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

18 Nobel Prize Laureates

8 Humboldt Professorships

643 Professors

9,500 Graduates per year

176 ERC Grants (since 2008)

>1,000 Research Agreements p.a.

more than

>1,000

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

1868
King Ludwig II of Bavaria founded the Polytechnische Schule München

1875
Carl von Linde constructs the first functioning refrigeration machine.

1893
Graduate Rudolf Diesel develops the engine that will come to bear his name, based on an idea he had as a student.
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.

2008
A patient receives the first-ever double arm transplant.
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.
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
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
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
Integrative Research Institutes (IRI)

Addressing future-focused issues through transdisciplinary approaches to research and teaching.
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.
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.
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.
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.
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.
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.
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.
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.
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
Maintaining health and targeting diseases
What Drives Us: Accelerator 3

Shaping a sustainable living environment
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 CO₂ 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
- 36% Female Students
- 86,153 Active Alumni
- 11,758 Staff Members
- 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.

50,484
Growth Path Student Enrollment

- 2000: 19,454
- 2005: 20,458
- 2010: 26,302
- 2015: 39,081
- 2020: 50,484

Technical University of Munich | Who Sets Us Apart
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 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 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

Aerospace

Software/Al

Quantum

Built Environment

ChemSPACE

Mobility

Food/Agro/Biotech

Robotics/Al

Healthcare

Additive Manufacturing

Sustainability/Bioeconomy/Energy

Technology Strategy
Bavaria, Germany, EU

Social, economic & technological Mega Trends

Significant Market Opportunities

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

13
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

Molecular Life Sciences | 38 Professorships

Life Science Engineering | 16 Professorships

One Health
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.
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.
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.
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).
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

- Ecosystem health and resilience
- Animal and human health
- Healthy and sustainable food

TUM Corporate Research Centers:
- Institute for Food & Health (ZIEL)
- World Agricultural Systems Center (HEF)
- Center for Infection Prevention (ZIP)

TUM Technology Core Facilities:
- Food and Agro Center for Innovation and Technology (FACIT)
- Plant Technology Center (PTC)
- Animal Research Center (ARC)
- Bavarian Center for Biomolecular Mass Spectrometry (BayBio MS)
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.
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.
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.
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.
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
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
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

- Leibniz Institute for Food Systems Biology (LSB)
- TUM School of Life Sciences
- EIT Food
- Fraunhofer Institute for Process Engineering and Packaging (FhW)
- Bavarian State Research Center for Forestry
- University of Applied Sciences - Weihenstephan-Triesdorf (HSWT)
Research Stations

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

Environmental Research Station Schneefernerhaus
Garmisch-Partenkirchen

Limnological Research Station Iffeldorf

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

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<tr>
<th>Molecular Life Sciences</th>
<th>Agricultural and Horticultural Sciences</th>
<th>Biosciences</th>
<th>Brewing, Food Technology and Process Engineering</th>
<th>Forest Science and Resource Management</th>
<th>Landscape Architecture and Landscape Planning</th>
<th>Nutrition Science and Food Chemistry</th>
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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)

≈ 1,400

Master of Science
Bachelor of Science
Others (Diplom-Braumeister)
Total number of students

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

≈ 4,600
TUM LS – International students

Circa 38% international students
TUM LS – International students
(statistics WiSe 2020/21)

96 countries of origin of international students

Top 5:
- China: 189
- India: 134
- Turkey: 86
- Austria: 47
- Pakistan: 47

By continent:
- Asia: 49 %
- Europe: 33 %
- 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

More than 30% international students
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.