

TUM. The Entrepreneurial University

Technical University of Munich



# Who We Are

**TUM at a Glance**

# TUM Facts and Figures

(Statistics 2022)



8

Schools and  
Departments



more than

9,500

Graduates per year



18

Nobel Prize  
Laureates



8

Humboldt  
Professorships

643

Professors



176

ERC Grants  
(since 2008)



>1,000

Research  
Agreements p.a.





**TUM has been named German  
University of Excellence three  
consecutive times.**



# A Leader in Academic Rankings

QS World University  
Rankings 2023-24

No. **1** 

in Germany

 No. **37**  
in the world

THE World University  
Rankings 2022-23

No. **1** 

in Germany

 No. **30**  
in the world

Shanghai World University  
Ranking 2022

No. **1** 

in Germany

 No. **56**  
in the world

# 18 Nobel Prize Laureates

Scientists and alumni of the Technical University of Munich have received the Nobel Prize in four fields: chemistry, literature, medicine and physics.

# 24 Leibniz Prize Laureates (DFG)

TUM members received the most prestigious award for scientists and scholars at German research institutions 24-times, including 10 distinctions in the last decade alone.





# Milestones

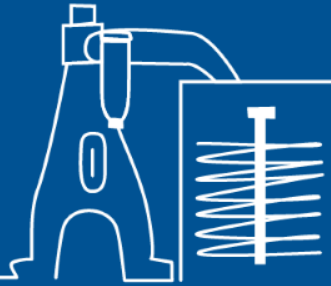
King Ludwig II  
of Bavaria founded  
the Polytechnische  
Schule München

**1868**



**1875**

Carl von Linde  
constructs the first  
functioning  
refrigeration  
machine.



Graduate Rudolf Diesel  
develops the engine that  
will come to bear his name,  
based on an idea he had  
as a student.

**1893**



# Milestones

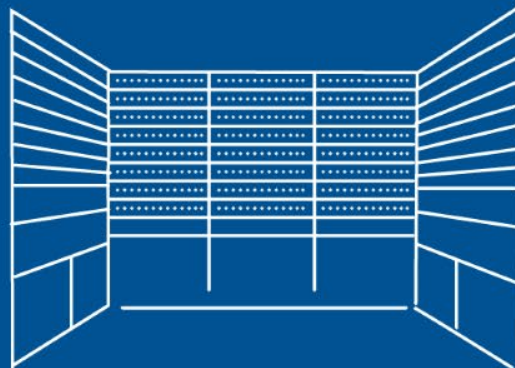
Hans Fischer  
synthesizes blood's  
red colorant, hemin,  
in a test tube  
(Nobel Prize, 1930).

**1928**



**1956**

The Programmgesteuerte  
Elektronische  
Rechenanlage München  
(PERM) is developed. It is  
the fastest computer in the  
world at the time.



**1985**

Robert Huber  
unlocks the secrets  
of photosynthesis  
(Nobel Prize,  
1988).



# Milestones

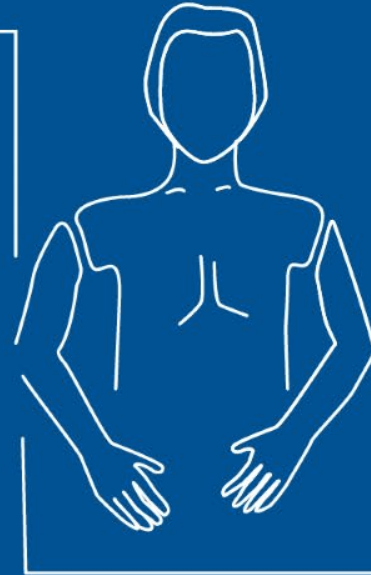
**1997**

A groundbreaking machine learning method – long short-term memory (LSTM) – is developed. Today, it serves as the basis of technologies such as speech recognition



**2000**

The world's first minimally invasive heart valve operation is performed.



A patient receives the first-ever double arm transplant.

**2008**



# Milestones



**2014**

Researchers map the human proteome.



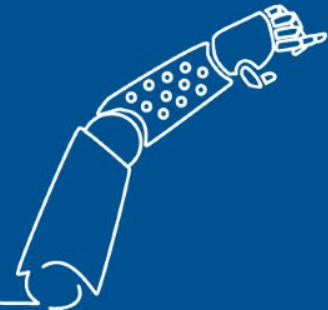
**2018**

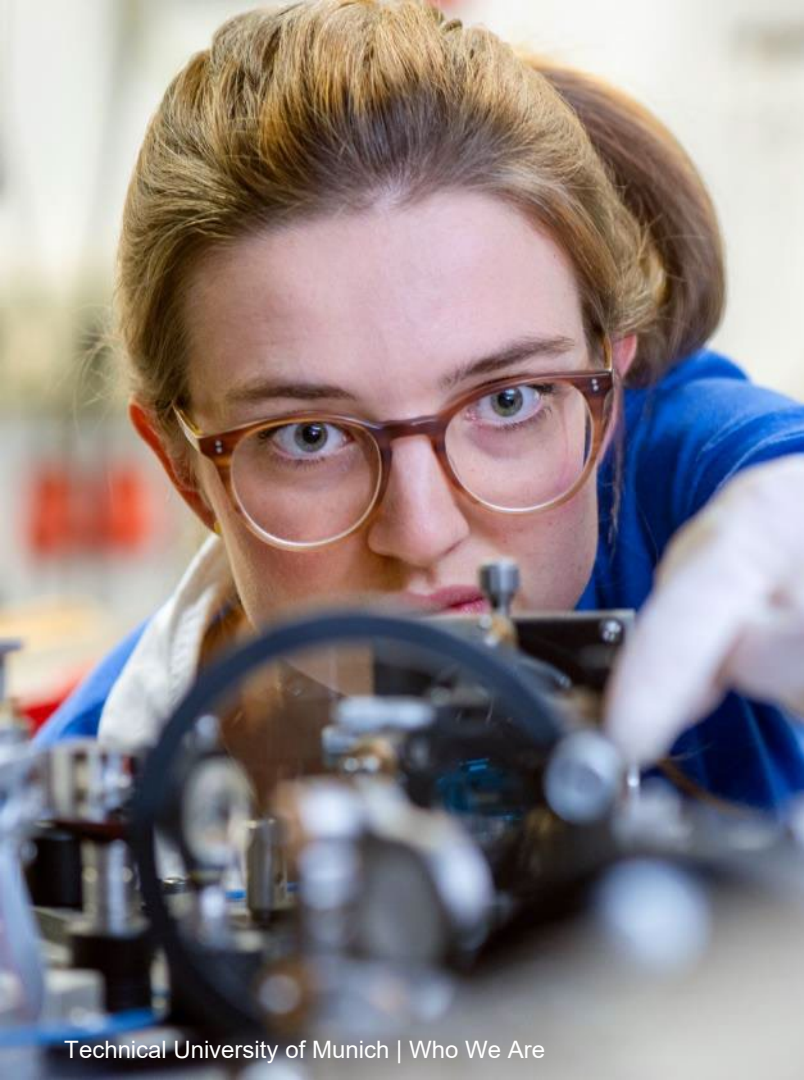
The source of an extragalactic neutrino is identified for the first time.



**2019**

Artificial skin with sensory abilities is developed for human-sized autonomous robots.





# Our Vision

As a leading entrepreneurial university, we are a site of global knowledge exchange, shaping the future with talent, excellence and responsibility.

# Our Mission

We inspire, promote and develop talents in all their diversity to become responsible, broad-minded individuals and empower them to shape the progress of innovation.



# Our Core Values

The foundation of our relationships with one another and our cooperation partners in research, teaching and innovation are our core values:

- Academic Excellence
- Entrepreneurial Mindset
- Professional Collegiality
- Resilience to Change

# Locations

A University born in Bavaria

TUM spans six large sites in Bavaria and one in neighboring Baden-Wuerttemberg.



# TUM Campus Downtown Munich

- TUM School of Computation, Information and Technology
- TUM School of Engineering & Design
- TUM School of Management
- TUM School of Social Sciences & Technology
- Hochschule für Politik München





# TUM Campus Garching

- TUM School of Natural Sciences
- TUM School of Computation, Information and Technology
- TUM School of Engineering & Design



# TUM Campus Heilbronn

- TUM School of Management

# TUM Campus Straubing

- Biotechnology
- Sustainability





# TUM Campus Weihenstephan

- TUM School of Life Sciences

# TUM Science & Study Center

- Located in a former monastery in Raitenhaslach in the Southeast of Bavaria
- Full service, year-round conference facility



# A University with a Global Mindset

TUM has set its sights on internationalization and cooperation, therefore the university is a sought after partner for leading institutions of science and technology around the world.



# TUM Global

- EuroTech Alliance
- International locations and strategic initiatives
- Flagship partners

**150+** partner universities worldwide

**350+** Erasmus partnerships across Europe



# TUM Asia (GIST) Singapore

In 2002 TUM Asia became the first overseas campus of a German university. The German Institute of Science and Technology (GIST) is bringing national engineering excellence to the technology hub of Southeast Asia.

628 Bachelor graduates in 2020  
1,171 Master graduates in 2020



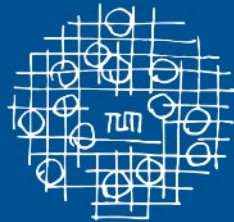


# TUM School Transformation

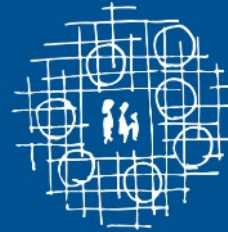
We are creating a new internal structure to promote innovation



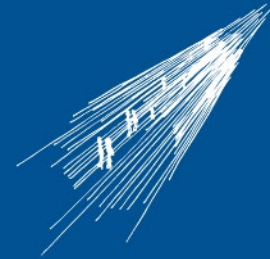
From a department structure  
to a matrix organization of  
schools



Fostering collective creativity  
and transdisciplinary teams

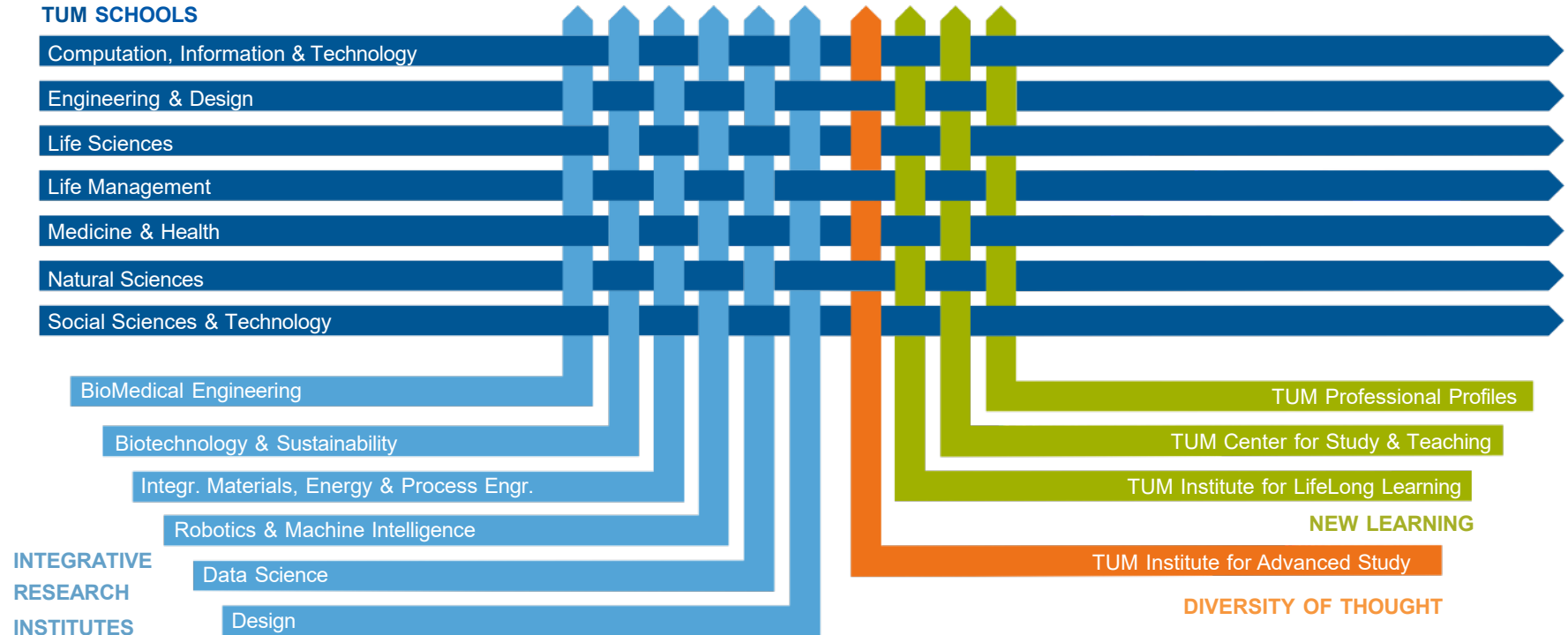


Integrating humanities and  
social sciences



Connecting people across  
disciplinary, institutional,  
cultural and generational  
boundaries

## TUM Matrix. Bridges to Innovation

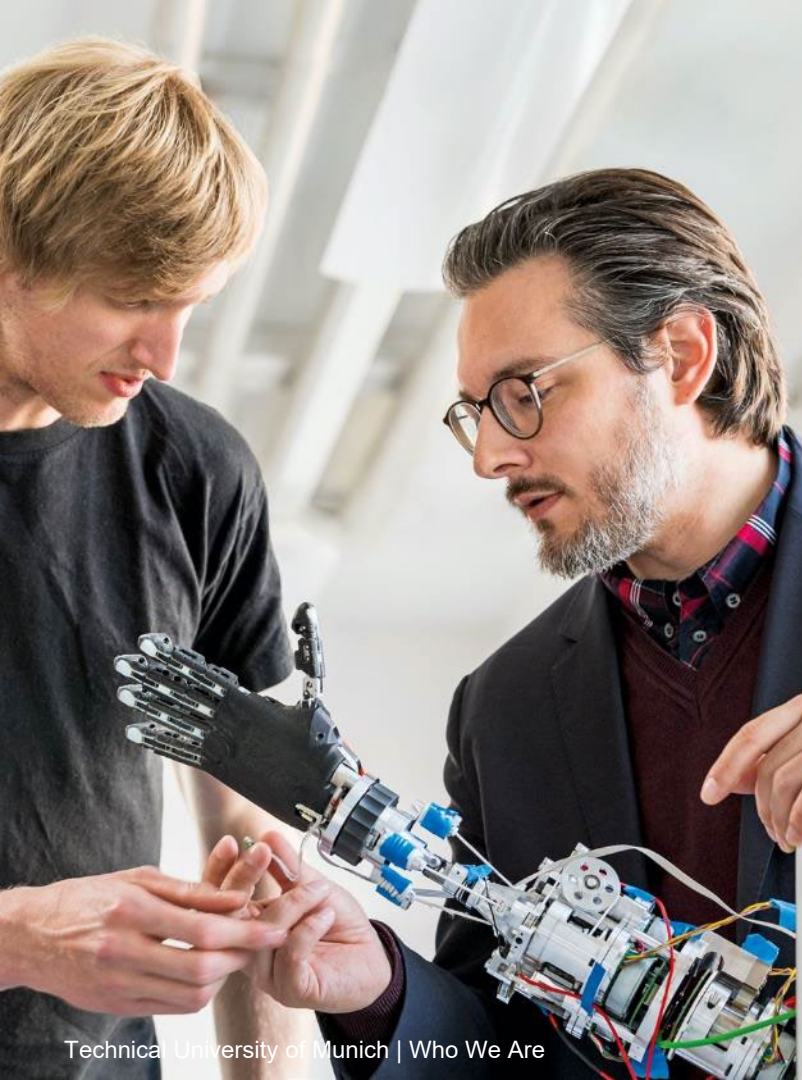




# Integrative Research Institutes (IRI)

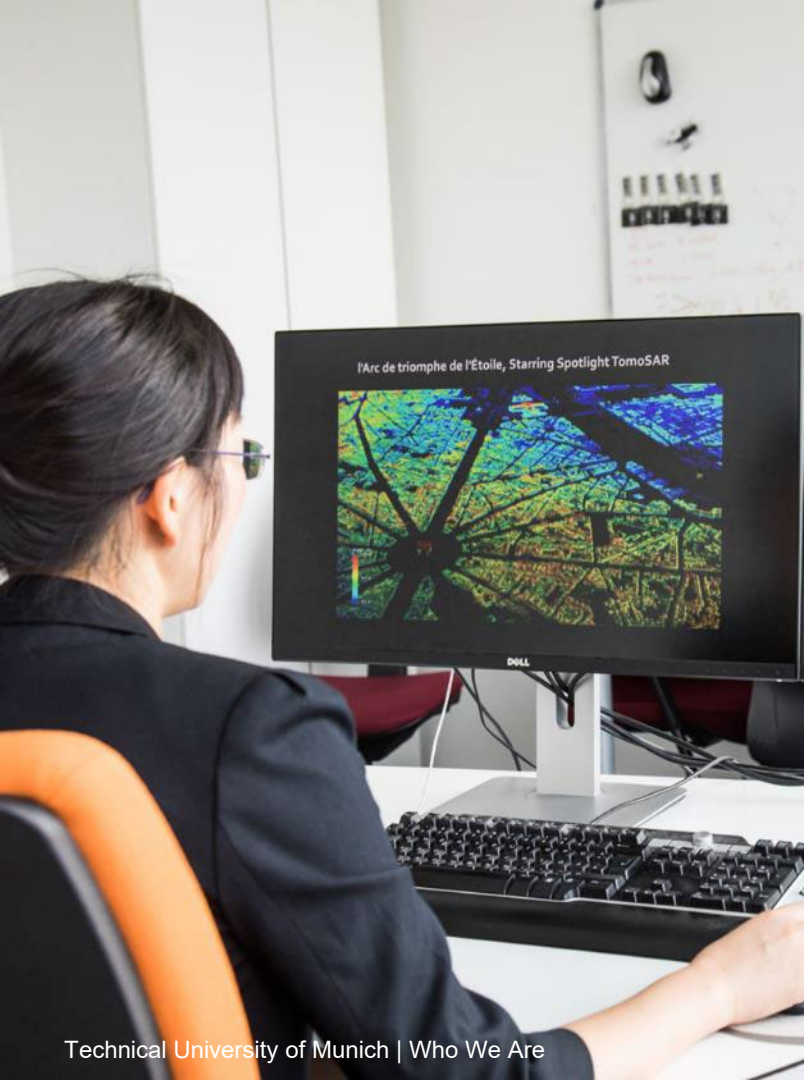
Addressing future-focused issues through transdisciplinary approaches to research and teaching.





# Munich Institute of Robotics and Machine Intelligence (MIRMI)

- The MIRMI is focused on transdisciplinary work around machines in the fields of **health, work and mobility**.



# Munich Data Science Institute (MDSI)

- The MDSI is TUM's central interface and innovation hub for questions and solutions arising from **Data Science, Machine Learning and Artificial Intelligence**, connecting people and ideas across disciplines.





# Munich Institute of Integrated Materials, Energy and Process Engineering (MEP)

- The institute is engaged in teaching and research in the areas of **Environment & Climate, Energy & Raw Materials and Mobility and Infrastructure.**



# Munich Institute of Biomedical Engineering (MIBE)

- At the MIBE researchers from a variety of academic disciplines work together to build foundations for new ways to **diagnose and treat diseases** and for technologies that compensate for physical disabilities.





# TUM Institute for Advanced Study (TUM-IAS)

- The IAS serves as a **flagship institute for top-level international research** at TUM, and has helped to drive the university's development into one of Germany's top academic institutions under the auspices of its strategy

# Clusters of Excellence Pioneering Research

The current four research clusters investigate the **scientific challenges of our time** in the areas of quantum science, neurology, energy supply and the origin of life.

Since 2006 Clusters of Excellence have greatly sharpened TUM's profile as one of Europe's leading research universities.

Cluster of Excellence

# ORIGINS

ORIGINS Cluster of Excellence searches for the **connection between planet formation and the formation of the first prebiotic molecules.**

Joint applicants are LMU Munich, the Max Planck Institutes of Astrophysics, Biochemistry, Extraterrestrial Physics, Physics and Plasma Physics, the European Southern Observatory (ESO), the Leibniz Supercomputing Center, and the Deutsches Museum.



Cluster of Excellence

# SyNergy

The SyNergy cluster promotes integrative research into a broad range of neurological diseases, with the aim to **improve pathomechanistic understanding and eventually therapeutic options.**

It is a joint project with LMU Munich, the Max Planck Institutes of Biochemistry, Neurobiology and Psychiatry, the Helmholtz Zentrum München, and the German Center for Neurodegenerative Diseases.



Cluster of Excellence

# MCQST

Munich Center for Quantum Science and Technology (MCQST) comprises seven research units covering all areas of **Quantum Science and Technology (QST)** from basic research to applications.

It is a joint endeavor with LMU Munich, the Max Planck Institute of Quantum Optics, and the Walther-Meißner-Institute for Low Temperature Research.

Cluster of Excellence

# e-conversion

The e-conversion cluster has a focus on **investigating fundamental mechanisms of energy conversion processes**.

It is a collaborative effort by LMU Munich, the Max Planck Institutes for Solid State Research, and Chemical Energy Conversion.





# TUM Institute for LifeLong Learning

The TUM Institute for LifeLong Learning (IL3) brings together all **further education programs** at TUM and offers a wide range of lifelong learning opportunities for:

- Executives & Professionals
- TUM Employees
- TUM Students

# What Drives Us

## 6 Accelerators



What Drives Us: Accelerator 1

# Understanding the essential foundations of life



What Drives Us: Accelerator 2

# Maintaining health and targeting diseases



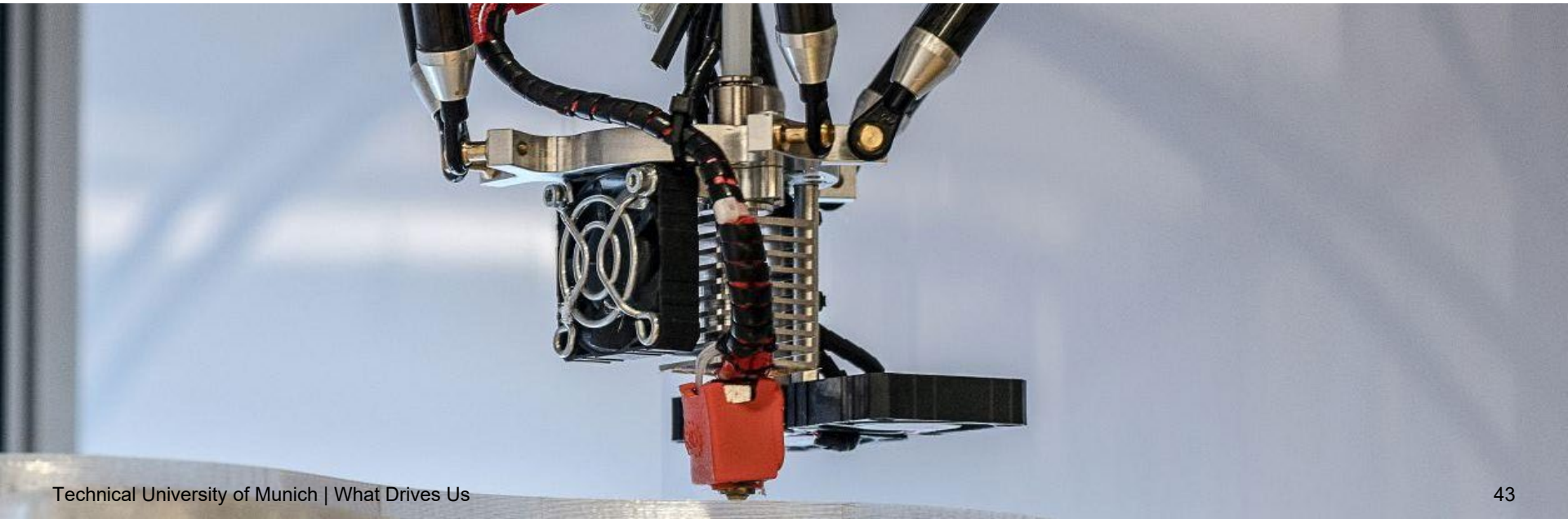
What Drives Us: Accelerator 3

# Shaping a sustainable living environment



What Drives Us: Accelerator 4

# Creating new materials and advanced manufacturing technologies





What Drives Us: Accelerator 5

# Pioneering the digital transformation for a secure future



What Drives Us: Accelerator 6

# Responsible research and innovation in service of society



# Sustainability as a Guiding Principle

The TUM Sustainability Office focuses on how the university can be more sustainable and environmentally friendly while increasing its contribution to global efforts.



# Sustainability as a Research Topic

Sustainability is also a key research and education topic: The international TUM-led AmazonFACE project assesses the impact of increased atmospheric CO<sub>2</sub> on the Amazon rainforest.



# Who Sets Us Apart

## People of TUM

# Diverse Talent Community

(Statistics 2022)



105

Tenure Track  
Professorships



41%

International  
Students



7,453

Researchers

11,758

Staff Members



36%

Female Students



86,153

Active Alumni



81

TUM Emeriti  
of Excellence

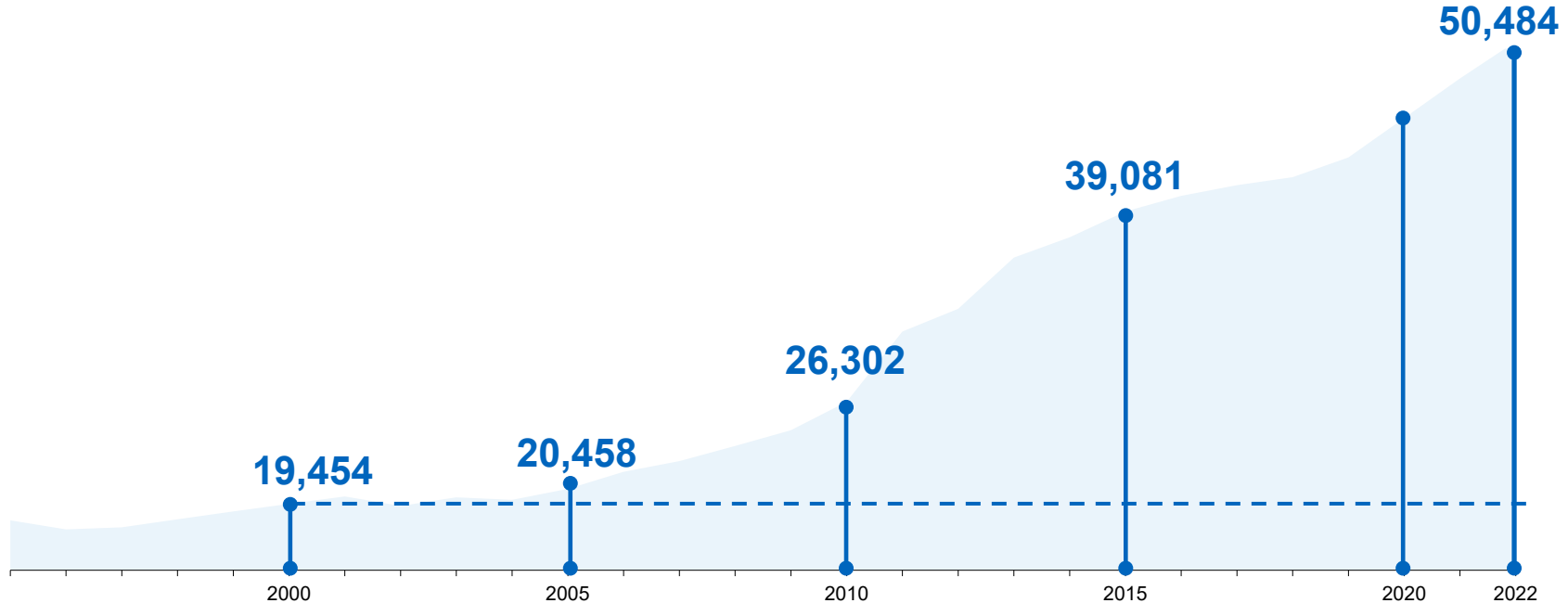


# International Student Body

The number of students pursuing one of the university's 181 Bachelor and Master degrees has been growing steadily to the record figure of today.



# Growth Path Student Enrollment





# Global Attraction

(Statistics 2022)

More than

20,800

International  
Students

→	China:	18%
→	Turkey:	10%
→	India:	9%
→	Italy:	4%

168

International  
Appointments of  
Professors

(2021–2022)

# Student Engagement and Campus Life

Our students are actively involved in **numerous projects, initiatives and associations** to immerse themselves in campus life.

# Student Engagement and Campus Life

The by-students-for-students **TUM Speakers Series** has been inviting leaders and shapers such as Bill Gates, Tony Blair and Ban Ki-moon to university's campus for over 20 years.



# Hyperloop Student Initiative

Founded in 2015 the TUM student team won all editions of Elon Musk's **Hyperloop Pod Competition** by setting new speed world records.

Inspired by the passion of our students, the Department of Aerospace and Geodesy has initiated its own Hyperloop research program.



# TUM Entrepreneurs

The university launches 70 to 80 technology-based start-ups each year and offers aspiring founders a wide range of consulting, research and qualification services as well as a strong support network.





**TUM has set itself the goal of becoming one of the most successful high tech start-up universities in Europe in the years ahead.**

# Success Stories: The Unicorns

Three start-ups established by our alumni with the support of the university exceed \$1 billion in value. Among these is Lilium GmbH and its personal air vehicle.





# The Decacorn: Celonis SE

The first German start-up worth **ten billion dollars** was launched by three students with the support of TUM.

After crossing this threshold, Celonis is now **the second most valuable** start-up in Europe.

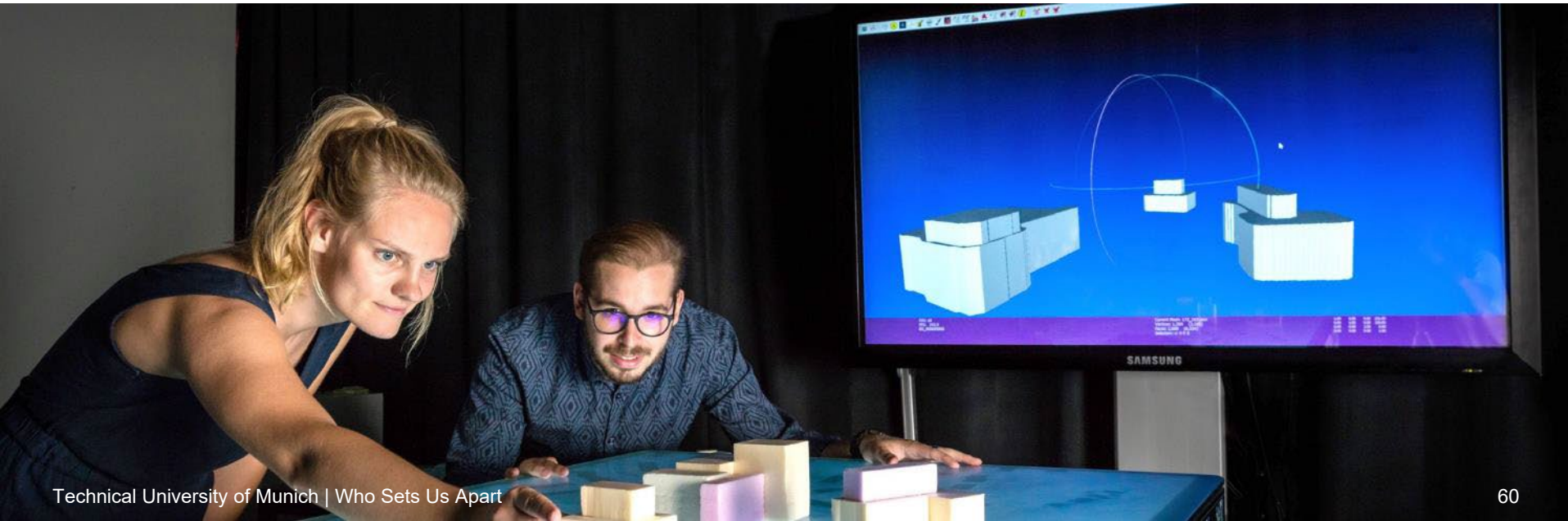
The provider of software helps companies analyze and improve their **business processes**.





# TUM Venture Labs

Fostering entire families of start-ups in key tech fields is the objective of the new TUM Venture Labs started in 2020.



# TUM Venture Labs

TUM Venture Labs are the new initiative of **TUM** and **UnternehmerTUM** with partner institutions and companies.

Leveraging the **unique research power**, the goal is to increase the quality and quantity of **scalable technology spin-offs** and ventures in the region **by a factor of ten**.

The resulting leading technology hub in Europe aims to become **a driving force** for the **future technological sovereignty of the continent**.

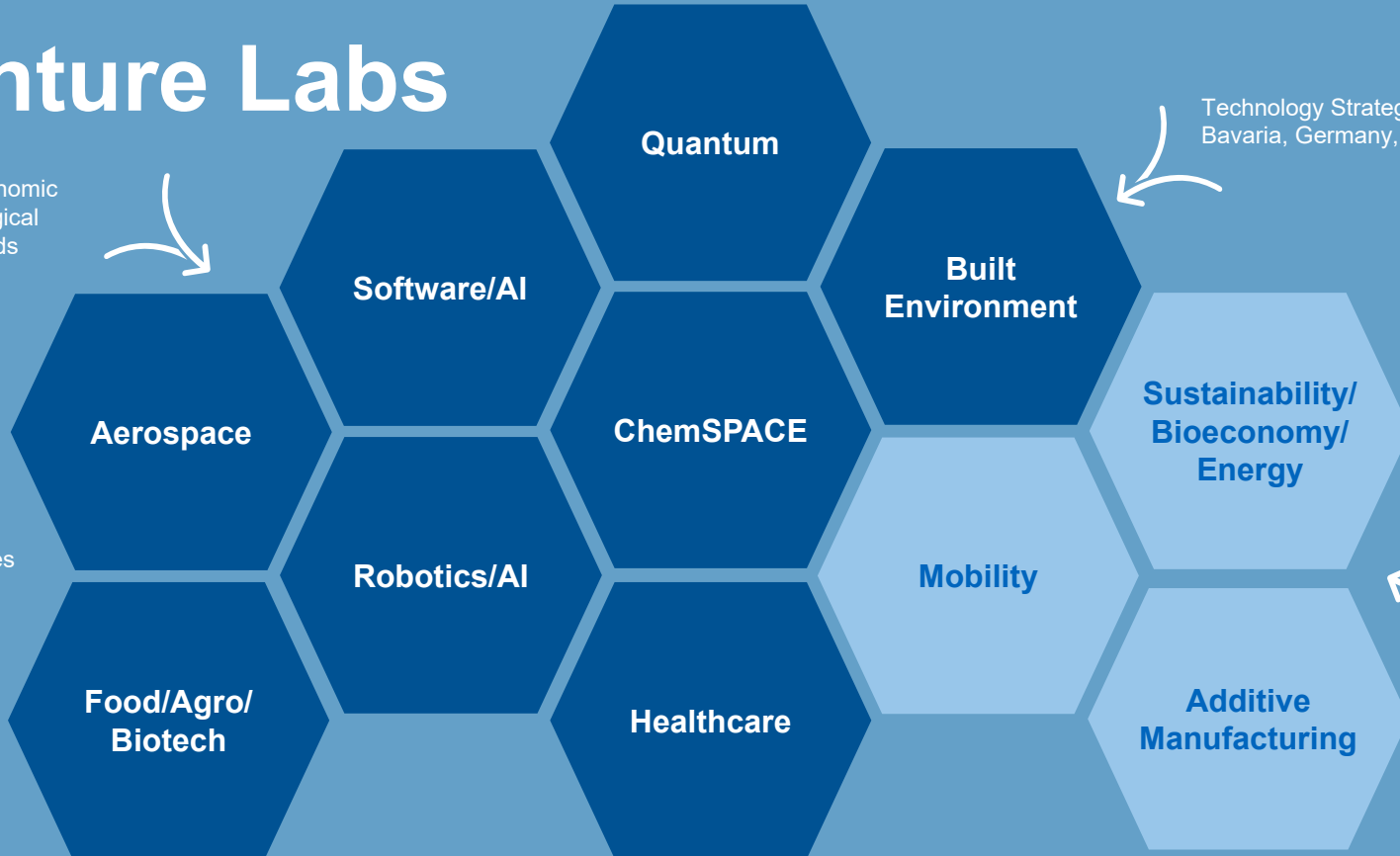


# Venture Labs

Social, economic  
& technological  
Mega Trends



Significant  
Market  
Opportunities



Technology Strategy  
Bavaria, Germany, EU



Unique  
Strengths  
of TUM/UTUM  
Ecosystem



# TUM Partners of Excellence



Airbus Group  
 ALTANA AG  
 AUDI AG  
 Bayerischer Bauindustrieverband e. V.  
 BMW AG  
 Robert Bosch GmbH  
 Busch Vacuum  
 Clariant International AG  
 Dräxlmaier Group  
 Evonik Industries AG  
 Google  
 Herrenknecht AG  
 HUAWEI  
 Infineon Technologies AG

Linde AG  
 MAN SE  
 Nestlé AG  
 Rohde & Schwarz GmbH & Co. KG  
 RWE Group  
 SAP SE  
 SGL CARBON SE  
 Siemens AG  
 TRUMPF GmbH + Co. KG  
 TÜV SÜD AG  
 vbw – Vereinigung der Bayerischen  
 Wirtschaft e. V.  
 Volkswagen AG  
 Wacker Chemie AG



# TUM University Foundation

A singular network of alumni, patrons and partners in Germany

Over 163 individual donors, including 26 Partners of Excellence | Endowment: € 57M | Value of funding in 2020: € 2.4M







TUM Campus Weihenstephan

# TUM School of Life Sciences





# TUM School of Life Sciences

Structural reform of the TU Munich:

TUM School of Life Sciences launched in October 2020 as the first of 7 schools





# Facts and Figures

(Statistics 2023)



3

Research  
Departments



4

TUM TechCore  
Centers



2

CRCs

~90

Professorships



29%

Female Professors



More than

4.600

Students



12

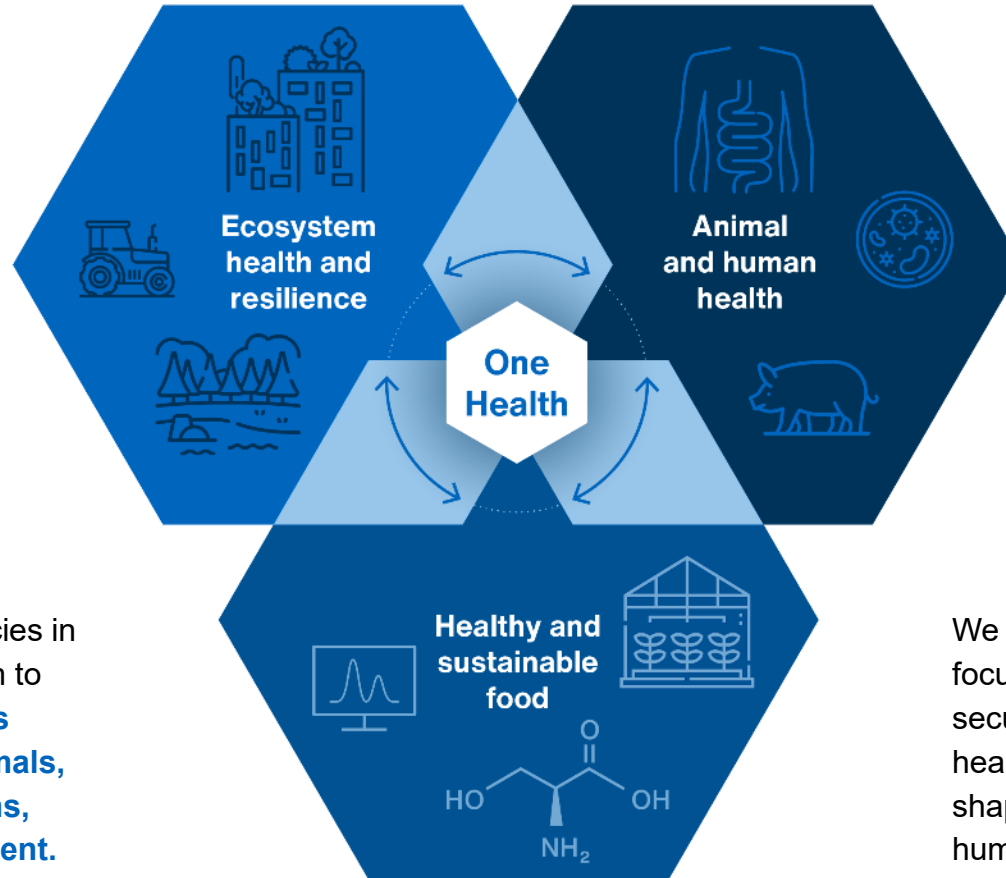
ERC Grants



# Working for One Health

3 Research Departments | 2 CRCs | 4 TUM TechCores

# TUM School of Life Sciences: Working for One Health



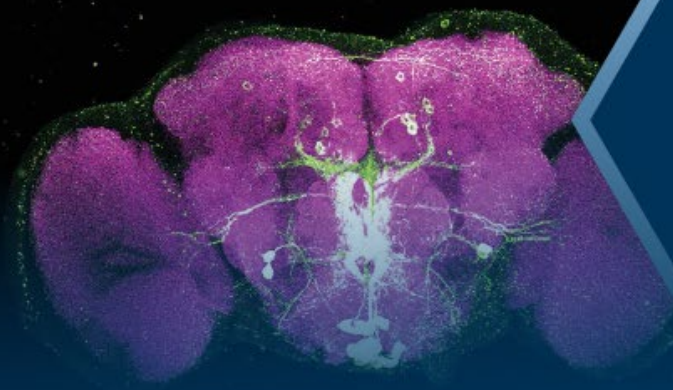
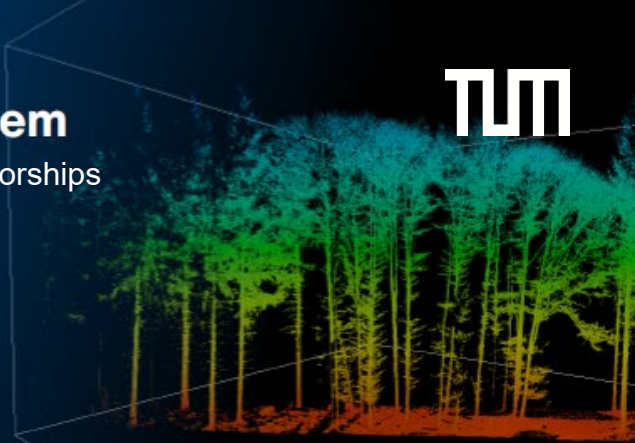
Bundling the competencies in the life sciences, we aim to understand **interactions between humans, animals, plants, microorganisms, soil, and the environment.**

We do interdisciplinary research focusing on „**One Health**“ to secure the foundations of healthy living and sustainably shape the coexistence of humankind.

**TUM School of  
Life Sciences:**  
Research Departments  
working for One Health

**Life Science System**

| 34 Professorships



**One  
Health**

**Molecular Life Sciences**

| 38 Professorships

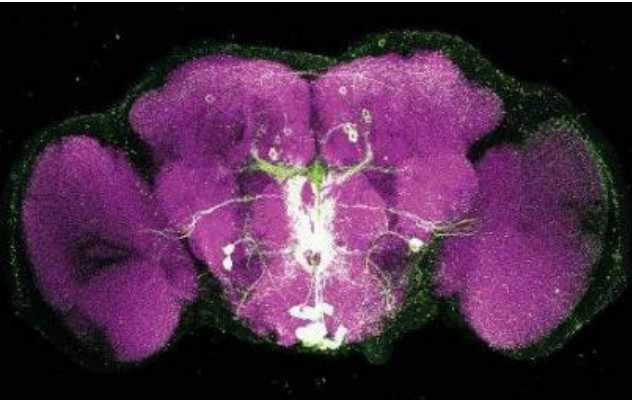
**Life Science Engineering**

| 16 Professorships



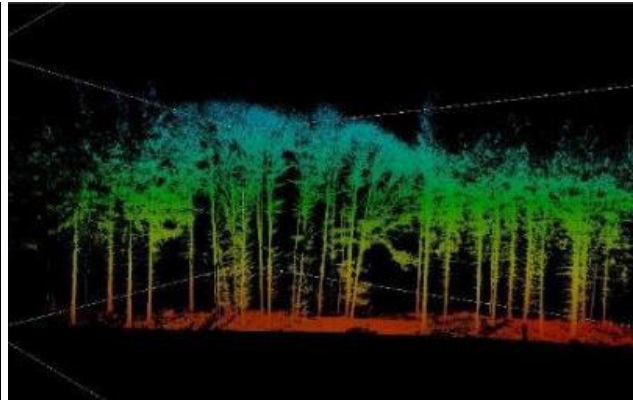


# Research Departments



## Molecular Life Sciences (MLS)

Explores biomolecular foundations from the molecule to the cell to entire organisms such as humans, animals, and plants.



## Life Science Systems (LSS)

Investigate systems in forestry and agriculture, including ecological, societal, and economic aspects, such as the causes and consequences of climate change.



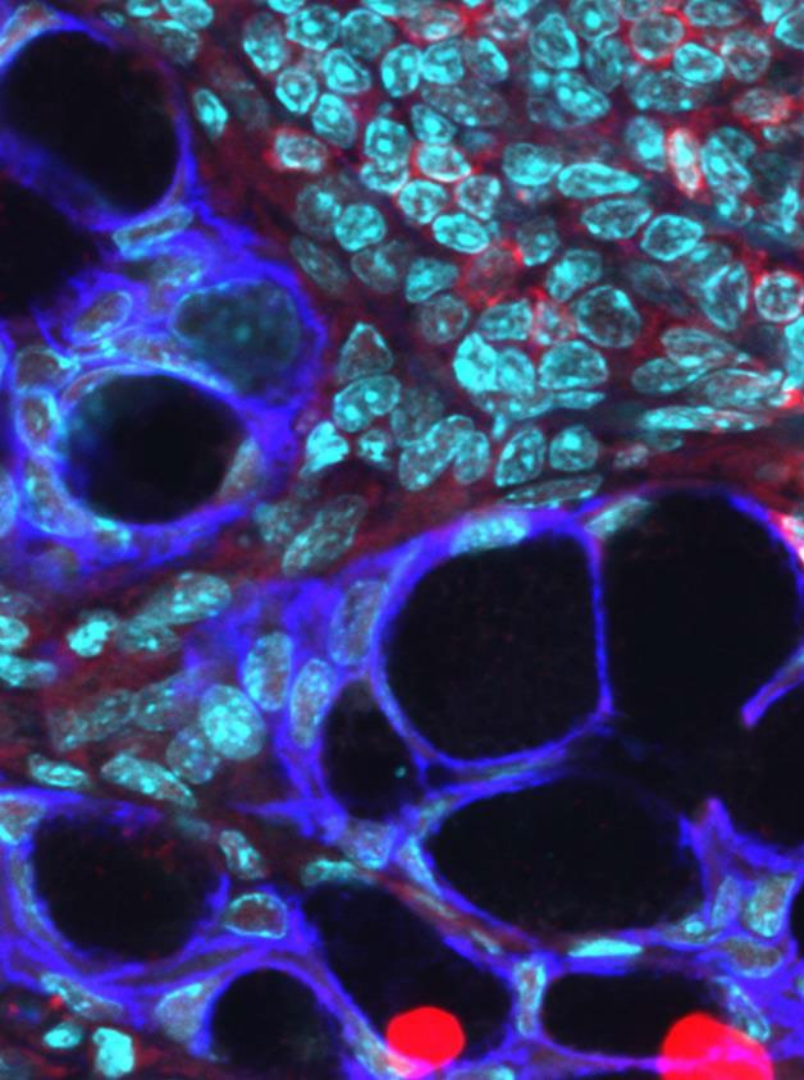
## Life Science Engineering (LSE)

Combines engineering with biological systems and food science, develops additive production processes using innovative biomaterials, and shapes the digitalization of value chains.

Collaborative Research Center (CRC) 924

# Molecular mechanisms regulating yield and yield stability in plants

The CRC 924 consortium investigates the molecular mechanisms responsible for yield-relevant properties in plants, such as fertilization success or pest and drought resistance, with the scope to **significantly accelerate plant breeding in the future**.



Collaborative Research Center (CRC) 1371

# Microbiome Signatures

The goal of the CRC 1371 initiative is to **understand the functional relevance of microbiome signatures** and to determine their precise contribution in a disease-specific manner.

FOR 2290

# Understanding Intramembrane Proteolysis

The FOR 2290 is dedicated to **defining the repertoire of substrates and their molecular architectures** in order to better understand the intramembrane proteases, which affect a wide range of important biological functions and are implicated in several severe diseases including Alzheimer's disease (AD).



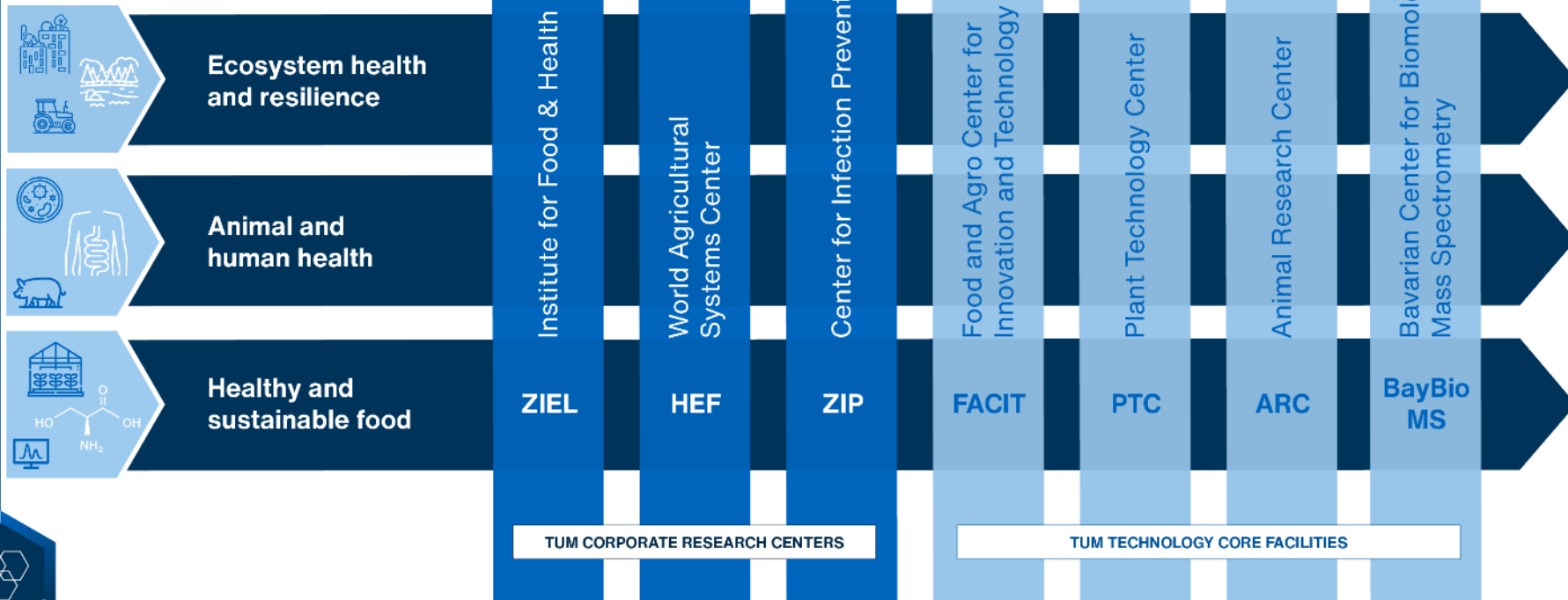
FOR 5298

# iMAGO – Personalized diagnostics for the treatment of obesity

The FOR 5298's goal is the development of new diagnostic approaches through label-free measurement of the current metabolic status, which will create [new possibilities in personalized nutrition](#) and [medicine for the treatment of overweight and obesity](#).



# TUM School of Life Sciences: Structures facilitating research



TUM TechCores on campus

# Plant Technology Center (PTC)

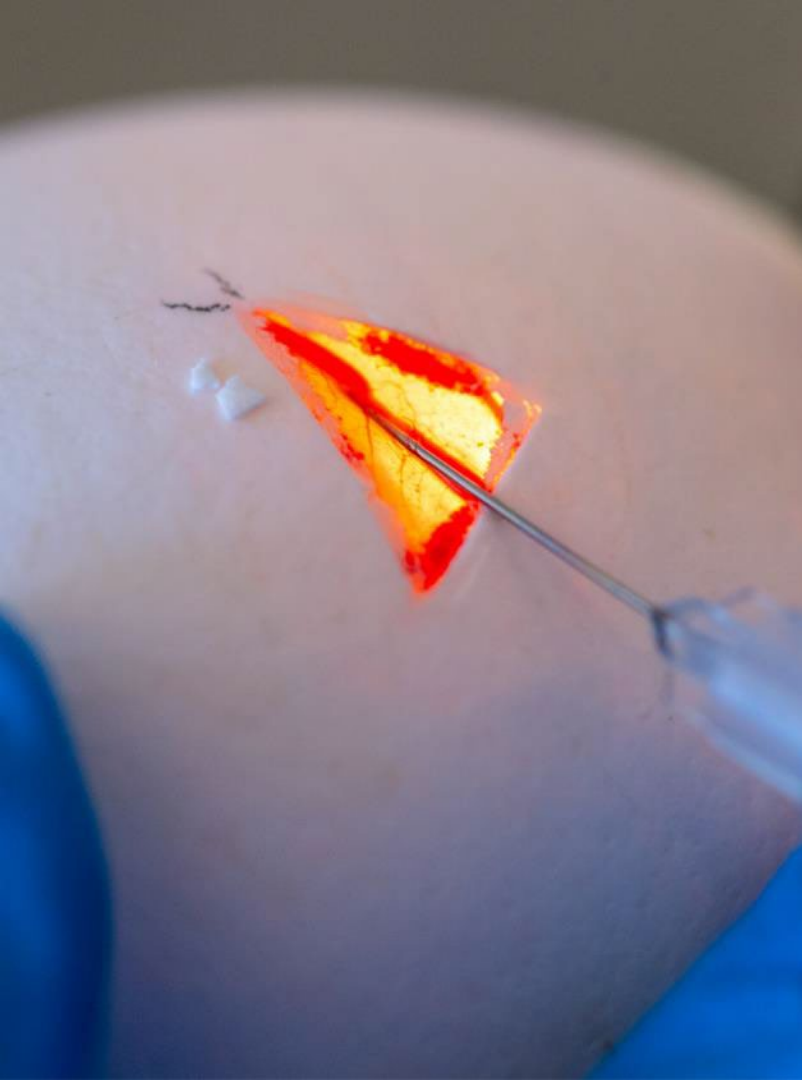
The TUM Plant Technology Center brings together **expertise from plant sciences, ecology, forestry and agriculture** to address current and future challenges of life sciences with an inter- and transdisciplinary approach.



TUM TechCores on campus

# Animal Research Center (ARC)

The ARC provides the necessary research infrastructure for small and large animals, including aquaculture. **New research and husbandry facilities and the establishment of a Genetic Engineering Core Unit** will make the ARC internationally competitive.





TUM TechCores on campus

# BayBioMS – Bavarian Center for Biomolecular Mass Spectrometry

The BayBioMS, which was founded back in 2015, offers **state-of-the-art proteomics and metabolomics tools** for application in biomedicine, plant and food research.

TUM TechCores on campus

# FACIT – Food & Agro Center for Innovation & Technology

The FACIT is a **Tech Core Facility and university incubator for startups in the food, agriculture and biotechnology sectors**. The Life Science Tech Core Facility, provides technical facilities and workshop infrastructure for start-up projects, as well as research and teaching.



TUM Corporate Research Centers on campus

# World Agricultural Systems Center

Hans Eisenmann-Forum for Agricultural Sciences (HEF)

Research focus on plants and animals, soil and water, ecology and economy – from the molecular and cellular level to the agricultural landscape

- Networking of agricultural science oriented chairs and institutions of TUM
- Cooperation with external institutions
- Provision of professional expertise
- Platform for communication, dialogue and knowledge transfer to society

TUM Corporate Research Centers on campus

# ZIEL – Institute for Food & Health

Focus on interdisciplinary research of food, nutrition sciences and medicine

- Production of food
- Food processing
- Human physiology
- Nutritional medicine

Development of prevention programs

Co-development of safer and healthy food

Cooperation with industry and authorities





TUM Corporate Research Centers on campus

# ZIP – Center for Infection Prevention

**In the fight against germs and pathogens**

- Researching new strategies to contain resistant pathogens and to be able to combat them in the event of an infection
- Five competence teams on the topics of microbiome, microbiology, immunology, technology and translation

# TUM School of Life Sciences: Partners on campus



# Research Stations

TUM School of Life Sciences mainly uses three off-campus research stations in Bavaria.



**Limnological Research  
Station Iffeldorf**



**Environmental Research  
Station Schneefernerhaus  
Garmisch-Partenkirchen**



**Friedrich N. Schwarz  
Research Station  
Berchtesgaden**

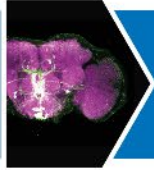


# Interdisciplinary Teaching

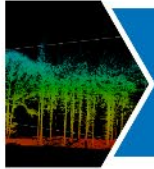
6 fields of study | 23 degree programs |  
4 international master's programs



# TUM School of Life Sciences: Research & Teaching



**Molecular Life  
Sciences**



**Life Science  
Systems**



**Life Science  
Engineering**



**Agricultural and  
Horticultural Sciences**



**Biosciences**



**Brewing, Food Technology and  
Process Engineering**



**Forest Science and  
Resource Management**



**Landscape Architecture and  
Landscape Planning**



**Nutrition Science and  
Food Chemistry**





# Agricultural and Horticultural Sciences

- Agricultural and Horticultural Sciences B.Sc.
- Agrosystem Sciences M.Sc.
- Agricultural Biosciences M.Sc. (in English)
- Teacher training at vocational schools in the field of agricultural economics B.Ed. / M.Ed. \*

\* In cooperation with TUM School of Education

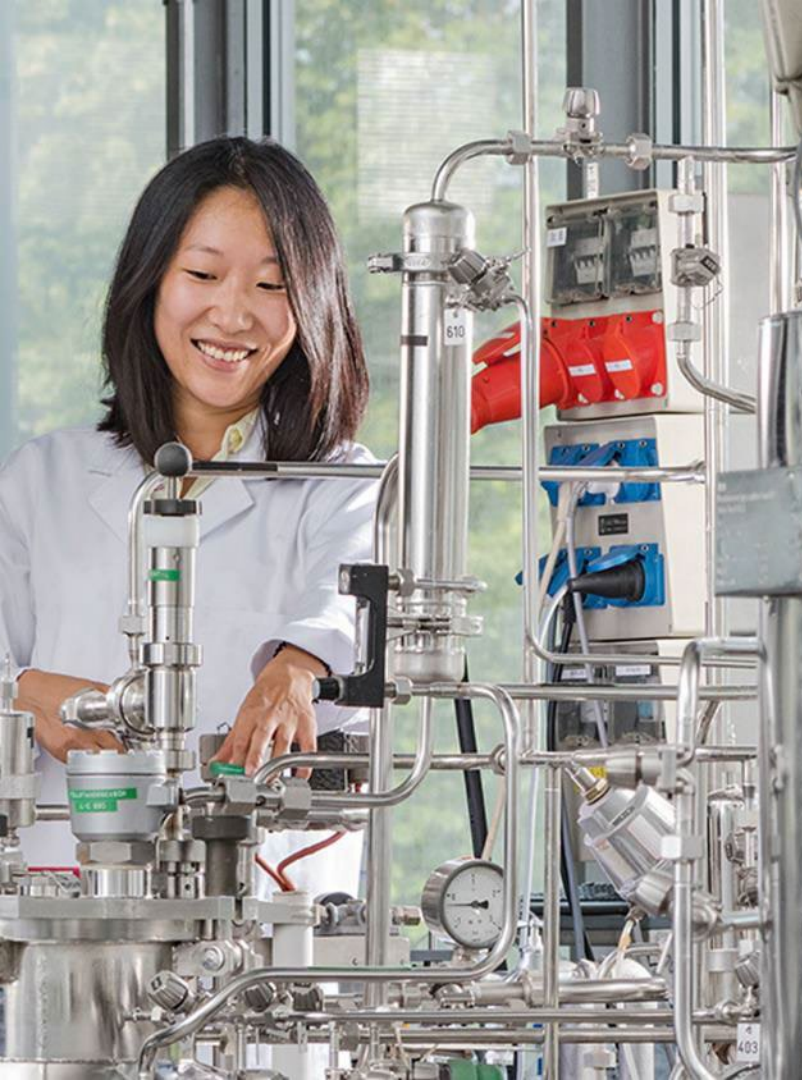
# Biosciences



- Life Sciences Biology B.Sc.
- Biology M.Sc. (in German and in English)
- Molecular Biotechnology B.Sc. / M.Sc.
- Teacher training for grammar school, science education (first and second subject biology) B.Ed. / M.Ed \*

\* In cooperation with TUM School of Education





# Brewing and Food Technology

- Brewing and Beverage Technology B.Sc. / M.Sc.
- Brewing with degree Master brewer (Diplom-Braumeister)
- Food Technology B.Sc. / M.Sc.
- Pharmaceutical Bioprocess Engineering B.Sc. / M. Sc.



# Forest Science and Resource Management

- Forest Science and Resource Management B.Sc.
- Forestry and Wood Science M.Sc.
- Sustainable Resource Management M.Sc. (in English)



# Landscape Architecture and Landscape Planning

- Landscape Architecture and Landscape Planning B.Sc.
- Ecological Engineering M.Sc.
- Conservation and Landscape Planning M.Sc.



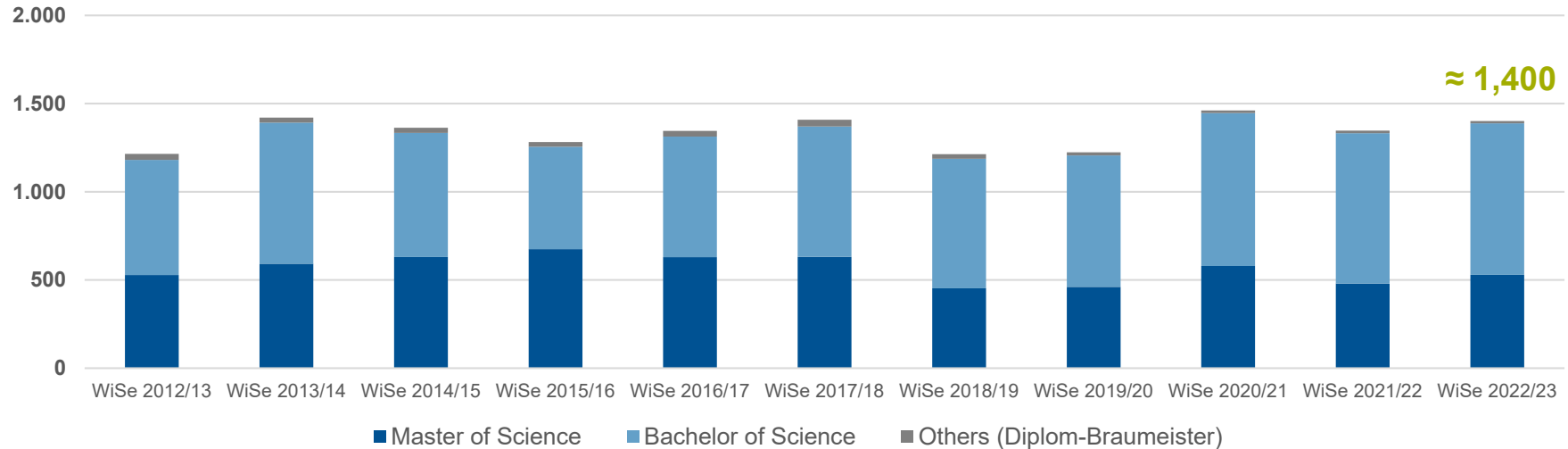


# Nutrition Science and Food Chemistry

- Life Sciences Nutrition B.Sc.
- Nutrition and Biomedicine M.Sc. (in English)
- Food Chemistry M.Sc.

# Student enrollments

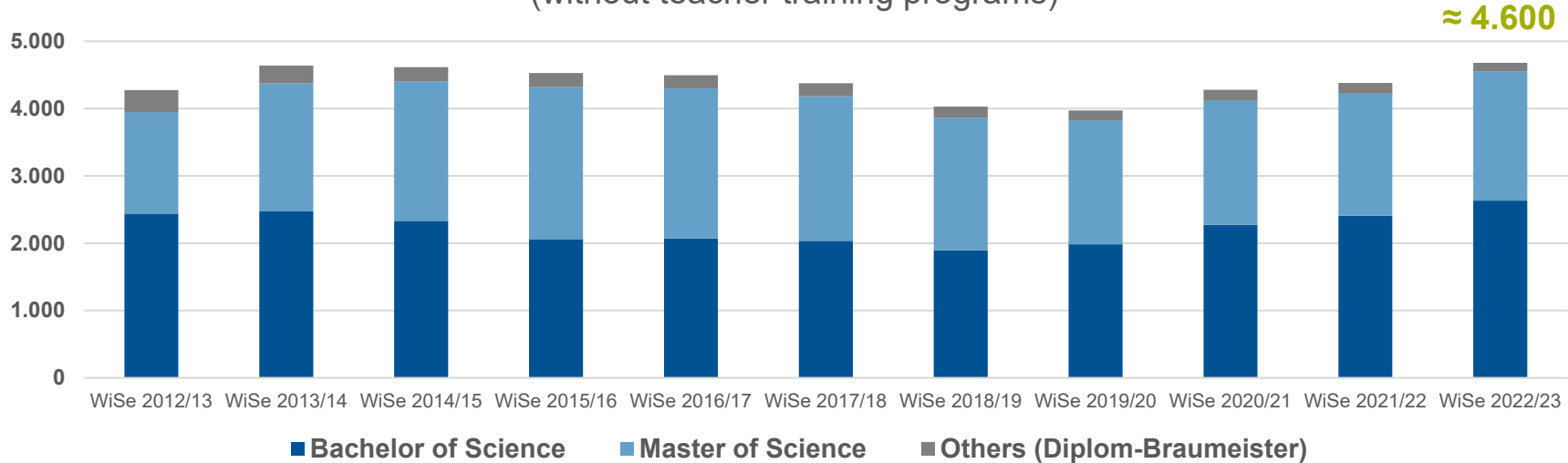
First semester students at TUM School of Life Sciences  
(without teacher training programs)





# Total number of students

Students at the TUM School of Life Sciences  
(without teacher training programs)



# TUM LS – International students



Circa  
**30%** international  
students

# TUM LS – International students

(statistics WiSe 2022/23)

# 98

**countries of  
origin of  
international  
students**

## Top 5:

→	China:	191
→	India:	137
→	Turkey:	86
→	Italy:	48
→	Austria/ Pakistan:	47

## By continent:

Asia:	47 %
Europe:	34 %
Americas:	12 %
Africa:	6 %

# StudiTUM – House of the Students

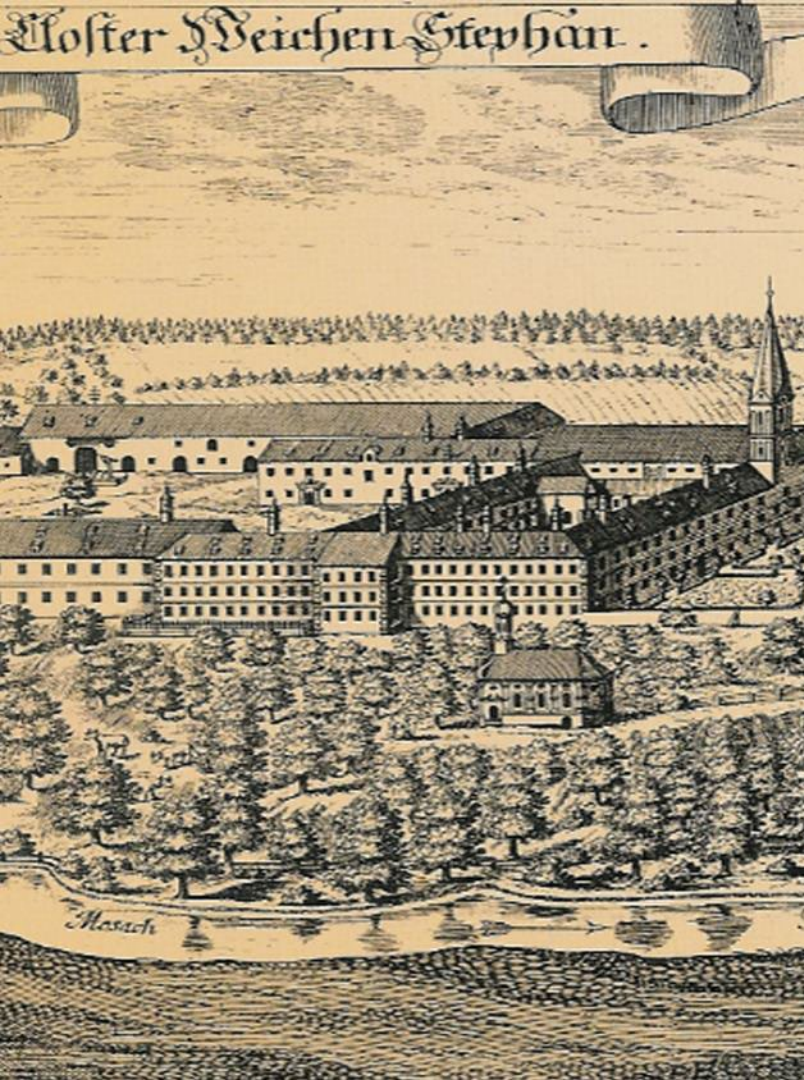
A modern learning environment in a historic setting: about 200 learning places, a rehearsal room, a family room, and a lounge are located in the old experimental distillery of Weihenstephan.





# University Library Life Sciences





## History

# Weihenstephan

- **1803** Founding of the „School of Agriculture“
- **1895** „Royal Bavarian Academy for Agriculture and Beer Brewing“
- **1928** Incorporation in Technical College of Munich (later to become TUM)
- **1998** Relocation of TUM Department of Biology
- **1999** Forestry Department becomes part of TUM
- **2000** Four departments united to TUM School of Life Sciences Weihenstephan
- **2020** Transformation in TUM School of Life Sciences (LS)

**Thanks.**