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
18
Nobel Prize Laureates

>1,000
Research Agreements p.a.

643
Professors

9,500
Graduates per year

176
ERC Grants (since 2008)

8
Humboldt Professorships
TUM has been named German University of Excellence three consecutive times.
A Leader in Academic Rankings

QS World University Rankings 2022

No. 1
in Germany

No. 49
in the world

THE World University Rankings 2022

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.
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
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
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.
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.
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.
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
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 CO$_2$ on the Amazon rainforest.
Who Sets Us Apart

People of TUM
Diverse Talent Community

(Statistics 2022)

105
Tenure Track Professorships

41%
International Students

11,758
Staff Members

7,453
Researchers

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.

50,484
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 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.
Unique Strengths of TUM/UTUM Ecosystem

Significant Market Opportunities

Social, economic & technological Mega Trends

Technology Strategy
Bavaria, Germany, EU

Aerospace
Software/Al
ChemSPACE
Quantum
Built Environment
Healthcare
Mobility
Additive Manufacturing
Sustainability/Bioeconomy/Energy

Venture Labs

Technical University of Munich | Who Sets Us Apart
TUM Partners of Excellence

Airbus Group
ALTANA AG
AUDI AG
Bayerischer Bauindustrie-Verband 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
(Statistik 2022)

3
Research Departments

4
TUM TechCore Centers

2
CRCs

91
Professorships

29%
Female Professors

More than
4,600
Students

13
ERC Grants

TUM School of Life Sciences | Campus Weihenstephan
Bundling the competencies in the life sciences, our aim is to understand interactions between humans, animals, plants, microorganisms, soil and environment.

We do interdisciplinary research with focus on „One Health“ to secure the foundations of healthy living and shaping the coexistence of mankind in a sustainable way.
Research for One Health

3 Research Departments | 4 TUM TechCores | 2 CRCs
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 the fields of 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, develop additive production processes using innovative biomaterials, and shape the digitalization of value chains
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 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
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 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 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.
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
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
Interdisciplinary Teaching

6 fields of study | 23 degree programs | 4 international master’s programs
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.
First semester students at TUM School of Life Sciences
(without teacher training programs)

≈ 1,400

Student enrollments
Total number of students

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

≈ 4,600
TUM LS – International students

Circa 30% international students
TUM SoLS – 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)
Partnership facilities on campus

Bavarian State Brewery Weihenstephan
Thanks