ForLab HELIOS) – jointly with the University of Hamburg
- Research Center for Medical Technology Hamburg (fmthh) – University Medical Center Hamburg-Eppendorf (UKE)
- Fraunhofer Center for Maritime Logistics and Services (CML)
- Fraunhofer Research Institution for Additive Manufacturing Technologies (IAPT)
- Helmholtz-Center Geesthacht (HZG)
- Max Planck Institute for Meteorology
- *Stadtreinigung Hamburg (City cleaning Hamburg) (SRH)*
- Technology Center Hamburg-Finkenwerder (THF)
- University Medical Center Hamburg-Eppendorf (UKE)
- Center of Applied Aeronautical Research (ZAL)
- Centre for High Performance Materials (ZHM) – Helmholtz-Center Geesthacht (HZG)

3 TU Hamburg: A Growing, Dynamic University

3.1 IMPLEMENTATION CONCEPT

It is nearly two years since Hamburg Parliament approved the TU Hamburg's growth concept, which has since been implemented step by step at the University.

The growth concept contains many different elements that complement and influence each other positively. The creation of more than 15 new professorships with their respective work groups increases the TU Hamburg's research and teaching capacities in equal measure, thereby enabling the University to offer more student places, to launch new degree courses or reshape existing study programs and to open up new research areas and cooperation arrangements.

Both the newly created professorships and chairs vacated due to retirement are awarded to appointees with regard to the TU Hamburg's strategic objectives. They provide a unique opportunity to further extend the areas of expertise and interdisciplinary technologies that were confirmed in the strategy process. Taking existing strengths into account, digitization and development of computer science and energy systems research as a part of Green Technologies and Life Science Technologies were especially identified in the implementation concept as future technologies to be strengthened. The TU Hamburg also intends to an even greater extent than hitherto to face up to its responsibility to society, and suitable professorships are envisioned with that in mind.

3.1.1
NEW PROFESSORSHIPS

New appointments were made and appointment procedures initiated in the reporting year:

- Two new appointees started work in the reporting year:
  - Prof. Matthias Mnich at the Institute of Algorithms and Complexity
  - Prof. Daniel Ruprecht in the chair of Computational Mathematics
- By the year's end a further six appointments had been made in the following areas:
  - Data Science Foundations
  - High-Frequency Technology
  - Geo-Hydroinformatics
  - Smart Machine Elements
  - Process Systems Engineering
  - Imaging Process Engineering
- For eight professorships the appointments committees have reached various stages of selection.
- A further seven appointments were advertised in December 2019. They are five professorships for the Energy Systems Center in which keen interest, including international interest, has been shown and two advertised in cooperation with the German Aerospace Center (DLR) for Digital Aeronautical Engineering and Digitization of Efficient Repair and Maintenance Processes.

Since the TU Hamburg has uniformly advertised its professorial vacancies in English there has been a significant increase in international applications, resulting in a qualitative and quantitative improvement in choice. The University has also professionalized its applications management.

3.1.2
STRENGTHENING OF INFRASTRUCTURE AND ADMINISTRATION

Nearly 30 new professorships around 20 I[3] program projects in 2018 and 2019 alone, each involving recruitment and procurement, are leading to a qualitative improvement in teaching and more students. They also involve more coordination, project management and administrative work. That is why the growth process provides for 10 percent of available funding to be allocated to these areas. So far, in 2018 and 2019, eight posts have been newly created and filled. Plans for 2020 include staff appointments for the schools of study. Together with the

PROF. DR.
DANIEL RUPRECHT

Institute of Mathematics (E-10)
Chair Computational Mathematics
Am Schwarzenberg-Campus 3 (E)
21073 Hamburg
Phone: +49 40 428 78 32 79
E-Mail: daniel.ruprecht@tuhh.de
www.mat.tuhh.de/home/druprecht

School of Electrical Engineering, Computer Science and Mathematics (E)

MAIN RESEARCH AREAS

Efficient numerical methods for computer-based models in the natural and engineering sciences • Parallel algorithms for high-performance computers • Numerical solution methods for time-dependent differential equations

APPOINTMENT IN 2019

newly elected Chancellor a sustainable administration concept will be drawn up within the scope and adapted to the new dimension of growth.

3.1.3 ELEVEN TENURE TRACK PROFESSORSHIPS FOR YOUNG SCIENTISTS

Another important building block of growth is the eleven tenure track professorships that the TU Hamburg has acquired as part of the federal and state government program to promote young scientists. For the term of these junior professorships it receives up to EUR 1.3 million per year. That will strengthen research and teaching in the fields of digitization, computer science, internationalization and innovation and take the University's growth forward.

Promotion and qualification of young scientists is a priority for the TU Hamburg. Tenure track professorships pave the way for young academics to secure a full professorship and establish themselves permanently in the scientific community. Following successful tenure evaluation they will be guaranteed a direct transition to a tenured professorship.

3.2 CONSTRUCTION MEASURES AND GROWTH SPACES

Dynamic personnel growth must be accompanied by growth in floor space. Along with new buildings on the central campus, space is also available in Harburg's Inner Harbor. Moving into rental space in the Hamburg Innovation Port (HIP) One building has also set in motion the development of a new Inner Harbor campus.

HIP ONE

At a November 2019 ceremony the HIP One was inaugurated as the first construction phase of the Hamburg Innovation Port in Harburg's Inner Harbor. The TU Hamburg currently rents around 4,000 square meters of additional space there as part of its growth. The Waste Resources Management Work Group has already moved in, as has an institute as the first building block of the planned Center for Information Technologies. Further computer science institutes and work groups will follow.

The next five years will see more development and office space, laboratories and co-working spaces built in the HIP for use by the new TU Hamburg institutes, other research facilities and companies too. Exchange and collaboration between science and business are to be expressly promoted in the HIP.

ZENTRUM FÜR STUDIUM UND PROMOTION (CENTER FOR ADVANCED STUDIES AND DOCTORAL EDUCATION)

After a lengthy planning and coordination phase, work began in May 2019 on the main TU Hamburg campus on the construction of the *Zentrum für Studium und Promotion*, toward the financing of which the student body made a far from insignificant contribution. Completion is likely to be at the end of 2020. Student learning spaces, the Graduate Academy for Technology and Innovation and the Research Group of Excellence will share more than 1,600 square meters of floor space. The *Zentrum für Studium und Promotion* will optimize the working conditions of around 7,700 students and improve the promotion of the doctoral education.

The reason for the new building is the TU Hamburg's increased student teaching and learning space requirement, while the Graduate Academy will for the first time provide an integrative on-campus contact and meeting place. It will also house a cafeteria run by the Studierendenwerk because the on-campus refectory facilities are now exhausted. Hamburg Ministry of Science, Research and Equality and Sprinkenhof GmbH are building the new facility.

3.3 DEUTSCHLANDSTIPENDIUM SCHOLARSHIPS AT THE TU HAMBURG

A growing University of Technology also relies on industrial and business support. Thanks to vigorous support the TU Hamburg was able in 2019/20 to award Deutschlandstipendium scholarships for a fifth year in succession. EUR 300 a month helps highly talented and committed students with their studies. Awarded irrespective of personal income and study subject, the scholarships are funded in equal measure by the Federal Ministry of Education and Research (BMBF) and private individuals, companies and foundations. This financial support enables students to concentrate more on their studies.

PROF. DR.-ING. THORSTEN A. KERN

Institute for Mechatronics in Mechanics (M-4)
Eißendorfer Str. 38 (O)
21073 Hamburg
Phone: +49 40 428 78 42 04
E-Mail: t.a.kern@tuhh.de
www.tuhh.de/imek

School of Mechanical Engineering (M)

MAIN RESEARCH AREAS

Systems for the haptic human-machine interface • Autonomous water measurement technology • Optical projection systems • Actuators and machines • Energy storage systems and energy management in island networks

APPOINTMENT IN 2019

In 2020, 81 TU Hamburg students, including 44 bachelor's and 37 master's students, received a Deutschlandstipendium. That was almost twice as many as in the previous year, with funding provided by new sponsors. Since 2016 a total of 216 TU Hamburg students have received a Deutschlandstipendium.

The following sponsors are supporting this year's Deutschlandstipendium holders at the TU Hamburg:

Deutsche Bahn AG, Karl H. Ditze Stiftung, hit-Technopark GmbH & Co. KG, Gebr. Mankiewicz GmbH & Co., Gisela und Erwin Sick Stiftung, SICK AG, Synthopol Chemie Dr. rer. pol. Koch GmbH & Co. KG, Bundesdruckerei GmbH, Jenoptik AG, Leser GmbH & Co. KG, IB&T Software GmbH, Stiftung Bostelmann, TÜV Nord, Dr. Ing. Hans-Joachim Wegmann Stiftung, univativ GmbH, HC Hagemann and the TU Hamburg-foundation.

3.4 ALUMNI WORK

A vibrant university culture includes keeping in touch with former students, "looking after" TU Hamburg graduates. The aim of alumni work is to develop a close network of competence between current and former TU Hamburg people and representatives of business, politics and the arts nationally and internationally, creating attractive offerings and added value in the process. Under the umbrella brand TU & YOU, service and event offers, a website and a separate online portal are provided and alumni are looked after in social networks such as LinkedIn and XING. These structures enable the TU Hamburg to address alumni, staff, students and sponsors directly and to link them to the University on a long-term basis. Over the past five years alumni association membership has doubled to around 2,000.

In 2019 there was a focus on international alumni work. The TU Hamburg has 13 alumni chapters around the world in which TU Hamburg alumni can network and share news and views locally. Chapter meetings in 2019 were held in Hamburg, Berlin, New York, Costa Rica, Munich and Shanghai.

To intensify relationships with alumni living abroad the "Stay TUned – International Alumni Ambassadors" project was devised and granted via the DAAD in 2019. The project is aimed primarily at former international TU Hamburg students and scientists who have returned to their home countries or have settled abroad. As international alumni ambassadors they can

serve as primary contacts in forging ties, relating their own experiences and canvassing for the TU Hamburg and Germany as a place of study.

3.5 PERSONNEL DEVELOPMENTS ON THE ADVISORY BOARD AND IN THE EXECUTIVE BOARD

ADVISORY BOARD

In 2019 the TU Hamburg was able to welcome two new members to the Advisory Board. Its five members are appointed half by the TU Hamburg's Academic Senate and half by Hamburg Ministry of Science, Research and Equality. Section 84 of the Hamburg Higher Education Act (HmbHG) specifies that the Advisory Board supports and assists the University and the Executive Board with the further development of structural and development plans and advises the Executive Board on matters of university policy and positioning.

The Hamburg Ministry of Science, Research and Equality named as its Advisory Board appointee Lars Reger, Chief Technology Officer of the international microelectronics group NXP Semiconductors. He took over from Michael Westhagemann, who is now Senator for Economic Affairs of the Free and Hanseatic City of Hamburg.

The other new member of the Advisory Board is Prof. Dr. Kathrin Fischer, Director of the Institute for Operations Research and Information Systems at the TU Hamburg. Prof. Dr. Fischer took over from August-Wilhelm Henningsen, former CEO of Lufthansa Technik. As a full member of the TU Hamburg's Academic Senate she has a dual role that should lastingly strengthen communication between the two bodies.

Other Board members are Walter Conrads (chair), Dr. Anka Mulder and Sibylle Stauch-Eckmann.

EXECUTIVE BOARD

Two official handovers in the University's management took place in 2019 and in early 2020. At a ceremony held in April 2019 Prof. Dr.-Ing. Kerstin Kuchta took over as the TU Hamburg's Vice-President Academic Affairs. She is the first woman in the TU Hamburg's history to hold this office. She took over from Prof. Dr. Sönke Knutzen, who held the post for seven years and now, in addition to heading the Institute of Technical Education and University Didactics, remains in charge of the joint Hamburg Open Online University (HOOU) project.

In November 2019 the Advisory Board unanimously endorsed the TU Hamburg President's proposal to appoint Arne Burda as the University's new Chancellor. Following his official appointment by the Political Senate of the Free and Hanseatic City of Hamburg Mr Burda began his nine-year term of office on February 1, 2020. He took over from Klaus-Joachim Scheunert, who had reached retirement age.

3.6 EQUAL OPPORTUNITIES

In 2019 the TU Hamburg was successfully re-audited for a third time as a family-friendly university. It has held this certificate since 2013 and continuously seeks to improve its family-friendliness. The Presidium has decided to upgrade the CampusNest flexible day care center into a full-scale day care center for children with a larger capacity for which work is at the planning stage.

In addition to the family-friendly university audit the TU Hamburg has since July 2019 undergone the equal opportunities check funded by the federal government's Anti-Discrimination Office with a focus on working and employment conditions. The initial workshop and two analytical workshops were held in 2019 with the final workshop and the development of precisely tailored measures to improve equal opportunities to follow. The findings of the audit, the equal opportunities check and the statistical data compiled for it will be fed into a new equal opportunities concept that will form the basis of the new equal opportunities plan for the University's academic staff.

With a major increase in academic appointment numbers anticipated over the years ahead in the course of the TU Hamburg's growth process the Equal Opportunities Office has drawn up a handout on procedure for dealing with equal opps aspects of the appointment process that is available digitally on the relevant TU Hamburg website page. In 2019 it also took over the "dual career" area for new appointees and set up a complaints department for students and academic staff on the basis of the General Equal Treatment Act (AGG).

4 Research – Status and Developments

Research at the TU Hamburg is diverse and thrives on the ideas of its scientists, who do individual research and also work in large, coordinated research groups with industry and business and in universities and non-university research. Research activities developed positively in the reporting year. Ninety-five young scientists were able to complete their doctoral studies in 2019. External funding approvals totaled around EUR 55 million, including the junior professorships acquired. External funding income in 2019 totaled around EUR 45 million with both Deutsche Forschungsgemeinschaft (DFG) research funding and competitive state research funding contributing to these successes. One success criterion is networking, especially with partners in the Hamburg metropolitan region.

4.1 I³ PROGRAM RESEARCH FUNDING

The I³ program is a central growth component; I³ stands for *Interdisziplinarität und Innovation in den Ingenieurwissenschaften* (Interdisciplinarity and Innovation in the Engineering Sciences). Its aim is to identify new interdisciplinary projects at the TU Hamburg and to finance them by means of internal startup funding to the extent that projects can then apply for external funding, be it from the DFG, the EU or the federal government. Ideally, emerging germ cells of future research focal points at the TU Hamburg can in this way be identified at an early stage.

The I³ Program is competitive and comprises three funding lines with different framework conditions:

1. **I³ Labs** supports projects that consist of four experienced scientists for four years, each with a research position and material resources. Project partners should then be in a position to, say, make a DFG Research Group application and over time become a new pillar of scientific activity at the TU Hamburg.
2. **I³ Projects** support projects that consist of two scientists for two years, each with a research position and material resources. They might then apply for I³ Lab status or secure external funding.
3. **I³ Junior Projects** is aimed at young scientists and students who can apply for one year's funding for material resources.

In May 2019, calls for all three funding lines were published.

The I³ Labs, the most important I³ program instrument, continued in 2019 to be very popular at the TU Hamburg. The I³ Lab applications submitted were assessed by external evaluators and then selected by the Senate Strategic Research Planning Committee (ASPF) with the participation of recognized external scientists. In this way two more I³ Labs were able to start work and seven are currently in receipt of funding. They are:

- Business Analytics – Optimization Potential and Strategic Risks for Maritime Logistics Systems
- Model-based Machine Learning for Soft Tissue Modeling in Medicine
- HELIOS: Hamburg Electronics Lab for Integrated Optoelectronical Systems
- Structural Integrity by Vibroacoustic Modulation to Extend the Lifetime of Civil Infrastructure
- Smart Reactors
- Cyber Physical Energy Systems – Sustainability, Resilience and Economics
- Novel Products from Maritime Resources

I³ projects and junior projects were pre-assessed by the ASPF according to formal and content criteria and were able to present their applications orally. Of the 11 I³ project applications submitted in cooperation at the TU Hamburg four were selected for funding and a further four were recommended for funding in cooperation with other scientific institutions. Six of the 12 applications for I³ junior projects were approved. The I³ projects and I³ junior projects began regular work at the end of 2019.

PROF. DR.-ING. MATTHIAS KUHL

Institute for Integrated Circuits (E-9)
Eißendorfer Str. 38 (O)
21073 Hamburg
Phone: +49 40 428 78 3392,
Fax: +49 40 4273 14607
E-Mail: matthias.kuhl@tuhh.de
www.tuhh.de/circuits

School of Electrical Engineering, Computer Science and Mathematics (E)

MAIN RESEARCH AREAS

Microelectronics • Integrated circuits (CMOS ICs) • Autonomous sensor systems • Brain Machine Interfaces • Intelligent implants

APPOINTMENT IN 2018

4.2
BASIC RESEARCH – YOUNG SCIENTISTS

Jointly with the University of Hamburg the TU Hamburg succeeded in securing funding for a DFG Research Training Group on Modeling, Simulation and Optimization with Fluid Dynamic Applications. Other project partners are the University Medical Center Hamburg-Eppendorf (UKE) and the Max Planck Institute for Meteorology. The TU Hamburg's spokesperson is Prof. Dr.-Ing. Thomas Rung.

The focus of the interuniversity Graduate College is on connecting simulation-based approaches from mathematics with applications from the engineering sciences, medicine and climate research. Under the leitmotif "Mathematics Drives Applications – Applications Inspire Mathematics" the interdisciplinary college is intended to deliver reciprocal benefits. Specific applications are driven forward by mathematical approaches and mathematical approaches are developed further by insights gained in the application. For the TU Hamburg this means that the central research subject of modeling, simulation and optimization is further enhanced in engineering applications or in the digitization of design and production processes.

At the Graduate College young scientists are trained holistically and in an application-oriented way in the mathematical disciplines of modeling, simulation and optimization (MSO). Activities are closely linked with fluid dynamics issues inspired by Hamburg-specific applications in the areas of aeronautical engineering or naval architecture, climate research and medicine.

4.3
DFG PRIORITY PROGRAM

Biotechnology is the research focus of the DFG Priority Program (SPP) 2240 Bioelectrochemical and Engineering Science Fundamentals for the Establishment of Electro-Biotechnology for Biosynthesis (eBiotech). The program is to investigate in an interdisciplinary and coordinated manner the scientific fundamentals of current or emerging fields of research. Its coordinator is Prof. Dr. An-Ping Zeng.

Electrobiosynthesis is an emerging and forward-looking area at the interface of electrochemistry, energy, materials sciences and biotechnology. Collaboration within the consortium is profitable for engineering and scientific process developments. The eBiotech SPP deals with basic research. Unlike in current bioproduction processes, renewable power is to be the main source of energy in future. It offers the advantage that low-energy substances such as CO_2 are used to manufacture value-added products, thereby making possible both an increase in the reduction of CO_2 emissions and a decrease in the consumption of fossil raw materials.

4.4
RESEARCH FUNDING BY THE FEDERAL GOVERNMENT

An example of successful application-oriented research is the HELIOS Microelectronics Research Lab. As part of its Hightech Strategy 2025 the Federal Ministry of Education and Research (BMBF) is making available EUR 50 million across Germany for investments in microelectronics research at universities. The Hamburg Microelectronics Research Laboratory for the Co-Integration of Electronics and Photonics—ForLab HELIOS for short—of the TU Hamburg and the University of Hamburg was awarded a EUR 5.2 million grant. The project term is three years and the TU Hamburg coordinator is Prof. Dr.-Ing. Hoc Khiem Trieu.

Co-integration of microelectronics and photonics opens up novel application areas with a large interdisciplinary effect and wide-ranging impact on medical and measurement technology and in optical data transmission and signal processing up to and including optical computers. Over time the cost and development times of novel optoelectronic applications can be reduced drastically. Investments along the overall development process—from concept and modeling via fabrication, integration and encapsulation to testing, characterization and feedback—will strengthen Hamburg as a business and scientific location in research, development and education and keep it internationally competitive.

4.5
STATE RESEARCH FUNDING

In the course of competitive state research funding the TU Hamburg was able to acquire three projects, two in the HamburgX (HHX) funding line; it is participating in others.

The first HHX project, CIMMS – Center for Integrated Multiscale Materials Systems, is to receive EUR 4.0 million in start-up funding. Along with the TU Hamburg, which submitted the

funding application, the project partners are the University of Hamburg (UHH), the German Electron Synchrotron (DESY) and the Helmholtz Center Geesthacht (HZG). The project spokesperson is Prof. Dr. Gerold Schneider.

The CIMMS aims to produce sustainable multifunctional composites from self-assembling nanoparticles by means of 3D printing. These so-called multiscale hybrid and integrated material systems differ fundamentally from existing materials. Using scale-independent three-dimensional structuring and analysis new functionalities are to be achieved by means of the most eco-friendly materials possible. This approach, which will transfer unique nanoscale material functions to macroscopic applications, will facilitate new technological developments in the fields of energy, mobility and medicine. Compared with conventional production methods this concept is more energy-efficient and promises a higher level of sustainability.

The second HHX project is the Innovative Air-based Urban Mobility (i-LUM) project. Funding success was secured jointly with our partners the Helmut Schmidt University (HSU), the Hamburg University of Applied Sciences (HAW), the HafenCity University Hamburg (HCU) and the German Aerospace Center (DLR). Its spokesperson is Prof. Dr.-Ing. Volker Gollnick.

The aim of the i-LUM collaborative project is to devise and holistically evaluate feasible and innovative air-based urban mobility concepts. Taking as an example future (2040/2050) scenarios for the Hamburg metropolitan region, regional competences in technology, computer science, urban planning, logistiocs, society and law are brought together to investigate multidisciplinary issues coherently. From an urban planning perspective the urban transportation system of the future is modeled in order to identify the preconditions required to make the air taxi integratable as a mode of transport. The anticipated benefit for the city, residents and visitors is quantified and balanced against the cost. It is a systems technology basic research project.

The TU Hamburg is also a participant in the HXX project Center for Data and Computing in Natural Science (CDCS), a new joint facility of the UHH, DESY and the TU Hamburg. The TU Hamburg's spokesperson is Prof. Dr. Sabine Le Borne.

In the natural sciences research in many areas is based on collection and analysis of large, complex and in recent years drastically increasing quantities of data. This is due in part to the digitization of complex technical systems and the growing importance of simulations. The only way to deal with these challenges is by means of close interlocking of the sciences with methodically oriented research in computer science and applied mathematics. That is why the outcome is envisioned as an interdisciplinary center where the requisite areas of expertise are bundled.

Finally, startup funding was raised for the Simulation-based Design Optimization of Dynamic Systems under Uncertainties project, in which the UHH and the HSU are participating. The project spokesman is Prof. Dr.-Ing. Thomas Rung.

Due to drastically reduced time and funding budgets for developing new products, computer-assisted optimization of virtual product prototypes is growing increasingly important. The more independent (robust) of subsequent production- or operation-related fluctuations the performance features of an optimized product design are, the more economically the product can be manufactured and operated. A robust design is of decisive importance especially for maintenance-intensive or maintenance-free products in the area of Hamburg aviation and medical technology. The aim of the project is to develop innovative simulation processes for robust optimization of complex components. By conflating methods of applied mathematics and theoretical mechanical engineering, optimization models are developed that take dynamic operating conditions and uncertain manufacturing processes into account.

4.6 TECHNOLOGY TRANSFER VIA TUTECH INNOVATION GMBH

Tutech Innovation GmbH supports the TU Hamburg as a subsidiary in contract research, protective rights management and startup activities. Tutech also assists TU Hamburg research scientists with EU and federal government funding applications. Successful assistance with the acquisition and implementation of contract research projects has led to sales revenue in this area of around EUR 11.6 million, of which EUR 8.934 million is included in the TU Hamburg's third-party funding statistics.

In supporting startups Tutech and its sister company Hamburg Innovation collaborate closely with the TU Hamburg and the other universities in the Hamburg metropolitan region. Especially worth mentioning in this connection are the startup platform beyourpilot and the startup campus in Harburger Schlossstrasse, which Tutech runs.

PROF. DR. MATTHIAS MNICH

Institute for Algorithms and Complexity (E-11)
Blohmstraße 15
21079 Hamburg
Phone: +49 40 428 78 4907
E-Mail: matthias.mnich@tuhh.de
www.tuhh.de/algo

School of Electrical Engineering, Computer Science and Mathematics (E)

MAIN RESEARCH AREAS

Artificial Intelligence • Machine Learning • Algorithms for Big Data • Network Optimization • Algorithmic Decision Support • Efficient Resource Planning • Optimal Control • Dynamic Programming

APPOINTMENT IN 2019

In addition, the TUTECH ACADEMY provides further scientific education and practice-oriented workshops and seminars. In line with requirements, subjects such as innovation management, international research management, patent management, startup support and technology and knowledge transfer are covered, and in close cooperation with TU Hamburg scientists lifelong learning concepts are developed, especially further scientific education offerings for engineers.

In 2019 Tutech achieved a positive result, with revenues totaling EUR 14.8 million.

4.7 HAMBURG OPEN SCIENCE AND RESEARCH INFORMATION SYSTEM

The TU Hamburg is a member of the Hamburg Open Science (HOS) project. It is an inter-university project implemented jointly with Hamburg's State and University Library (SUB) and the Ministry of Science, Research and Equalilty (BWFG). Its aim is to change the scientific process itself by means of digital, open exchange and to make the sources and results of publicly financed research freely available. HOS enables Hamburg researchers to file and manage their research findings (research data, publications) in institutional repositories in a structured way. Research funders such as the DFG require material of this kind to be held in storage. Another approach was to report to society in general about research activities and results at the TU Hamburg in respect of a research information system.

Since mid-2019 the TU Hamburg's scientific achievements have been documented and published in TORE (TU Hamburg open research). In close collaboration with the University Library, the Data Center and the TU Hamburg's Presidential Office a system has been established that is based on the Open Source software DSpace-CRIS and incorporates the functions of a repository for open access publications and research data and a research information system. Dissertations, open access publications, preprints and related research data can be published directly in TORE and made generally accessible.

The TU Hamburg's Research Report for 2019 was generated from this system. It contains more than 1,200 publications of which around 260 were Open Access, and 630 research pro-

jects from 80 institutes and workgroups. It also includes conference and book contributions and degree theses.

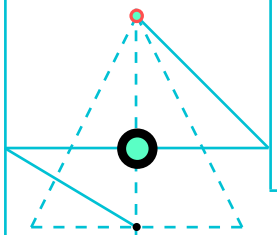
Link: www.tuhh.de/forschung/fobe/2019/

4.8
BUSINESS STARTUPS

The Hamburg startup initiative Startup Port, coordinated by the TU Hamburg, was approved EUR 3.5 million by the Federal Ministry for Economic Affairs and Energy (BMWi) to strengthen regional startup promotion. The aim of the Hamburg joint project "Startup Port – Knowledge-based Entrepreneurship in the Hamburg Metropolitan Region" is to promote business startups from science and to strengthen exchange between business, science, politics and society. The Startup Port project harmonizes and bundles existing promotion formats and creates transparency for prospective startups. The target it has set itself is to strengthen and encourage knowledge-based startups.

As an innovation and science location the city of Hamburg with its environs is a fundamental source of knowledge-based business startups. In order to provide a broad and dynamic basis for the promotion of startups from science, universities and research institutions from the Hamburg metropolitran region have joined forces with business and politics in the Startup Port project. With the University of Hamburg (UHH), the Hamburg University of Applied Sciences (HAW), the TU Hamburg (as the project coordinator) and the Helmut Schmidt University (HSU), the four largest Hamburg universities are cooperating with the University Medical Center Hamburg-Eppendorf (UKE), the Leuphana University in Lüneburg, Lower Saxony, and Wedel University of Applied Sciences in Schleswig-Holstein. Hamburg Innovation GmbH (HI), which is responsible for the promotion of knowledge transfer in all of the city's public universities, supports this collaboration. Other participants are the German Electron Synchrotron (DESY), the Helmholtz Center Geesthacht (HZG), the industry association Nordmetall, ContiTech AG and partners from politics and administration such as the Hamburg Ministries for Economics, Transport and Innovation (BWVI) and Science, Research and Equality (BWFG).

5 New Developments in Teaching and Studies



On April 1, 2019, Prof. Dr.-Ing. Kerstin Kuchta took office as Vice President Academic Affairs. Keynotes of her first year in office were the ongoing growth process, the introduction of an Orientation Program and the foundation of the ECIU University.

In the winter semester of 2019/20 the TU Hamburg was able to welcome 1,124 new students to bachelor's programs. Demand was strongest for mechanical engineering, opted for by 230 new students. Student numbers, with 7,698 students in all study programs, continued to be at a very high level. In the reporting year 1,285 students graduated.

5.1 FURTHER DEVELOPMENT OF RANGE OF STUDY PROGRAMS

In the course of growth, work continued in 2019 on profiling the TU Hamburg's study offering. Planning for the B.Sc. course in Data Science was taken forward to to the stage at which it was ready for adoption. Big Data, the capture and analysis of large quantities of data, is increasingly widespread in science. In the engineering sciences there are numerous fields of practice for data scientists in areas ranging from medical technology to mechanics. In offering the new study program the TU Hamburg is the first university in northern Germany to address the training of sought-after data science specialists.

The new study program will be taught from the winter semester 2020/21. The B.Sc. in Data Science adds to the TU Hamburg's study offerings in computer science. The new B.Sc. course is also an outstanding match for the data science research area of the ahoi.digital computer science platform Alliance of Hamburg Universities in Informatics.

Along with expanding the study offering, internationalization is an important approach. In pursuit of this objective the bachelor's course in General Engineering Science can from the winter semester 2020 be studied entirely in English. In addition, the schools of study are working on a revision of existing study programs and are preparing further innovations.

5.2
2019 TEACHING PRIZE

The Hamburg Teaching Prize for 2019 was awarded to Prof. Dr. Marko Lindner of the Institute of Mathematics and Prof. Dr. Kathrin Fischer of the Institute for Operations Research and Information Systems. The EUR 10,000 in prize money was awarded for "teaching innovation under the special conditions of engineering studies." An in-house jury chose the two winners from candidates nominated by students. Professor Lindner enriched the Math I and Math II lectures, two large-scale entry-level courses, with many didactic innovations, contributing to a high level of learning motivation and a better understanding of their exacting contents. In Operations Research Professor Fischer offers a master's elective at a very high didactive level. The course is characterized by its practical relevance, its teamwork and the prizewinner's high level of commitment. The 2019 prizewinners impressively demonstrated that innovative and outstanding master's teaching is possible in both basic and specialized courses.

5.3
QUALITY OF TEACHING

To further improve the quality of teaching at the TU Hamburg the Qualification Program on Research-based Learning (QPFL) was upgraded with the assistance of the Center for Teaching and Learning (ZLL) to the I^3 ProTeaching program. Financed by the Special University Pact (HSP), the QPFL was aimed mainly at academic staff whose posts were funded by the HSP. The I^3 ProTeaching program is now mandatory for all academic staff except third-party funding employees with no teaching commitments.

PROF. DR.-ING. CHRISTIAN J. CYRON

Institute of Continuum and Material Mechanics (M-15)
Eißendorfer Str. 42 (M)
21073 Hamburg
Phone: +49 40 428 78 22 56
E-Mail: christian.cyron@tuhh.de
www.tuhh.de/icm

School of Mechanical Engineering (M)

MAIN RESEARCH AREAS

Computational mechanics • Computer-aided materials research • Multi-scale simulations • Multiphysics simulations • Machine learning and data-based methods in mechanics • Biomechanics

APPOINTMENT IN 2018

Thirty-one members of academic staff registered for the inaugural program in the winter semester 2019/20. Thirteen opted for the University and Specialized Didactics competence line and 17 for the Research-related Teaching and Research-based Learning competence line. Digital teaching and learning played an important part in both. I³ ProTeaching leads to an even higher proportion of courses being taught by staff with university teaching qualifications.

Consolidation of the ZLL has contributed to further improvement in quality of teaching now the ZLL is able to continue its successful, nationally and internationally recognized work on a permanent basis.

5.4 ORIENTATION PROGRAM

In the winter semester 2019/20 the TU Hamburg was able with support from the Joachim Herz Foundation to offer an orientation program for the first time. The program helps students to select an engineering study program, makes it easier for them to start their studies and assists them, in accordance with their previous level of knowledge, with the Introduction to Mathematics for Engineers.

In the first year, 23 students enrolled for the new program. In the course of evaluation 87 percent said the orientation program had lived up to their expectations. From the winter semester 2020/21 the program will be offered as a course of study. Enrollment will then entitle students to apply for Bafög benefits.

5.5 ECIU UNIVERSITY – A VISION OF INNOVATIVE EUROPEAN UNIVERSITY EDUCATION

On November 7, 2019 the TU Hamburg and its 12 partners in the European Consortium of Innovative Universities founded the ECIU University. The ECIU University is receiving EUR 5.0 million in funding over a three-year period from the European University Initiative, a pilot project of the EU Commission. ECIU members are, in addition to the TU Hamburg, Aalborg University, Denmark, the Universidade de Aveiro, Portugal, the Universitat Autònoma de Barcelona, Spain, Dublin City University, Ireland, the INSA Group, France, the University of Linköping, Sweden, Kaunas University of Technology, Lithuania, the University of Stavanger, Norway, Trento University, Italy, Tampere University, Finland, Twente University, the Netherlands, and the Tecnológico de Monterrey, Mexico. The connecting link between these universities is their regional roots, their highest requirements of teaching and their stable links with industry and society.

The ECIU University is a new type of university where students, teachers, scientists, administrators, industry and civil society jointly develop innovative solution approaches to real societal challenges by means of challenge-based learning. A leading approach is its concentration on challenges that can be derived from the UN target of developing cities and municipalities sustainably. Instead of relying on directly specified degree programs the ECIU University offers a flexible, demand-oriented, interdisciplinary education. It is based on new modules—micro credentials—from which qualifications can be assembled in accordance with individual requirements and interests and conflated in a competence passport.

The idea for the ECIU University was developed together with industry, public organizations, society, scientists, future and current students in joint workshops throughout Europe. The University is supported by the administrations of cities where participating universities are located and by industry partners such as Airbus, NXP and Sick AG.

Link: www.eciu.org/

5.6 NIT NORTHERN INSTITUTE OF TECHNOLOGY MANAGEMENT

The NIT Northern Institute of Technology Management, together with its stakeholders, has taken its master's study program in Technology Management (M.A./MBA) further forward both content- and structurewise in a comprehensive process. Since October 2019 the first class—30 students from 12 countries—has followed the new model. With its innovative learning concept the NIT reflects today's agile, digital working world. It is based not on teaching but on learning that is flexible, practical, networked and relates to real projects. Studying at the NIT offers a high level of flexibility and individuality, and students can organize it themselves in accordance with their life situation, be it alongside an engineering degree program at the TU Hamburg, a career, doctoral studies or family commitments. The program can for the first time be completed with 120 ECTS credits.

In 2019 the NIT also successfully extended its further education offerings. A special project is the new "Digital Strategy" qualification program developed by the NIT and the Bildungswerk der Wirtschaft e.V. for the employers' associations Nordmetall and AGV Nord. The program aims to help metal and electrical industry enterprises to shape digital change. With the "Business Model Innovation" and "Work 4.0 – Corporate Culture and Initiating Change" modules the NIT is making an important contribution to this innovative further education series.

2019 was also a successful year for NIT students and alumni. The startup Evitado is a case in point in the area of business creation and innovation. With its parking assistance for aircraft it convinced the Hamburg Innovation Summit jury in the IDEE category and won the first prize of EUR 5,000.

5.7 TECHNISCH IST DAS MÖGLICH. – SOCIAL MEDIA CAMPAIGN TO RECRUIT STUDENTS

With a view to recruiting new students and increasing the university's visibility in the education market the TU Hamburg launched in June a digital campaign of its own: Change the World from Hamburg. It was a new approach by the TU Hamburg to student recruitment. The slogan *Technisch ist das möglich* (Technically That's Possible) stands for a social media campaign the TU Hamburg uses throughout Germany to recruit new bachelor's students for its engineering degree programs—the makers and shapers of the future. It was the first university of technology in Germany to advertise for students in the social networks. The campaign was launched to coincide with the start of student enrollment on June 1.

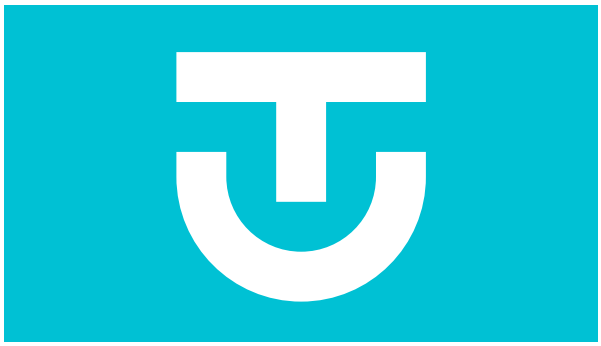
A modern campaign, it addresses young people where they are: in the social networks. It highlighted the relevance of engineering science to current societal challenges such as climate change, environmental pollution, urbanization, diversity or digitization. It also sought to establish a connection between the expectations of prospective students and the TU Hamburg's own claim to train a new type of engineer with technological and scientific know-how who takes on societal responsibility.

The core element of the marketing measures is the specially created landing page stuhhdium.de where prospective students can find out about engineering study programs at the TU Hamburg, special offers like the new orientation program, and events and counseling services. The page immediately precedes the application portal. In addition, throughout the entire application, admission and acceptance phase a team of experienced, trained students was at the ready for a live online chat almost around the clock.

At the same time the TU Hamburg launched its Manifest film and additionally produced spots or cuts in social media advertising, transforming the TU Hamburg logo visually into a talking testimonial. These activities generated an unprecedented reach of more than 28 million contacts. The number of followers of TU Hamburg social media activities was increased exponentially.

Technisch ist das möglich. – Social media campaign to recruit new TU Hamburg students

Link: www.stuhhdium.de

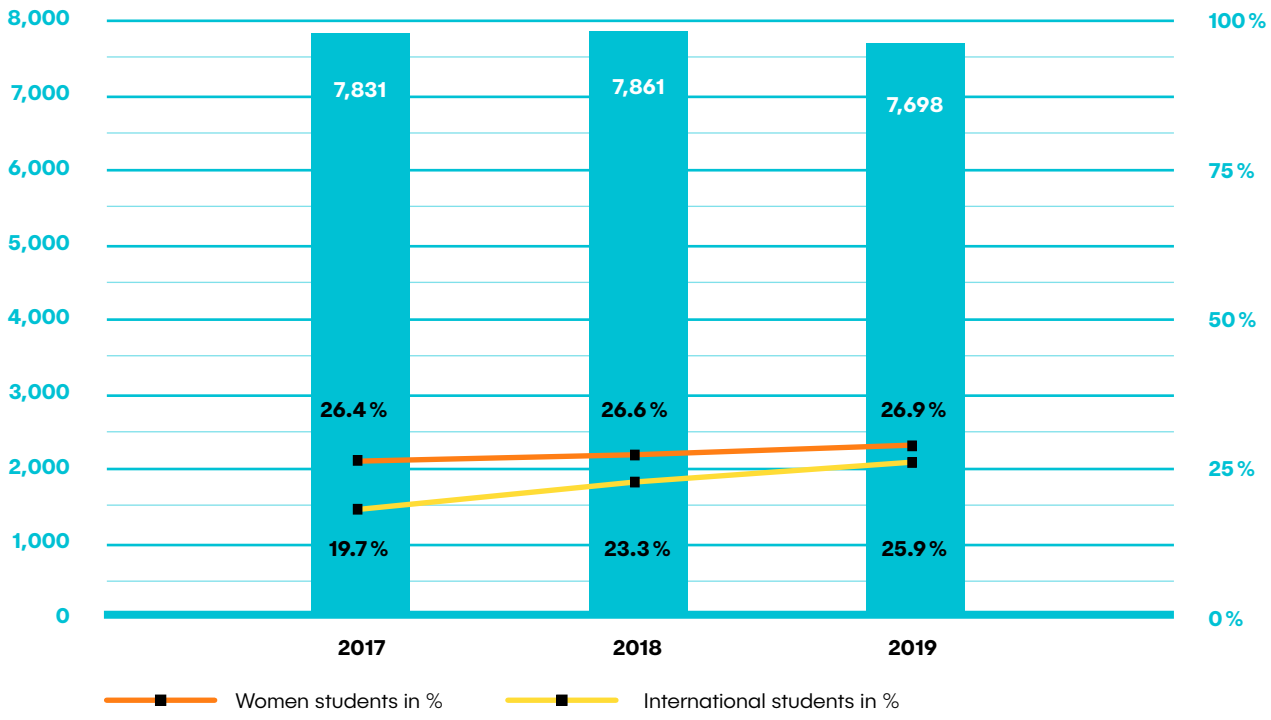


6 Statistics

6.1 TEACHING

6.1.1 STUDENTS

STUDENTS IN THE WINTER SEMESTER	2017	2018	2019[1]
Degree students (B.Sc./M.Sc./MBA/M.A.)	7,085	7,107	6,911
Teacher training course students	565	588	620
Orientation Program, doctoral and exchange students, academic further education, etc.	181	166	172
TOTAL	7,831	7,861	7,698
Percentage of women students	26.4	26.6	26.9
Percentage of international students[2]	19.7	23.3	25.9
Percentage with international university entrance qualification[3]	16.7	18.5	20.2
Percentage of students within the standard study period	69.0	66.0	64.1

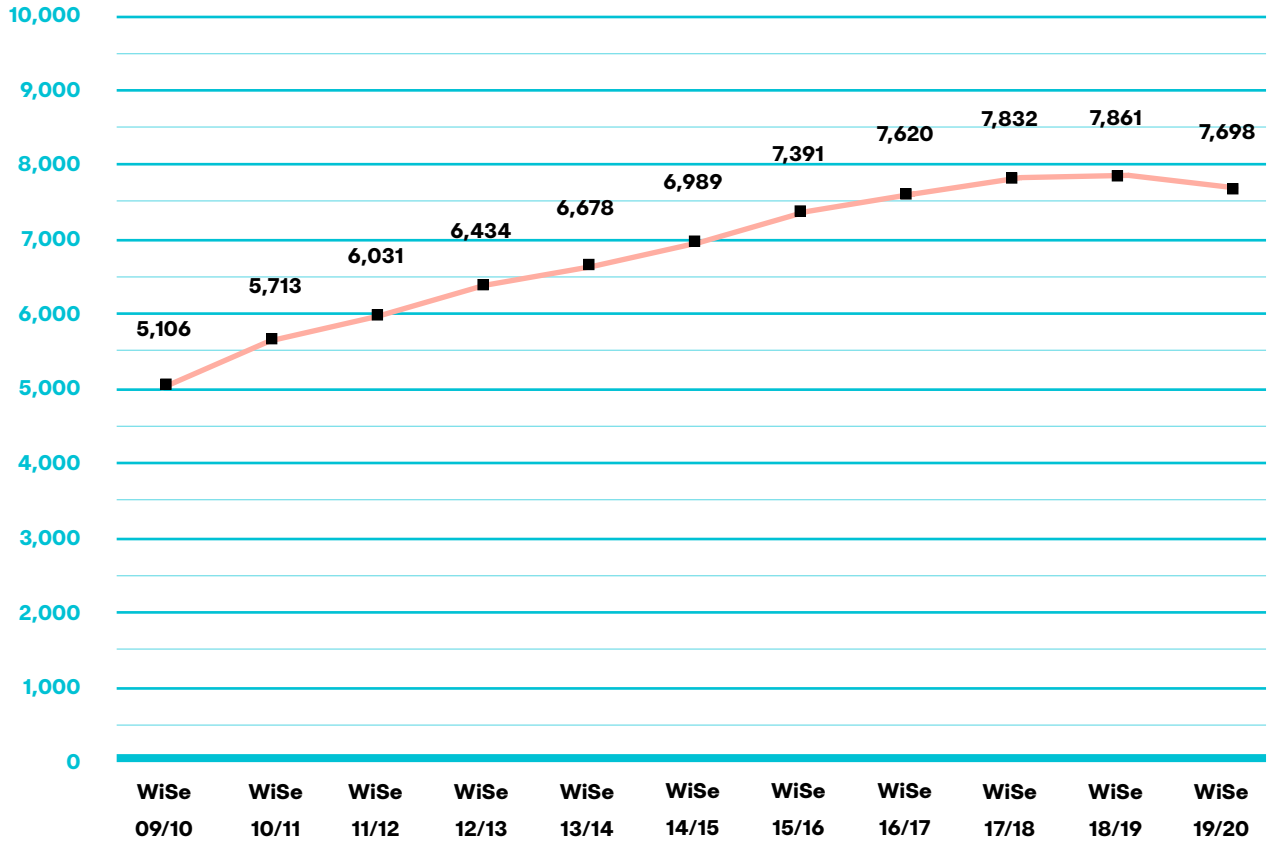


[1] *Winter semester 2019/20*

[2] *Students of non-German nationality*

[3] *Students with non-German university entrance qualifications*

6.1.2 DEVELOPMENT OF STUDENT NUMBERS



Total student number, including students on leave, orientation program, doctoral and exchange students

6.1.3 BACHELOR'S

BACHELOR'S STUDENTS	Number[1]	Percentage of women students	Percentage of international students[2]	Percentage with international HZB[3]	Percentage within RGZ[4]
TOTAL	**4,338**	**24**	**17**	**10**	**70**
Allgemeine Ingenieurwissenschaften	426	30	9	4	85
Civil and Environmental Engineering	597	37	19	11	68
Bioprocess Engineering	117	52	15	11	64
Computational Informatics	6	17	17	17	0
Computer Science	407	13	16	9	79
Electrical Engineering	188	9	19	12	70
Energy and Environ-mental Engineering	177	34	11	7	64
General Engineering Science	117	29	53	50	76
Computer Science and Engineering	307	17	27	16	78
Logistics and Mobility	435	38	14	4	64
Mechanical Engineering	1,072	15	15	7	65
Mechatronics	165	8	29	18	72
Naval Architecture	91	16	19	12	62
Technomathematics	84	31	10	4	75
Process Engineering	149	32	15	9	62

[1] *Winter semester 2019/20*

[2] *Percentage of students with non-German nationality*

[3] *Percentage of students with non-German university entrance qualifications (HZB)*

[4] *Percentage of students within the standard study period (RGZ)*

BACHELOR'S STUDY PROGRAMS	Number[1]	Percentage of women students	Percentage of international students[2]	Percentage with international HZB[3]	Percentage within RGZ[4]
TOTAL	**4,338**	**24**	**17**	**10**	**70**
of which[5]					
B	597	37	19	11	68
E	992	15	19	11	76
M	1,163	15	15	8	64
V	266	41	15	10	63
W	435	38	14	4	64
FIT	885	27	19	14	77

[1] Winter semester 2019/20

[2] Percentage of students with non-German nationality

[3] Percentage of students with non-German university entrance qualifications (HZB)

[4] Percentage of students within the standard study period (RGZ)

[5] Schools/Areas of Study: (B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology; (FIT) Interdisciplinary Engineering Sciences and Technologies

6.1.4 MASTER'S

MASTER-STUDIERENDE[1]	Number[1]	Percentage of women students	Percentage of international students[2]	Percentage with international HZB[3]	Percentage within RGZ[4]
TOTAL *(German- and English-language)*	**2,568**	**24**	**41**	**39**	**60**
MASTER'S STUDY PROGRAMS *(in German)*					
TOTAL	**1,598**	**25**	**12**	**9**	**61**
of which[5]					
B	226	37	18	17	69
E	253	13	15	11	57
M	615	19	11	8	60
V	181	37	12	8	57
W	276	29	9	7	66
FIT	47	34	2	0	51
MASTER'S STUDY PROGRAMS *(in English)*					
TOTAL	**970**	**23**	**89**	**88**	**58**
of which[5]					
B	101	43	96	95	57
E	259	31	99	98	63
M	438	7	80	80	53
V	113	43	100	100	58
W	36	31	72	72	83
NIT	23	35	74	78	52

[1] *Winter semester 2019/20*

[2] *Percentage of students with non-German nationality*

[3] *Percentage of students with non-German university entrance qualifications (HZB)*

[4] *Percentage of students within the standard study period (RGZ)*

[5] *Schools/Areas of Study: (B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology; (FIT) Interdisciplinary Engineering Sciences and Technologies; (NIT) Northern Institute of Technology Management*

6.1.5 TEACHER TRAINING

STUDENTS OF VOCATIONAL SUBJECT EDUCATION	Number[1]	Percentage of women students	Percentage of international students[2]	Percentage with international HZB[3]	Percentage within RGZ[4]
TOTAL	**620**	**55**	**5**	**1**	**57**
TEACHER TRAINING STUDY PROGRAMS (BACHELOR'S AND MASTER'S)					
TOTAL	**618**	**56**	**5**	**1**	**57**
of which					
Work study/Technology	357	80	8	1	59
Building and wood technology	96	18	0	1	59
Electrical engineering/ Information technology	29	14	3	0	59
Media technology	50	46	2	0	50
Metal technology	86	15	0	0	49
EXPIRING STUDY PROGRAM					
TOTAL	**2**	**50**	**0**	**0**	**0**

[1] *Winter semester 2019/20*

[2] *Percentage of students with non-German nationality*

[3] *Percentage of students with non-German university entrance qualifications (HZB)*

[4] *Percentage of students within the standard study period (RGZ)*

6.1.6 ORIGINS OF STUDENTS

PLACES OF UNIVERSITY ENTRANCE QUALIFICATION IN GERMANY

PLACE OF UNIVERSITY ENTRANCE QUALIFICATION	NUMBER[1]	PERCENTAGE	CHANGE ON PREVIOUS YEAR IN PERCENT
Baden-Württemberg	129	2	-8
Bavaria	91	1	-13
Berlin	46	1	-8
Brandenburg	30	0.4	-12
Bremen	43	1	-4
Hamburg	2,499	34	-7
Hesse	86	1	-16
Mecklenburg-Western Pomerania	76	1	-12
Lower Saxony	1,309	17	-3
North Rhine-Westphalia	270	4	-10
Rhineland-Palatinate	43	1	+13
Saarland	9	0.1	-31
Saxony-Anhalt	31	0.4	+24
Saxony	33	0.5	-6
Schleswig-Holstein	1,243	16	-7
Thuringia	21	0.3	+5
of which Hamburg Metropolitan Region	4,525	58	-4
Other countries	1,573	20	+8

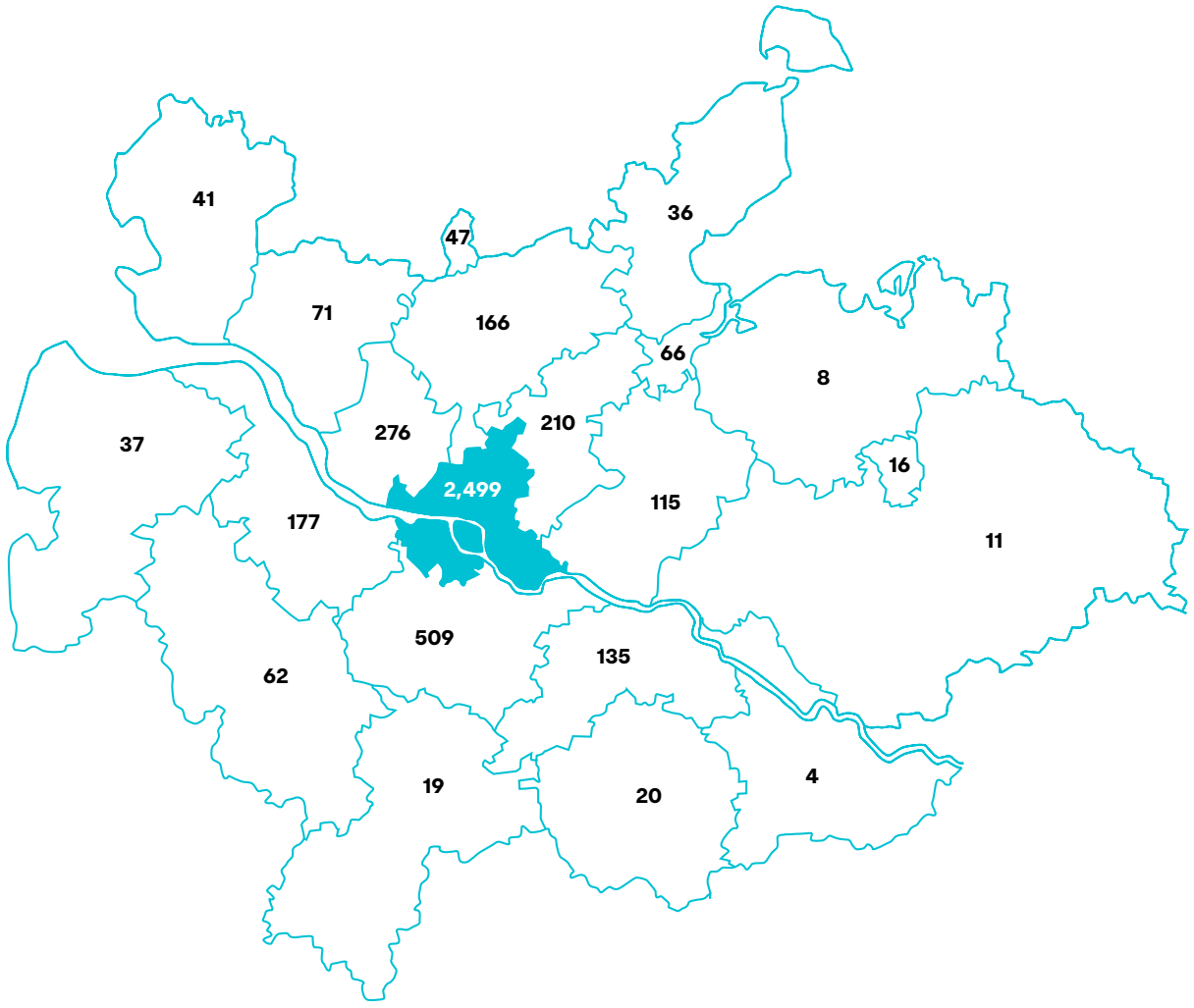
[1] *As of winter semester 2019/20*

PLACES OF UNIVERSITY ENTRANCE QUALIFICATION IN THE HAMBURG METROPOLITAN REGION

FEDERAL STATE	DISTRICT / CITY	NUMBER[1]	PERCENTAGE	CHANGE ON PREVIOUS YEAR IN PERCENT
Hamburg	Hamburg	2.499	55	-4
Lower Saxony	Cuxhaven	37	1	-3
	Harburg	509	11	-1
	Heidekreis	19	0.4	+58
	Lüchow-Dannenberg	4	0.1	-20
	Lüneburg	135	3	-6
	Rotenburg (Wümme)	62	1	-7
	Stade	177	4	-5
	Uelzen	20	0.4	-9
Schleswig-Holstein	Dithmarschen	41	1	-7
	Lübeck	66	1	-0
	Herzogtum Lauenburg	115	3	-6
	Neumünster	47	1	+4
	Ostholstein	36	1	+6
	Pinneberg	276	6	-5
	Segeberg	166	4	-9
	Steinburg	71	2	-10
	Stormarn	210	5	-9
Mecklenburg-Western Pomerania	Ludwigslust-Parchim	11	0.2	+10
	Nordwestmecklenburg	8	0.2	-27
	Schwerin	16	0.4	-11
TOTAL	**4,525**	**100**	**-4**	**-4**

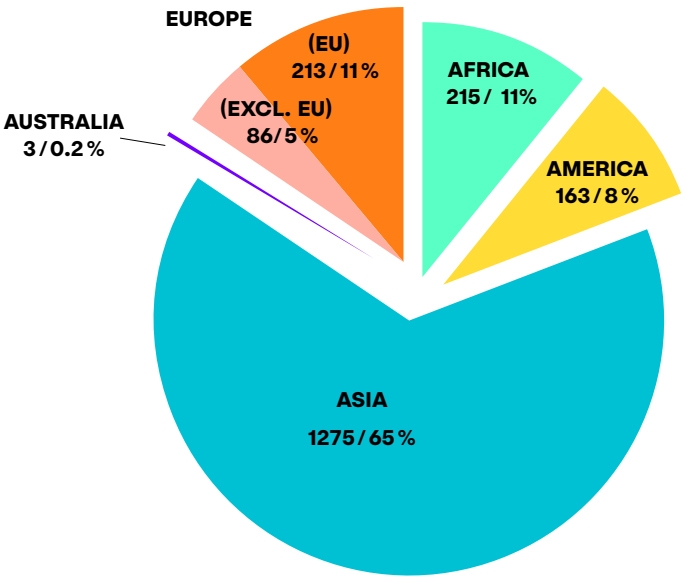
[1] *As of winter semester 2019/20*

STUDENTS WITH UNIVERSITY ENTRANCE QUALIFICATION IN THE HAMBURG METROPOLITAN REGION



6.1.7 INTERNATIONAL STUDENTS' COUNTRIES OF ORIGIN

TOTAL NUMBER OF INTERNATIONAL STUDENTS[1] IN THE WINTER SEMESTER 2019/20: 1,955



COUNTRIES OF ORIGIN OF INTERNATIONAL STUDENTS[1] (TOP 10)

COUNTRY	NUMBER	PROPORTION OF INTERNATIONAL STUDENTS IN PERCENT
India	408	21
Turkey	157	8
Syria	142	7
Pakistan	79	4
Iran	73	4
Egypt	71	4
China	69	4
Bangladesh	63	3
Mexico	51	3
Tunisia	42	2

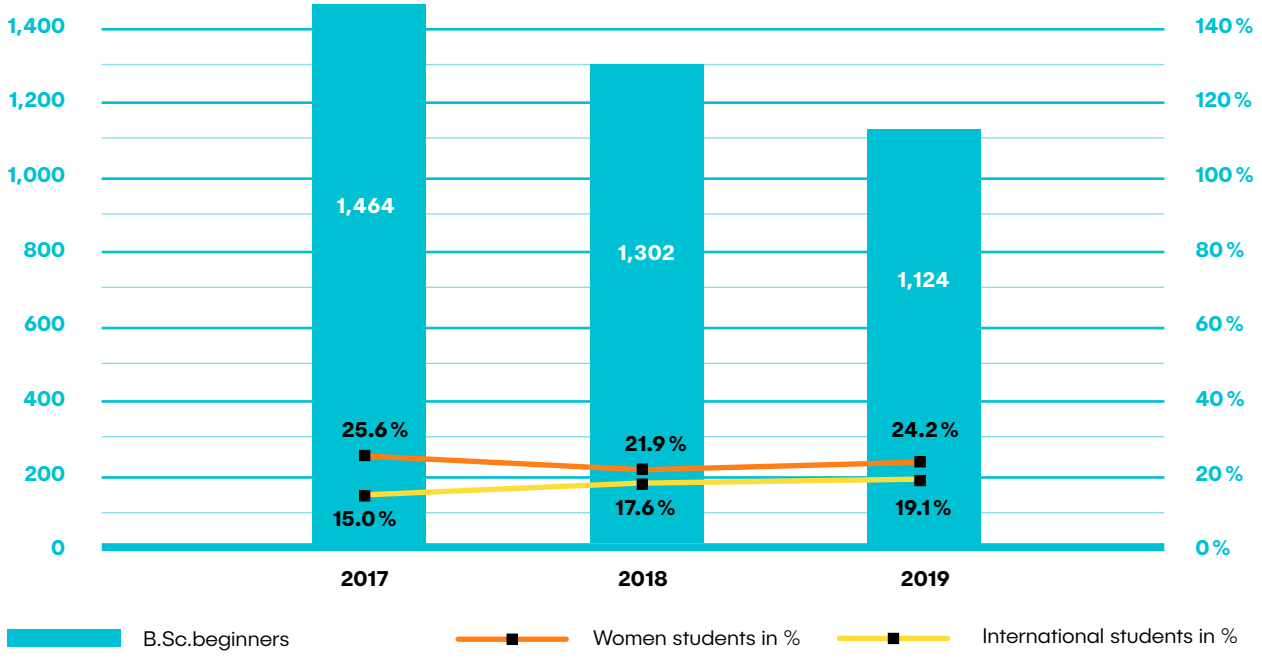
COUNTRIES OF ORIGIN OF INTERNATIONAL STUDENTS FROM EUROPE[1] (TOP 10)

COUNTRY	NUMBER	PROPORTION OF INTERNATIONAL STUDENTS IN PERCENT
Russian Federation	35	12
Spain	34	11
France	22	7
Poland	21	7
Portugal	18	6
Greece	17	6
Bulgaria	15	5
Italy	15	5
Ukraine	13	4
Austria	11	4

[1] *Students of non-German nationality*

6.1.8 FIRST-YEAR STUDENTS

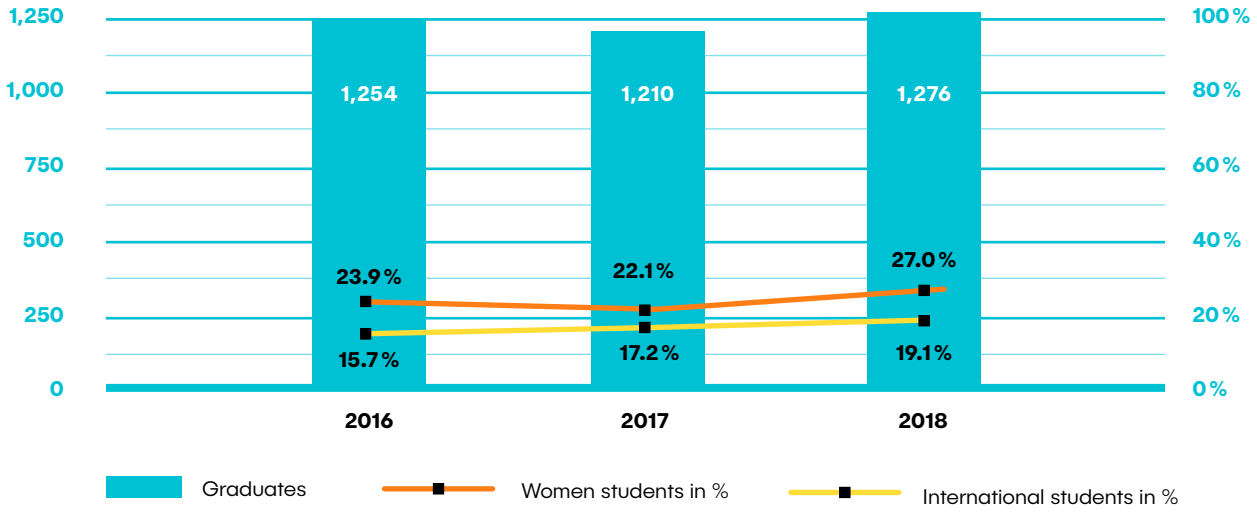
FIRST-YEAR STUDENTS IN THE WINTER SEMESTER	2017	2018	2019
TOTAL	**1,571**	**1,415**	**1,248**
BACHELOR'S STUDENTS (B.SC.)	**1,464**	**1,302**	**1,124**
Women students in percent	25.6	21.9	24.2
International students[1] in percent	15.0	17.6	19.1
New student places per academic year (as per ZLV for B.Sc. study programs)			
excl. HSP places	1,020	1,021	1,182
incl. HSP places	1,320	1,321	1,482
Capacity utilization (ratio of new students to places as per ZLV for B.Sc. study pro-grams)			
excl. HSP places	143.5	127.5	95.1
incl. HSP places	110.9	99.0	75.8
TEACHER TRAINING COURSES (INTER-UNIVERSITY)	**107**	**113**	**124**
Women students in percent	52.3	64.7	56.6
International students[1] in percent	4.7	12.4	3.2



[1] *Students of non-German nationality*

6.1.9 GRADUATES / DEGREES

GRADUATES BY CATEGORY	2017	2018	2019
TOTAL	**1,254**	**1,210**	**1,276**
of which			
Degree students (B.Sc./M.Sc./MBA/M.A.)	1,198	1,145	1,220
Teacher training students (cross-university)	56	65	56
Women students in %	23.9	22.1	27.0
International students[1] in %	15.7	17.2	19.1
International students with international HZB[2] in %	.	.	16.7



[1] *Percentage of students with non-German nationality*

[2] *Percentage of students with non-German university entrance qualifications (HZB)*

DEGREE SUBJECT	Number	Percentage of women	Percentage of international students[1]	Percentage with international HZB[2]
BACHELOR (B.SC.)	**536**	**26**	**9**	**6**
of which:				
Allgemeine Ingenieurwissenschaften	54	28	4	2
Civil and Environmental Engineering	77	38	4	3
Bioprocess Engineering	9	78	0	11
Computational Informatics	4	75	50	25
Computer Science	10	10	10	0
Electrical Engineering	26	4	12	4
Energy and Environmental Engineering	35	40	0	3
General Engineering Science	15	33	40	40
Computer Science and Engineering	22	14	5	5
Logistics and Mobility	54	43	13	11
Mechanical Engineering	152	18	11	4
Mechatronics	28	4	11	4
Naval Architecture	26	15	12	8
Technomathematics	11	36	0	0
Process Engineering	13	23	8	8

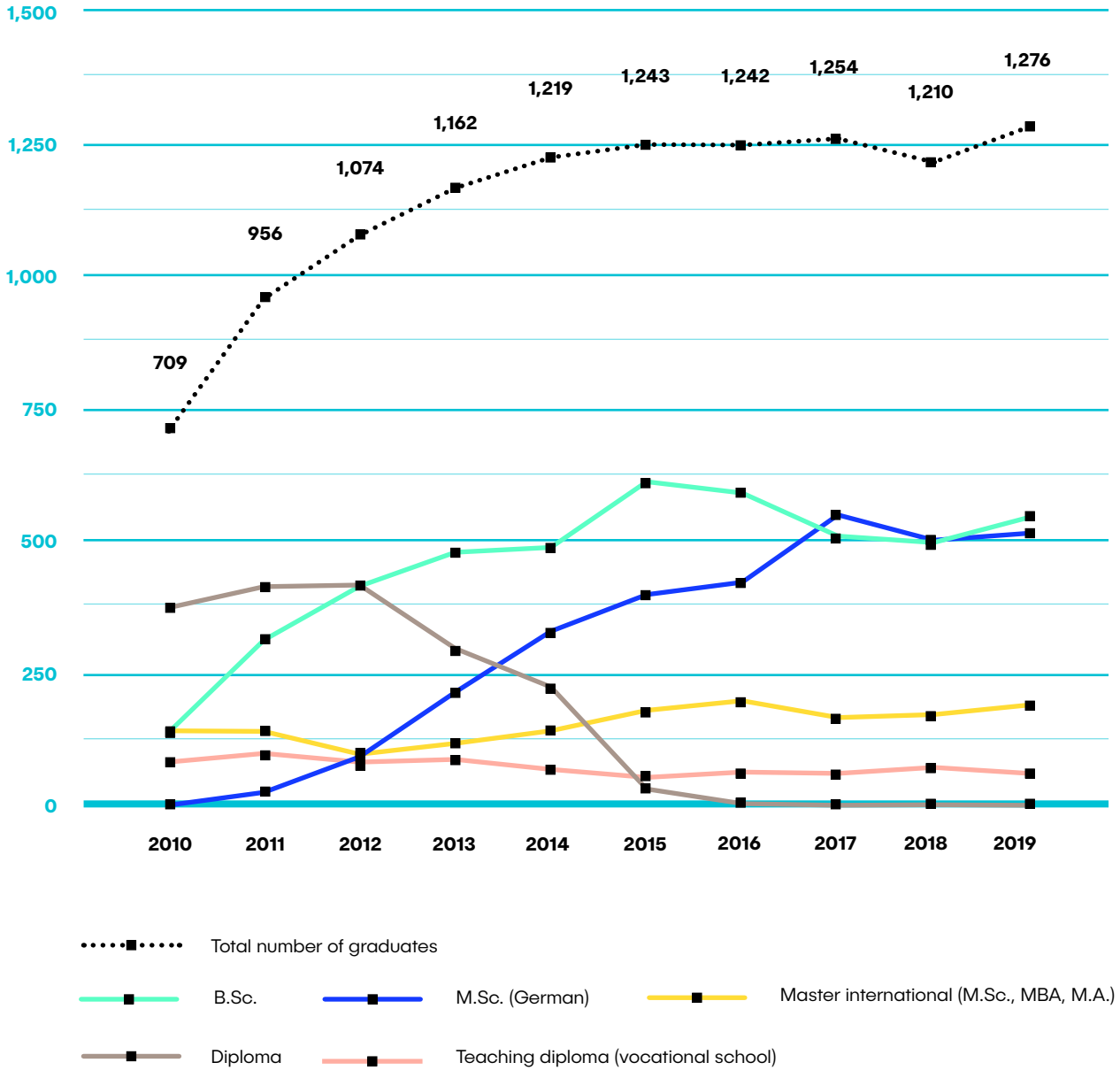
[1] *Graduates of non-German nationality*

[2] *Graduates with non-German university entrance qualifications (HZB)*

[3] *Schools/Areas of Study: (B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology; (FIT) Interdisciplinary Engineering Sciences and Technologies*

DEGREE SUBJECT	Number	Percentage of women	Percentage of international students[1]	Percentage with international HZB[2]
BACHELOR (B.SC.)	**536**	**26**	**9**	**6**
of which[3]				
B	77	38	4	3
E	73	16	10	4
M	178	17	11	4
V	22	45	5	9
W	54	43	13	11
FIT	132	27	8	7
MASTER (M.SC.), GERMAN-LANGUAGE	**505**	**29**	**7**	**5**
of which[3]				
B	62	50	5	5
E	101	22	13	10
M	155	19	3	2
V	61	41	7	7
W	94	28	10	5
FIT	32	41	6	3
MASTER (M.SC.), ENGLISH-LANGUAGE, INCL. JOINT MASTER	**167**	**24**	**84**	**83**
of which[3]				
B	22	55	95	95
E	37	30	97	95
M	85	11	72	72
V	23	35	96	96
NIT (MBA, M.A.)	**12**	**25**	**75**	**75**

6.1.10 DEVELOPMENT OF GRADUATE NUMBERS

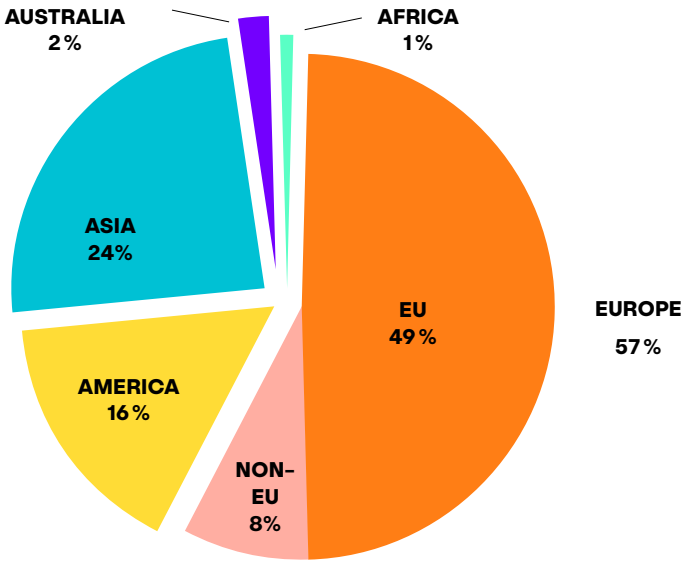


6.1.11 STUDENT EXCHANGES

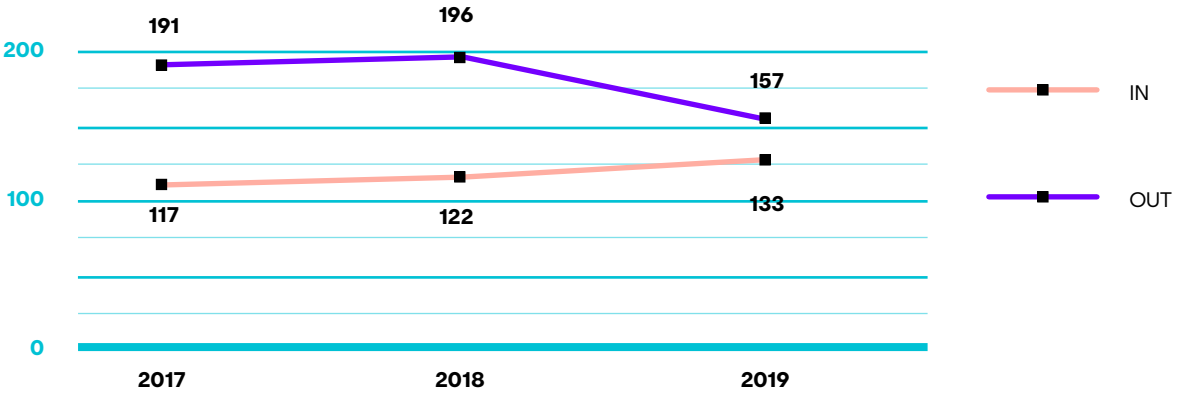
APPROX. 140 EXCHANGE COOPERATION AGREEMENTS IN 47 COUNTRIES

of which 69 ERASMUS (As at: Winter Semester 2019/20)

LOCATIONS OF EXCHANGE PARTNERS



DEVELOPMENT OF MOBILITIES ACHIEVED FROM THE TU HAMBURG (OUT) AND TO THE TU HAMBURG (IN)



TOP 3 COUNTRIES FOR STUDENT MOBILITY IN 2018/19

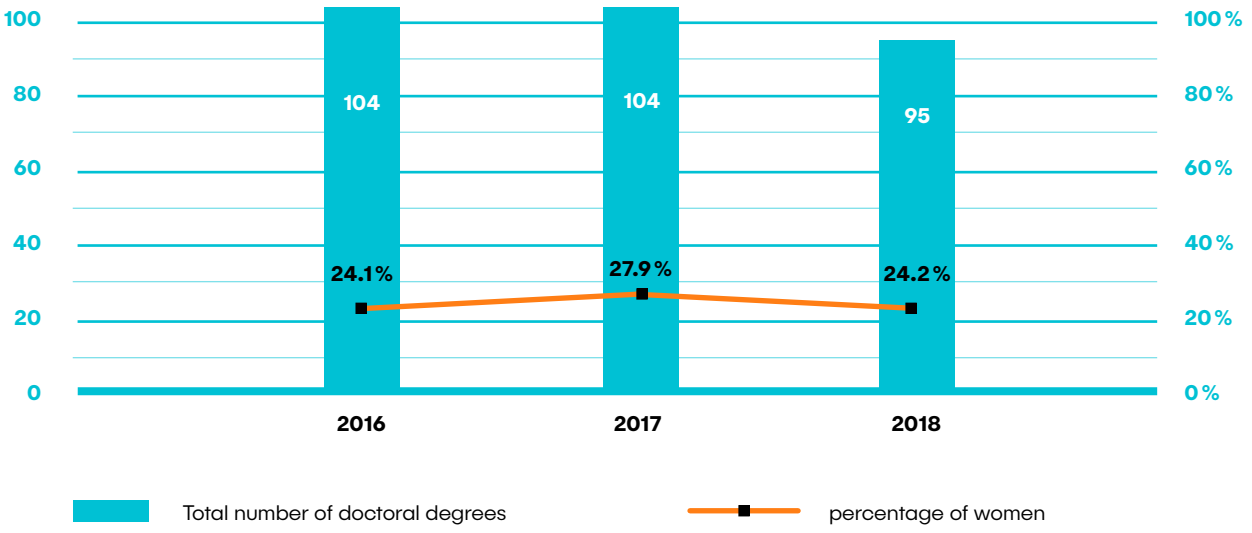
	OUTGOING	NUMBER
1.	Sweden	18
2./3.	Spain / USA	11

	INCOMING	NUMBER
1.	France	31
2.	Spain	19
3.	Mexico	13

6.2 RESEARCH

6.2.1 DOCTORAL DEGREES AND HABILITATIONS

NUMBER OF DOCTORAL DEGREES COMPLETED	2017	2018	2019
TOTAL	**104**	**104**	**95**
Percentage of women	24.1	27.9	24.2
Doctoral degrees per occupied professorship (W2/W3)	1.2	1.2	1.1
NUMBER OF HABILITATIONS COMPLETED	**2017**	**2018**	**2019**
TOTAL	**0**	**1**	**2**
Percentage of women	.	100	50.0



DOCTORATES BY SCHOOL OF STUDY[1]	2017		2018		2019	
	Number	Percentage of women	Number	Percentage of women	Number	Percentage of women
B	6	50.0	6	33.3	7	42.9
E	18	5.6	17	29.4	15	6.7
G	6	0.0	6	33.3	3	33.3
M	44	20.5	37	13.5	45	15.6
V	20	40.0	24	37.5	19	52.6
W	10	40.0	14	42.9	6	16.7
TOTAL	**104**	**24.1**	**104**	**27.9**	**95**	**24.2**

DOCTORAL DISSERTATIONS PER OCCUPIED W2/W3 PROFESSORSHIP IN 2019 BY SCHOOL OF STUDY[1]	2017	2018	2019
B	0.6	0.7	0.8
E	0.8	0.7	0.6
G	1.5	1.5	0.8
M	1.5	1.3	1.6
V	2.2	2.4	1.9
W	0.8	1.1	0.5
TOTAL	**1.2**	**1.2**	**1.1**

[1] *(B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology*

6.2.2 RESEARCH PROJECTS AND RESEARCH RESOURCES

KEY FIGURES (TU HAMBURG AND TUTECH INNOVATION GMBH BUSINESS DATA)	2017	2018	2019
Number of third party funded research projects	661	676	757
of which funded by			
DFG	136	126	145
BMBF (and other Ministries)	167	181	176
Federal state	43	43	67
EU, International	38	40	45
Other (e.g. DAAD, Fraunhofer Society, German Federation of Industrial Research Associations, Volkswagen Foundation)	127	126	87
Direct industrial research (Tutech Innovation GmbH)	150	160	237
Approved third-party funding in EUR '000	44,502	50,187	45,241
Third party funding income in EUR '000	40,690	42,939	45,368
of which DFG in EUR '000	8,126	8,580	9,257
Third party funded employees (FTEs, preliminary figures)	435	399	412
of which scientific staff	390	374	386

RELATIVE FIGURES	2017	2018	2019
Income from third-party funding and other earmarked income (excl. HSP) per occupied professorship in EUR '000	432	467	482

6.2.3 TECHNOLOGY TRANSFER

SERVICES PROVIDED IN 2019 BY SCHOOL OF STUDY[1]

SERVICES	B	E	G	M	V	W	TOTAL
Lectures at scientific conferences and seminars	54	138	34	221	98	75	620
of which abroad	29	74	9	126	63	25	326
Participation in organizing scientific conferences	7	35	7	46	10	17	122
of which leadership	2	5	5	12	7	11	42
Membership of coordinated DFG programs	5	7	0	14	14	0	40
of which research groups	.	0	0	1	3	0	4
of which priority programs	1	5	0	5	6	0	17
of which graduate colleges	2	1	0	3	2	0	8
of which collaborative research centers	.	1	0	4	2	0	7
Expert activities for the DFG	5	22	0	68	15	1	111
Research cooperation with business and public institutions	203	61	11	176	33	63	547
of which in Hamburg Metropolitan Region	34	27	5	79	7	37	189
Membership of executive and advisory boards	14	19	6	59	39	31	168
of which in scientific associations	6	15	6	41	34	19	121
of which in industry, business and public institutions	6	3	0	18	5	12	44
Number of startups launched	1	0	0	3	0	1	5
Inventions disclosed (PVA)[2]	2	2	0	10	7	1	22
Patents granted (PVA)[2]	1	1	1	2	1	0	6
Trade fair participation	1	12	2	7	5	1	28
School sponsorships	2	6	4	8	4	2	26
Marketing events	4	17	2	46	5	10	84

[1] *(B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology*

[2] *(PVA) Patent Exploitation Agency of Hamburg universities*

PUBLICATIONS BY SCHOOL OF STUDY[1, 2]	B	E	G	M	V	W	TOTAL
Publications in scientific journals	21	83	24	211	146	41	526
Conference reports	1	1	0	0	0	6	8
Articles in conference reports	35	131	6	129	12	29	342
Doctoral dissertations, habilitations	5	16	3	54	27	9	114
of which Open Access	3	7	0	27	6	3	46
Reference works	0	1	1	2	1	5	10
Articles for reference works	6	1	16	5	19	25	72
Open Access publications	9	51	11	100	43	31	245

TUTECH INNOVATION GMBH – KEY FIGURES	2017	2018	2019
Newly approved orders in cooperation with the TU Hamburg in EUR '000	6,906	9,188	8,020
Income in connection with departments of the TU Hamburg in EUR '000	7,281	8,031	8,934
Funding from the R&T framework program and other EU programs (approved TU Hamburg applications)	4	11	12
TUTECH ACADEMY events (number of events/attendees)	-	17 / 271	10 / 140

STARTUP DOCK – BUSINESS STARTUPS AT HAMBURG UNIVERSITIES	NUMBER
Startup inquiries	58
of which by TU Hamburg alumni, students, employees	41
Ongoing EXIST funding[3]	5
Formal startups with TU Hamburg alumni, students, employees	2

[1] (B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology

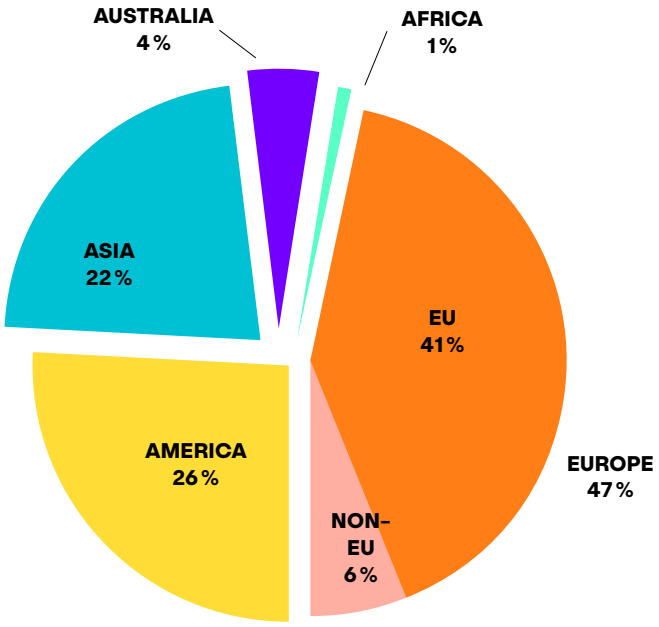
[2] Source: TORE (TU Hamburg research information system) as of April 3, 2020

[3] (EXIST) Funding program of the Federal Ministry for Economic Affairs and Energy (BMWi) that assists university graduates, academic staff and students with preparations for their technology-oriented and knowledge-based business startups

6.2.4 INTERNATIONAL UNIVERSITY RESEARCH COOPERATION

INTERNATIONAL UNIVERSITY RESEARCH COOPERATION AGREEMENTS: 116

LOCATIONS OF RESEARCH PARTNERS



COUNTRIES WITH THE MOST COOPERATIONS (TOP 5)	NUMBER	PERCENTAGE
USA	19	16
UK	9	8
France	7	6
Italy	7	6
China	6	5

6.3 PERSONNEL AND FINANCES

6.3.1 PERSONNEL IN SCHOOLS OF STUDY

OCCUPIED POSTS[1]	2017	2018	2019
Professorships	88	87	89
Junior professorships	6	5	5
Senior engineers	59	60.7	60.5
Scientific employees	224	262.9	252.8
Technical and administrative staff	190.5	185.3	180.4

6.3.2 ACADEMIC PERSONNEL IN SCHOOLS OF STUDY[2]

OCCUPIED POSTS[3]	B	E	G	M	V	W	TOTAL
Professorships	9	24	4	29	10	13	89
Junior professorships	0	1	0	2	2	0	5
Senior engineers	8.6	12	3	21.9	9	6	60.5
Scientific employees	24.5	72.3	15.1	70.6	36.9	33.6	252.8

[1] Budgeted positions, FTEs, as of December 2019

[2] (B) Civil Engineering; (E) Electrical Engineering, Computer Science and Mathematics; (G) Vocational Subject Education; (M) Mechanical Engineering; (V) Process Engineering; (W) Management Sciences and Technology

[3] Budgeted positions, FTEs, as of December 2019

6.3.3 THIRD-PARTY FUNDING

INCOME IN EUR '000	2019	2020 (PLAN)
Total income from transfer payments (third-party funding)[1]	45,325	41,000
of which Tutech Innovation GmbH in cooperation with Institutes	8,934	o. A.

6.3.4 TU HAMBURG BUSINESS PLAN

PROFIT PLAN *(in EUR '000)*	RESULT 2019	PLAN 2020
INCOME		
Income from business activity	93,650	83,968
of which operating subsidy for ongoing commitments	72,339	71,068
Income from transfer payments (third-party income)	32,817	41,000
Income from fees and change in inventories of unfinished products and services	3,740	3,600
Other income	10,231	8,200
of which income from release of special item for investment grants	7,824	5,890
TOTAL INCOME	**140,438**	**136,768**
EXPENDITURE		
Expenditure on business activity (incl. third-party funding and student fees)	15,214	13,626
Personnel expenditure (incl. third-party funding and student fees)	101,393	98,302
Expenditure on transfer paymtents	4,498	5,700
Depreciation	9,209	7,570
Other expenses	12,524	15,085
TOTAL EXPENDITURE	**142,838**	**140,283**

[1] *Third-party income includes third-party projects of TU Hamburg institutes that were handled by Tu-tech Innovation GmbH*

6.2 RANKINGS

CENTRUM FÜR HOCHSCHULENTWICKLUNG (CHE) 2019

Positions in the leading group for: Studies

- International alignment (master's)
- Environmental/Civil Engineering
- Electrical Engineering and Information Technology
- Process Engineering
- Mechatronics

Position in the leading group for: Contact with career practice (bachelor's)

- Biotechnologie Verfahrenstechnik

Positions in the leading group for: Graduation in appropriate time (master's)

- Civil Engineering
- Electrical Engineering and Information Technology

Positions in the leading group for: Support at start of studies

- Process Engineering
- Biotechnology Process Engineering
- Engineering Sciences, interdisciplinary Process Engineering

TIMES HIGHER EDUCATION (THE) WORLD UNIVERSITY RANKING 2020

In the Top 600 overall of around 1,400 participating universities. Among the Top 150 in the Third-party Funding from Industry category; above the median in four out of five assessed categories

U MULTIRANK 2019

Rated "Very Good" or "Good" in 25 categories. In the leading international group for third-party income. Among Global Top 25 Performers for International Orientation of Programs in Mechanical Engineering (School of Process Engineering).

Positions in the leading group for: Research

- Third-party funding income
- Interdisciplinary publications
- Strategic research partnerships

Positions in the leading group for: Knowledge Transfer

- Co-publications with industry partners
- Income from non-public sources
- Co-patents with industry
- Spinoffs

Publications quoted in patents the leading group for: Regional Roots

- B.Sc. graduates employed in the region

Master's Degree within Standard Study Period category

- Rated "Good" by 83 percent

WIRTSCHAFTSWOCHE 2019

Among the Top 10 in economics for the International Management and Engineering study pro-gram.

LIST OF ABBREVIATIONS

A

ASPF · Senatsausschuss für stragische Planung der Forschung

B

BMBF · Federal Ministry of Education and Research
BMWi · Federal Ministry for Economics and Energy
BWFG · Hamburg Ministry for Science, Research and Equality
BWVI · Hamburg Ministry for Economics, Transport and Innovation

C

CML · Fraunhofer-Center for Maritime Logistics und Services

D

DAAD · German Academic Exchange Service
DESY · Deutsches Elektronen-Synchrotron
DFG · German Research Foundation
DLR · German Aerospace Center

E

ECIU · European Consortium of Innovative Universities

F

FhG · Fraunhofer Society
fmthh · Research Center for Medical Technology Hamburg

H

HAW · Hamburg University of Applied Sciences
HCU · HafenCity University Hamburg
HHX · HamburgX (Cluster of the Hamburg research funding)
HI · Hamburg Innovation GmbH
HIP · Hamburg Innovation Port
HmbHG · Hamburg Higher Education Act
HOOU · Hamburg Open Online University
HOS · Hamburg Open Science
HSP · Special University Pact
HSU · Helmut Schmidt-University
HZG · Helmholtz-Center Geesthacht

I

I^3 · Interdisciplinarity, Engineering Sciences (Ingenieur-swissenschaften) and Innovation (TU Hamburg reseach contest)
IAPT · Fraunhofer-Research Institution for Additive Manufacturing Technologie

N

NIT · Northern Institut of Technology Management

Q

QPFL · Qualification Research-based Learning at TU Hamburg

S

SUB · Hamburg State and University Library

T

THF · Technology Center Hamburg-Finkenwerder

U

UHH · University of Hamburg
UKE · University Medical Center Hamburg-Eppendorf

Z

ZAL · Center of Applied Aeronautical Research
ZHM · Centre for High Performance Materials
ZLL · TU Hamburg Center for Teaching and Learning

IMPRINT

PUPLISHER

Präsident der TU Hamburg

EDITORIAL STAFF

Dr. Johannes Harpenau, Dr. Oliver Rayiet

LAYOUT

formlabor

PICTURE CREDITS

Photography

© TU Hamburg Marketing – Eva Haeberle (S. 13, S. 15, S. 18);

© Andreas Heddergott / TU Muenchen (S. 24);

© privat (S. 21)

Coporate Design Gstrheinländer Worldwide GbR

PRINT

Hans Steffens Graphischer Betrieb GmbH

Gedruckt auf 100% Recyclingpapier, RecyStar polar

Technische Universität Hamburg

Am Schwarzenberg-Campus 1

21073 Hamburg

August 2020