

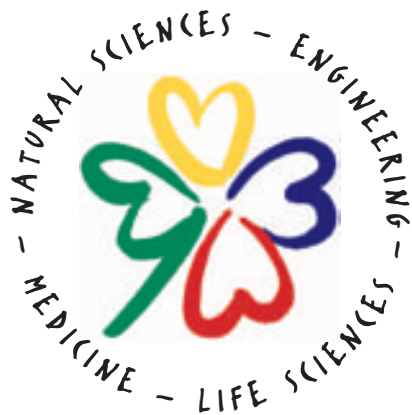
Technische Universität München



Natural Sciences – Engineering –
Medicine – Life Sciences

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Technische Universität München:

At home in Bavaria – successful in the world

Since its foundation in 1868 as the “Königlich Bayerische Polytechnische Schule” (“Royal Bavarian Polytechnical School”), the Technische Universität München has accompanied Bavaria from its beginnings as an agrarian country to a high-tech location.

“At home in Bavaria – successful in the world”: this is our motto. Our graduates work all over the world, our professors are at home in every country. The secret of our success has many different components: specialist competence, ability to communicate and collaborate with the neighbouring disciplines, a team spirit that goes beyond the boundaries of disciplines and departments, alliances with professionals with practical work experience. A balance struck between the – sometimes inevitable – academic aloofness and a realistic down-to-earth attitude that lays down the guidelines. Ingenuity and normality, ivory tower and workbench, lecture hall and laboratory, brewing technology and “virtual reality” – all this is brought together under the one umbrella of the Technische Universität München (TUM).

Our university has a range of science subjects unrivalled in Europe: natural and engineering sciences, medicine, life sciences – our ‘four-leafed clover’. The traditions of each separate discipline deserve our respect, but we expect interdisciplinary cooperation in teaching and research.

Thus, the revolutionary inventions of bygone decades were always born from among the disciplines, resulting constantly in new fields of teaching and research. Names like Carl von Linde, Rudolf Diesel, Willy Messerschmitt, Hans Fischer, Rudolf Mössbauer and Ernst Otto Fischer stand for this interdisciplinary approach. The sciences of the Technische Universität München bear testimony to, and are a guarantee of, sustainability, the responsible use of resources, technical progress and quality of life. Our achievements in engineering, science and medicine do not strive to be at the top for their own sake, but to improve the quality of human existence whilst at the same time protecting the environment that nurtures us. But while doing this, we also want to be attractive for the new generation, which we are equipping with the best scientific and technological competence. Youth is central. And this is why we work so enthusiastically for our young university.

Wolfgang A. Herrmann
President

Munich: high-tech with a heart

The Greater Munich area is the ideal environment for science and research. And today, grouped around that cultural metropolis steeped in tradition, we find a high-tech cluster of international renown. Munich is Germany's science capital. And we at the TUM are doing our part in keeping it so.

We are happy with our top position in the German university ranking, but we are trying hard to close up with the top international universities.

The TUM has three attractive locations: the original campus in Munich itself, the Garching campus and the Weihenstephan campus. A dense public-transport network provides speedy connections between each of the campuses as well as to the university clinics and the TUM sports complex in the Olympic Park.

University in the centre of Munich

The founder campus of the Technische Universität München is situated in the centre of Munich. Bavaria's capital, with its population of 1.3 million, has a great deal to offer for scientists and students: 8,500 conferences and congresses a year, 30 major international trade fairs, three universities, universities of applied sciences, academies and dozens of science libraries. Numerous major research institutes of international standing like the Max Planck Society and the Fraunhofer Society are based here.

Those who want to go into business or industry will find the best conditions. "Bavaria's Silicon Valley" is a focal point of the electronic, electrical engineering and computer in-

dustries. Europe's largest biotechnology centre is developing along the Martinsried – Munich – Garching – Weihenstephan axis.

Munich has a star role as a city of the media. And ingenious minds can have their inventions patented at once, and on the spot, at the German and European Patents Offices.

The range of cultural and leisure activities is legendary: over 200 museums, galleries and collections await the visitor, among them the Deutsche Museum, the world's oldest and most important museum of technology. More than 50 theatres, countless music stages and jazz cellars, discos and party halls offer a large variety of leisure-time pursuits. And events like the world-famous Oktoberfest ensure that Munich can never be boring.

Just outside the city the Upper Bavarian countryside begins, with its lakes, forests and nature reserves. For those who want to hike, climb, ski or visit the well-known fairy-tale castles of Ludwig II, the Alps are only an hour away.



Garching Campus – the centre of a research cluster

North of Munich is the Garching science park with the old and the new TUM neutron sources as its landmarks. Here five natural-science and engineering faculties of the Technische Universität München are accommodated in elegant new buildings. Close by, further well-known research institutes have been established, for example the Max Planck Institutes for astrophysics, extraterrestrial physics, plasma physics and quantum optics, the Walter Meissner Institute for low-temperature research and the European Southern Observatory.

The new university town of Garching also offers an extensive range of cultural activities and a variety of recreational facilities in areas of natural beauty and conservation areas.

Weihenstephan Campus – studying in a green environment

In the north of Munich, Freising-Weihenstephan is home to the TUM Centre of Excellence for the Life Sciences. These modern sciences are grouped around the world's oldest brewery – founded in 1040. With subjects that cover everything from plant-breeding through land cultivation methods and nutrition science to molecular plant genetics – Weihenstephan points the way for the “green life sciences”.

The history of the ancient diocesan town of Freising can be traced back almost 1300 years. With its cosy nooks and alleys, beer gardens and cafés, student pubs and cabarets it is steeped in the atmosphere of an old university town. Its landmark is the cathedral set on a hill, an art-historical treasure chamber of the first order. Just a few kilometres away is Munich's modern international airport.

Weihenstephan is the embodiment of tradition and progress, in other words the embodiment of modern Bavaria.

**Technische Universität
München (TUM)**
<http://www.tum.de/>







Scientific excellence

The TUM started life as one of Germany's oldest schools of technology. Founded in 1868 by King Ludwig II, it won the right to confer doctor's degrees in 1901 and in 1905 it enrolled its first female student – a bold step in those days. In 1970 it changed its name from Technische Hochschule München to Technische Universität München.

Since its foundation it has offered a wide range of scientific and engineering subjects, including architecture. The range has been extended continuously through the establishment of faculties for agriculture (1872), brewing (1930), medicine (1967), informatics (1992), economics (2002) and sports (2002). The most recent extension came in 2003, in the form of the affiliated "German Institute of Science and Technology" (GIST) in Singapore.

Today there are twelve faculties and six central institutes with some 480 professors, a staff of 8,500 and approx. 20,000 students.

In the course of its more than 130-year-old history TUM scientists have been repeatedly singled out for the award of the Nobel Prize:

1927	Heinrich Otto Wieland Nobel Prize for Chemistry
1930	Hans Fischer Nobel Prize for Chemistry
1961	Rudolf Ludwig Mößbauer Nobel Prize for Physics
1973	Ernst Otto Fischer Nobel Prize for Chemistry
1985	Klaus von Klitzing Nobel Prize for Physics
1988	Robert Huber Nobel Prize for Chemistry

Today, nine holders of the Leibniz Prize awarded by the German Research Council – Deutsche Forschungsgemeinschaft (DFG) – give lectures and pursue research at the Technische Universität München. When it comes to attracting external research funds we rank first among all German universities and colleges. 13 special fields of research (SFB) supported by the DFG guarantee a high level of scientific standing.

Four TUM courses were incorporated into the Elite Network of Bavaria – Elitenetzwerk Bayern –, which was founded in 2004: a doctoral degree in Applied Mathematics - TopMath, Advanced Materials Science (Master of Science), Technology Management (Master of Science) and the Bavarian Graduate School of Computational Engineering (Master of Science with honours in cooperation with the University of Erlangen-Nürnberg). All in all, the TUM is involved in seven of the 15 projects of the Elite Network of Bavaria.

Among the many famous TUM graduates are the aviation pioneers Claude Dornier and Willy Messerschmitt, the founder of modern refrigeration technology Carl von Linde, the pioneer of electricity and initiator of the Deutsches Museum Oskar von Miller, and Rudolf Diesel, the inventor of the diesel engine.

Profiling the interdisciplinary approach

The combination of natural sciences, engineering, medicine and life sciences is unique. There is no other university in Europe with such a perfect 'four-leaf clover'. In recent years bridges have been built up consistently to enhance the interdisciplinary profile of the TUM. Attractive platforms, research projects and courses of study have been created across these disciplines.

Close industrial cooperation

As is customary in Germany, the Technische Universität München is a public institution and is government-financed. It is proud, however, of its right of academic autonomy, which it has been able to extend appreciably in recent years. Today, external funds in the form of endowed chairs, sponsored projects and industrial contracts account for a not inconsiderable part of the budget. Since 1999 the university has broken new ground with its professional fundraising campaigns.

Contacts to industry generate not only finance but also valuable scientific input from the practical realms. Highly qualified candidates with practical experience are regularly appointed to TUM professorships, and prominent executives are seconded from industry as lecturers or honorary professors.

There is also a fruitful exchange in the opposite direction. For example, TUM students are privileged to attend lectures on management science by Professor Joachim Milberg, who moved in 1993 from a professorial chair at the TUM to the Executive Board of BMW. In 1999 he was appointed CEO of BMW AG, and today is chairman of its Board of Supervisors. In addition to these responsibilities, he continues to work for his university as an honorary professor. TUM graduates Wolfgang Reitzle (Linde AG), Carl-Peter Forster (Opel AG) and Bernd Pischetsrieder (Volkswagen AG) are at the head of big corporations, including renowned automotive groups. And the Germans are supposed to make the best automobiles in the world.





Carl von Linde



Oskar von Miller



Hans Fischer



Willy Messerschmitt



Rudolf L. Mößbauer



Ernst Otto Fischer



Robert Huber

Who we are, where we want to go

At the TUM we are ambitious and yet down-to-earth. In our work we strive to achieve these objectives:

High-profile international research

We are a research institute with both a tradition and a high-profile worldwide. We achieve first-rate results in technology, natural sciences and medicine. The main focus is on the new High-Tech disciplines and the Life Sciences.

Scientific exchange and cosmopolitan attitudes

We encourage scientific exchange. Our university structure is both cosmopolitan and hospitable. Interdisciplinary work ranks high. We cooperate with renowned enterprises, universities and research institutes at national and international levels.

Excellent standards of instruction

We provide our students with the highest level of instruction. The innovative spirit of our new generation of scientists is allowed to unfold freely. We regard this as vital to our university's constant process of renewal.

Strong practical relevance

We are adapting constantly to new study and advanced training needs. We are accelerating the transfer of knowledge and technology between

university and practical life. After all, today's professions and professional qualifications are accompanied by a process of life-long learning.

Science and technology for people

Our mission is to advance science and technology. We do not regard these as ends in themselves. On the contrary, we lay particular emphasis on their benefit to our society. Technological and scientific progress must respect human dignity, a sustainable economy and the need to protect nature.

Education, not just knowledge

We have clear educational aims: cultural sensitivity and social competence are just as important as high professional standards and entrepreneurial activity.

Modern management

As a "university enterprise", we accept the challenges of society and industry.

In doing so, we have created modern organisation and management structures. We are constantly opening up new fields of development at the interface between science and industry. And we acknowledge the performance principle.

Public dialogue

The dialogue we conduct is a public dialogue. It is important, after all, for society to know what we in science and technology are doing for our common future.

Sponsorship and performance

Our private and industrial sponsors play a substantial part in ensuring that we successfully maintain and strengthen our position in international competition.

Study at the Technische Universität München

[http://www.tu-muenchen.de/
studium](http://www.tu-muenchen.de/studium)

The Technische Universität München not only wants to attract the best students. Their respective talents and inclinations also need to find a perfect match in the subject and university of their choice. This is why four faculties have introduced aptitude testing, which has been a great success. For many of the courses leading up to the Master's degree the university itself selects the participants from a large number of international applicants.

Counselling is given pride of place

[http://www.iz.
hr.tu-muenchen.de](http://www.iz.hr.tu-muenchen.de)

The Student Service Centre – StudentenServiceZentrum (SSZ) – combines counselling and administration under a single head. From the very first interview the student feels well looked after and well informed.

The central study advice service has expert partners to consult on questions of admissions and examinations, registration procedures, study facilities, contents and requirements, change of subject and university, exchange programmes and grants, language courses and advanced training facilities and even



postgraduate and alumni offers. Group and individual counselling sessions provide guidance and help with planning and offer professional support in study-related questions and problems.

The Centre of International Affairs is a component part of the Student Service Centre. Its staff members provide information on exchange programmes and studies abroad. They are well informed not only about the range of degree courses and grants, but also about visas and many other practical questions. To prepare for their “foreign posting” German students can learn any of ten languages – even, for example, Arabic or Czech, at the TUM Language Centre.

Intensive support for foreign students

Already 100 years ago, the university was proud of its foreign student entry. Today, one out of every five TUM students comes from abroad.

Foreign students receive help and support from the Student Service Centre from their very first application right up to their exam and later as alumni. Help is of course provided in looking for accommodation and coping with administrative procedures. Pre-study courses provide German language skills and learning techniques. There is a wide range of support programmes during the period of study such as, for example, the TUM International Initiative (TUMI), which is run by students.



Tutorials help to ease the settling-in process, and apart from that foreign students profit from the traditionally high commitment shown by German professors in caring for their students. German-language courses help to constantly improve students' knowledge of the language.

The one-month-long summer schools are becoming increasingly popular. They offer a trial course of study at the TUM and provide an insight into the country and its people. Some participants also use them as preparation for a Master's Degree programme.

Just like other German universities it is not customary to live on campus at the TUM. But foreign students soon come to feel that they are part of the big TUM family with its wide variety of opportunities to meet people, clubs, initiatives and events.

And at the end of the study visit there is perhaps a distinction waiting: every year the German Academic Exchange Service (DAAD) awards a prize to the best foreign student.



Courses of study in keeping with the times

<http://www.tu-muenchen.de/einrichtungen/fakultaeten/vv>

TUM moves with the times and is continually introducing new needs-oriented courses of study. Offers like construction materials engineering, bioinformatics, chemical engineering and medical technology have proved to be the big hits in recent years.

Among more than 70 courses of study we find the classical German Diploma, as well as numerous Bachelor's and Master's degree courses. Taught partly or completely in English, these courses are equally attractive to German and foreign students. A B.Sc.(TUM) or M.Sc.(TUM) opens up outstanding international career opportunities. The Bologna process has resulted in permeability between Diploma and Bachelor/Master courses.

At the TUM an interdisciplinary approach is top priority, as demonstrated by the following elite Master's degree courses: Advanced Materials Science (for chemists, physicists, materials scientists and engineers), Technology Management (for students of business ad-



ministration and management, information scientists and electrical engineers) and the Bavarian Graduate School of Computational Engineering (for mathematicians, information scientists and engineers).

A TUM specialty: Deans of Studies

At the TUM students elect Deans of Studies from among their professors. These deans are responsible for the organisation of teaching in their faculty. If required "study faculties" are established which combine courses of study related in content and go beyond the faculty limits usually determined by tradition.

From students to alumni

<http://www.iz.hr.tu-muenchen.de/alumni>

In the course of their studies, students meet former graduates, members of staff, visiting academics and professors who maintain a commitment to their university even after they have left it. Numerous Alumni societies donate prizes for the new generation of scientists, finance graduation ceremonies and provide important professional and scientific contacts. They make themselves available as mentors, offer practical training jobs, hold talks at career events or give generously in support of the development of teaching and research.

The responsibility for setting up and maintaining the worldwide Alumni network, KontakTUM, lies with the TUM Alumni & Career work centre. Its services include effective publicity work via the Alumni Forums, the Alumni magazine KontakTUM and attractive further education and advanced training offers.

Alumni are the best public ambassadors for the TUM - in their own country and abroad. This is why Alumni & Career encourages the foundation of new alumni societies and networks such as the ones now in place in Latin America, Southeast Asia and Eastern Europe.

Internationally minded reform-minded open-minded

The declared aim of the TUM is an international positioning as a research university with a high profile in the Life Sciences and High-Tech. So the TUM has bundled its activities into an internationalisation drive, enabling an even greater involvement in global competition.

Worldwide partnerships

<http://www.iz.hr.tu-muenchen.de>

Strategic partnerships with other universities intensify exchange in teaching and research. The integration of global players from industry creates resources for international activities and provides traineeships for TUM students abroad or foreign students at the TUM.

Studying in another country broadens the horizon. Team work in a foreign scientific and working atmosphere helps to strengthen cultural and social skills.

The TUM is attracting a great deal of attention with its summer schools. The number of foreign students has been rising continually and is currently around 20 percent in the university as a whole; in certain subjects it is even appreciably higher.

In the last few years the number of contractually agreed cooperations between TUM and other universities has risen from 33 (1996) to 128 (2004). The TUM also participates in a variety of international exchange programmes. The SOCRATES programme with more than 200 partner universities, for example, promotes student mobility in Europe. T.I.M.E. (Top Industrial Managers for Europe)

is an attractive exchange programme for engineering students. The “Leonardo da Vinci” exchange programme gives students of technical subjects the opportunity to complete a three-to-twelve-month traineeship in industry in a country of the European Union and other countries in central and eastern Europe. Especially attractive are the dual diploma agreements between four of the faculties and a total of seven French universities and one Spanish university.

Just as important as the exchange of students is the exchange of lecturers – guest professors enrich teaching and help motivate students and colleagues to spend time abroad.

“In Munich” – attractive for students from North America

The programme for students from North America offered in co-operation with Siemens has proved to be a big hit. “In Munich” comprises a summer school with a large variety of offers, a pre-study course to teach learning techniques and the German language, a winter semester at the TUM followed by a training period in industry.



- Budapest University of Technology and Economics (BUTE)
- Cranfield University, Silsoe, Bedfordshire
- Czech Technical University in Prague (CTU)
- École Centrale Paris
- École Nationale des Ponts et Chaussées, Paris (ENPC)
- École Nationale Supérieure d'Ingenieurs de Constructions Aeronautiques, Toulouse (ENSICA)
- Escuela Técnica Superior de Ingenieros Industriales - Universidad Politécnica de Madrid (ETSII-UPM)
- M.V. Lomonosov Moscow State University
- Norwegian University of Science and Technology, Trondheim
- Politecnico di Milano
- St. Petersburg State University
- Universitatea Politehnica din Timisoara
- Cornell University of New York
- Georgia Institute of Technology, Atlanta
- Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)
- Pontificia Universidad Católica de Chile (PUC)
- Stanford University, California
- Universidade de São Paulo (USP)
- University of Illinois, Urbana, Illinois
- University of Texas, Austin, Texas

- Hong Kong University of Science and Technology (HKUST)
- Indian Institute of Science Bangalore (IISc)
- Indian Institute of Technology Bombay (IITB)
- Indian Institute of Technology Delhi (IITD)
- Institut Teknologi Bandung (ITB)
- Korea Advanced Institute of Science and Technology (KAIST)
- Kyoto University
- National University of Singapore (NUS)
- Shanghai Jiao Tong University (SJTU)
- Tokyo Institute of Technology (TITech)

- Tongji University, Shanghai
- Tsinghua University, Beijing
- University of Tokyo (UT)
- Zhejiang University of Technology, Hangzhou (ZJUT)

These examples are just a few among many lively partnerships.



Our top university partners





GIST – the newest TUM affiliation in Singapore
<http://www.gist.edu.sg>

In February 2003 TUM was the first German university to establish a privately organised affiliation abroad, the German Institute of Science and Technology (GIST). The start-up funds were provided by the German Academic Exchange Service – Deutscher Akademischer Austauschdienst (DAAD) – and the Singapore government. In future the privately organised university will finance itself exclusively by means of tuition fees. Scholarships are available for suitable candidates.

In Singapore GIST is competing with already established affiliations of renowned universities such as the Massachusetts Institute of Technol-



ogy (MIT), the Georgia Institute of Technology and the John Hopkins University.

To begin with, a Master of Science Programme in Industrial Chemistry was established in co-operation with the renowned National University of Singapore (NUS), followed by degree courses in Industrial Mathematics specialising in Risk Control and Industrial Ecology.

After a ten-month period of study in Singapore GIST students complete eight months of study at the TUM, including a training period in a German company which ends with the master's thesis. Apart from this, a cultural supporting programme provides valuable insights into different mentalities and moral concepts. The TUM and NUS jointly award the academic degree of Master of Science.



The LAOTSE Programme (Links To Asia By Organising Traineeship And Student Exchange) is sponsored by leading industrial companies and combines study with practical training. TUM students in their sixth to eighth semesters may apply for a transfer to a partner university abroad for four months. The study visit abroad is supplemented by a four-month traineeship in a local industrial company.

LAOTSE also operates in the other direction: the TUM and Bavarian industry regularly take on exceptionally gifted Asian students.

This successful model is currently being extended to include leading universities in other regions. The first agreements have already been signed in Chile and Mexico.



LAOTSE network

<http://www.laotse.vo.tum.de>

In recent years, as part of its “Asia-Offensive”, the TUM has established 15 strategic partnerships with leading universities in China, India, Indonesia, Japan, Malaysia, Singapore, South Korea and Thailand.

TUM Professor Robert Huber, Nobel Laureate for Chemistry (1988), at GIST

A successful experiment: the reformed constitution

The TUM sees itself as a university of reform. For example, it has radically reformed its constitution. Based on the model of top international universities a clearly defined division of powers was created between the operational level and the controlling bodies. All executives take on personal responsibility for their decisions.

The university is headed by the president and his management team: four vice-presidents and the chancellor. Similar to the executive boards of company divisions, the vice-presidents are responsible for certain departments.



The Extended University Management Board takes the fundamental decisions regarding university policy. Here, the deans, the spokesperson for the deans of study and the spokesperson for the central insti-

tutes are also represented, along with the University Management.

As the electoral and controlling body of the University Management, the Administrative Council is made up of the Senate, which consists of ten members of the university, and a University Council consisting of eight high-ranking personalities from outside the university. Rather like the supervisory board of a joint-stock corporation, it oversees the decisions that determine the future course of the university.

Management responsibility and academic controlling – “Best Practice University 2000”

The allocation of financial means is geared to workload and performance. The deans are responsible

for the management of their faculty and for the most part decide on its budget autonomously. The agreed targets are controlled by Academic Controlling, and the future allocation of funds is dependent on compliance with these targets. The SAP R/3 data processing programme enables well-

founded planning procedures and constant control at all levels.

In the year 2000 we received the distinction of Best Practice University by the Stifterverband – Founders’ Association for German Science – and the Centre for University Development – Centrum für Hochschulentwicklung (CHE) – for our extensive structural and administrative reforms.

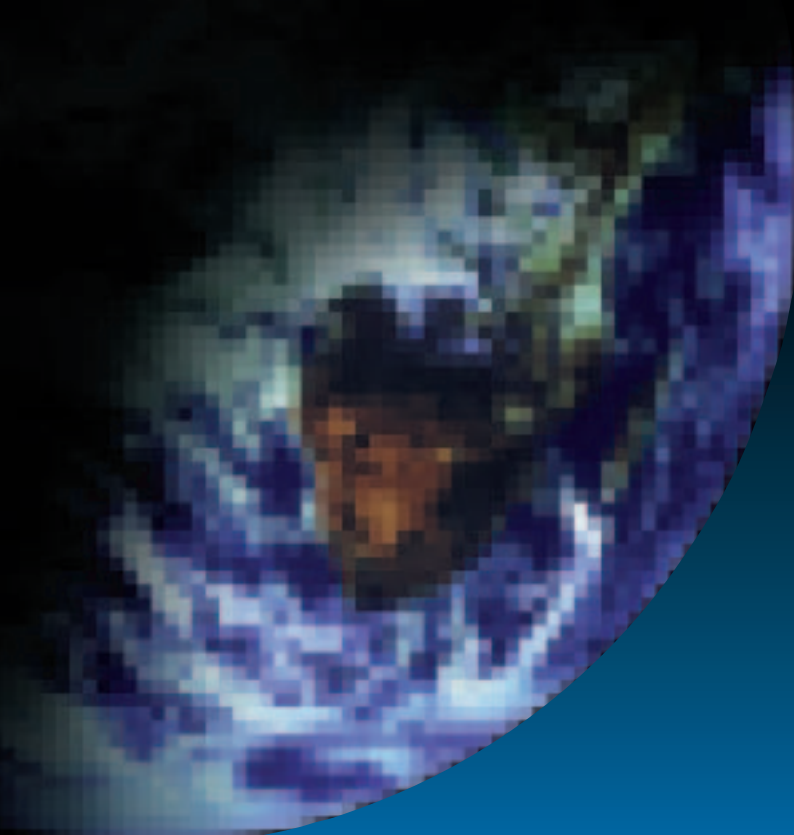
Reforms in research and teaching

The cultivation of consistent science and study practices overcomes the boundaries between the disciplines and facilitates innovative encounter. The former faculties at the Science Centre Weihenstephan have been replaced with a matrix structure of



research departments and study faculties that combine professorships in closely related subjects, or closely related courses of study. Central institutes and centres bundle interdisciplinary know-how at the interfaces of the disciplines.

In-service and advance training offers are aimed at students, employees, alumni already in employment, teachers, managers and other target groups: after all, life-long learning will become increasingly important in future.



“Alliance for knowledge” – the TUM partner programme

<http://www.partner-programm.tum.de>

In 1999 TUM was the first state university in Germany to start a fundraising campaign using the professional support of TUM-Tech GmbH. This enables the university to acquire partners who are prepared to join it in founding an “Alliance for Knowledge”. The themes broached by the partners are implemented by endowed professorships, research projects, academies, scholarships and unbureaucratic assistance. In return the partners receive regular information about the activities of the TUM, can exchange views and opinions with scientists and politicians working in the field of education and are involved in the decisions of “their” university. By promoting first-class science locally they also help to keep talents in their own country.

TUM-Tech GmbH – Technology transfer and management

<http://www.tumtech.de>

Technology transfer benefits teaching and research and strengthens Munich as a location for science and industry. Thanks to its unique ‘cloverleaf’ of natural sciences, engineering, medicine and life sciences TUM has considerable knowledge potential.

TUM-Tech GmbH selectively markets the university’s skills on behalf of the TUM and attracts partners from industry. Its key areas of responsibility are knowledge and technology transfer, management consultancy and fundraising.

UnternehmerTUM GmbH

<http://www.unternehmertum.de>

Industry expects not only technological and scientific excellence from its job entrants, but also entrepreneurial thinking. UnternehmerTUM GmbH, a wholly-owned subsidiary of TUM-Tech GmbH, provides seminars, networking and advisory services to help those starting a career as a self-employed person as well as an “entrepreneur in enterprise”.



Garching Technologie- und Gründerzentrum GATE

<http://www.gategarching.com>

The Garching Technology and Incubator Centre – Garching Technologie- und Gründerzentrum GmbH (GATE) offers young high-tech companies specialising in mechatronics, software or ICT the very best assistance for a successful start.

Faculties and Central Institutes

Faculty of Mathematics
(Centre for Mathematical Sciences)

Faculty of Physics (Physics Department)

Faculty of Chemistry (Chemistry Department)

Faculty of Civil Engineering and Surveying

Faculty of Architecture

Faculty of Mechanical Engineering

Faculty of Electrical Engineering and
Information Technology

Faculty of Informatics

Science Centre Weihenstephan for Nutrition,
Land Management and Environmental Studies

Faculty of Medicine

Faculty of Sports Science

Faculty of Economics

Central Institutes

Centre for Mathematical Sciences

Faculty of Mathematics

Application-related
and computer-oriented

From calculating satellite orbits to tram timetables, from computer game to global-climate simulation, from the production of “self-repairing” materials to options valuation in finance markets, mathematics at the TUM is application-related and computer-oriented. In Germany it is ranked regularly amongst the leaders.

An impressive new building has been constructed at the TUM campus in Garching for the Faculty of Mathematics and its sister faculty of Informatics. Generously proportioned architecture, a fantastically designed library, state-of-the-art computer equipment and an ultra-modern radio LAN network help motivate students and staff. Animations, summaries of the syllabus and supplementary teaching material are available online.

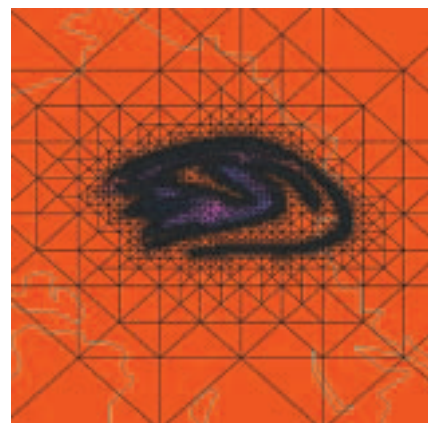
A wide variety of degree courses and research topics

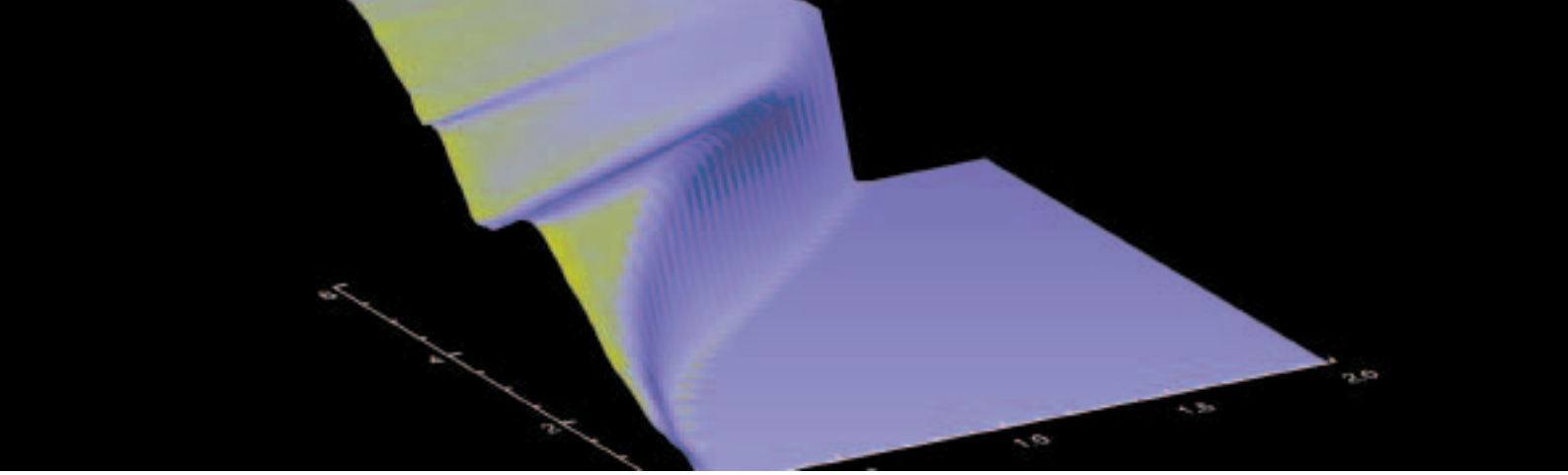
The Faculty of Mathematics offers a full programme of modular study courses: diplomas in mathematics for engineering or finance and economics, in the teaching of mathematics, as well as Bachelor of Science and Master of Science in Mathematics.

Further attractions are the large variety of research topics like robot control, development of materials, computer graphics and visualisation, dynamic systems, dynamic geometry, tomography, modelling of technical and economic processes, financial engineering and actuarial mathematics, biomathematics, climate simulations or pure mathematical research.

The TUM has an excellent line-up of young university teachers. The study courses are completed in a shorter than average time. Evaluation of research and teaching, promotion of the new generation of scientists, internationalisation and multi-media-assisted teaching are important future-oriented topics at this award-winning faculty.

The greatest importance is attached to supporting students during their studies - starting with study-orientation days through tutors and mentors down to study groups that prepare students for the exam and graduate school.





The latest hit is the elite study course in Applied Mathematics (TopMath) leading to a doctorate for outstanding students in only six to seven years.

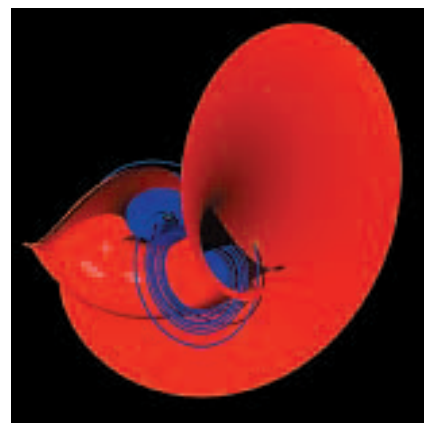
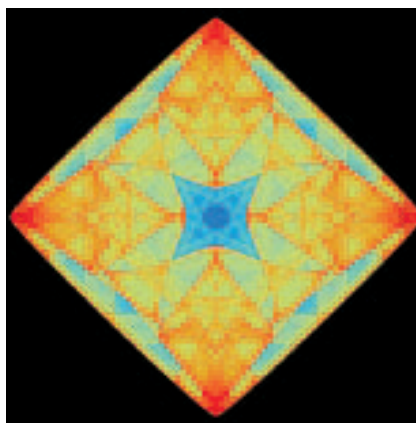
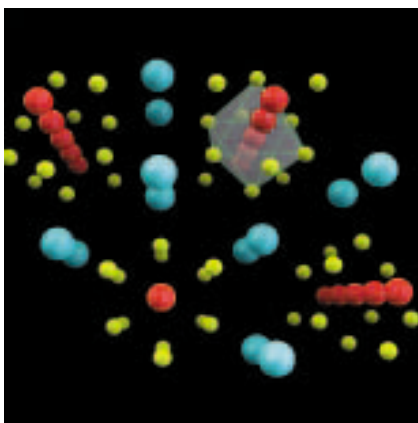
Excellence and practical relevance

Mathematicians who have received an application-oriented training have tremendous career prospects. There are mathematicians on the executive boards of banks, insurance companies and high-tech firms. The TUM is also an excellent springboard for university research: even

while they are studying, students can take on practical research assignments from industry.

During their studies, students are already encouraged to collaborate intensively with the other faculty disciplines, as many mathematicians will be working closely together with colleagues from other subjects in their later professional lives. Also, the international study and examination structure makes it easy for students to spend some time abroad. The percentage of foreign students has increased from 10 percent to more than 20 percent in recent years.

Faculty of Mathematics
<http://www.ma.tum.de>



Physics Department Faculty of Physics Creative multi-talents

Whether it be high-tech research, computer and software development, nuclear medicine, environmental protection and patent law, risk management for banks and insurance companies or even forensic work for criminal investigation departments, physicists are much appreciated everywhere owing to their ability to analyse and structure a large number of isolated occurrences and to put them together to form a clear picture.

TUM: physics unlimited

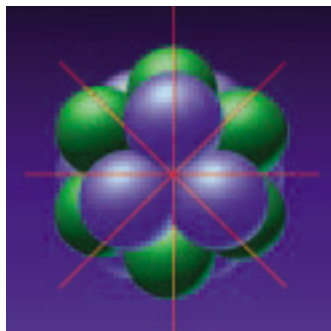
The TUM Physics Department has 36 professors and 12 honorary professors. It covers the entire range of modern physics from fundamental high-energy and astro-particle physics right down to technical physics and fluid dynamics, optics and the properties of soft and hard matter. Research covers elementary particle and nuclear physics, the physics of condensed matter, material sciences and biophysics.

What is unique to Garching is the concentration of physical research facilities: in the immediate vicinity of the campus there are five Max

Planck institutes, the Walther Meissner Institute for low temperature research, the Walter Schottky Institute for fundamental research into semiconductor electronics, the accelerator laboratory (Maier-Leibnitz Laboratory), the Bavarian Centre for Applied Energy Research and the ultra-modern TUM Research Neutron Source FRM-II (see p. 44).

Five subjects of study

From the five subjects of study, namely General Physics, Technical Physics, Biophysics, Engineering Physics and Physics Teacher, students can put together a course of study tailored to their personal re-





quirements with more than 500 optional subjects from all TUM faculties. Each student has a professor as personal mentor. The internationally oriented Bachelor's and Master's Degree in Engineering Physics provides well-founded physical and technical training in the sciences of materials and energy.

TUM Physics = Basic Research + Technology + Industry

The boundaries between technical physics and engineering sciences are fluid even during one's studies. Many students write their dissertation for their diploma while working for Munich's high-tech industry. Al-

most everywhere physicists' skills and knowledge are much sought-after. Today, for example, physicists are in great demand as partners to physicians in nuclear medicine, to bankers in risk management, to lawyers in patent law and environmental protection, to biologists in biophysics and to meteorologists in the weather service.

One third of physics students use the international contacts of the TUM for studying abroad and, conversely, many foreign students and scientists come to the TUM. English is to an increasing extent becoming the language of instruction and examination at the Physics Department.

Faculty of Physics
<http://www.ph.tum.de>



Chemistry Department Faculty of Chemistry

Chemistry is
science and industry

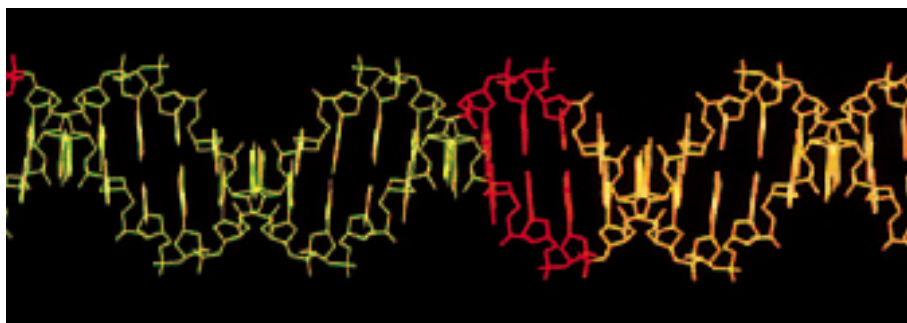
The TUM Faculty of Chemistry is proud of its tradition which reaches as far back as 1868 and can boast four Nobel Prize winners (Heinrich Otto Wieland, Hans Fischer, Ernst Otto Fischer, Robert Huber). Graduates of the faculty made pioneering discoveries in industry such as, for example, catalytic acetaldehyde synthesis (1958) at the Bavarian Wacker-Chemie company.

Modern equipment, renowned scientists, excellence in research and teaching

TUM Chemistry is not only the German chemical faculty that is quoted most frequently throughout the world but also achieves top positions in German rankings. This is hardly surprising: the Garching Campus offers state-of-the-art technologies and research laboratories such

Chemistry is intellectual craftsmanship

TUM Chemistry encompasses the full scope of present-day chemistry and combines basic research and practical relevance. This is why its graduates are much sought-after in industry. Along with the classic subjects it also offers industry-oriented subjects like life-science chemistry, technical chemistry, organo-metallic



as, for example, one of the world's largest centres for nuclear magnetic resonance spectroscopy for the investigation of complicated molecular structures.





chemistry, construction chemistry, chemical engineering, computer chemistry, radiochemistry, polymer chemistry, environmental analysis. One particular, unmistakable focus is catalyst research, an example of sustainable resource management.

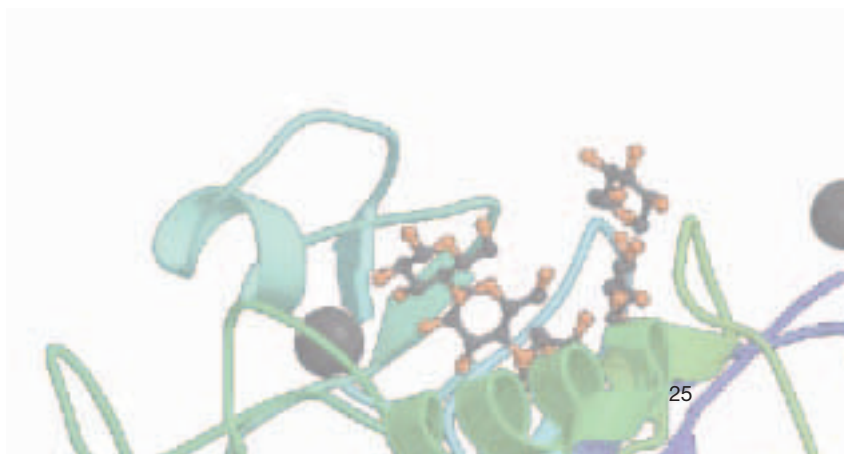
Chemistry is teamwork

Today's chemists co-operate with many experts from other disciplines: with microbiologists, process engineers and food technologists in biotechnology, with engineers from all subject areas in chemical engineering, with architects and civil engineers in construction chemistry, with electrical engineers and information scientists in computer chemistry, as well as with physicians and genetics engineers in the development of new drugs. TUM Chemistry has a strong focus on the modern life-sciences.

Chemistry in Garching is in great demand internationally: many of its professors are guest lecturers at some of the world's best universities. Most young chemistry researchers from abroad prefer Garching over other German chemistry faculties, as is demonstrated by the statistics of the Alexander Humboldt Foundation. Advanced lectures are therefore offered in English, which is also the common laboratory language.

Faculty of Chemistry
<http://www.ch.tum.de>

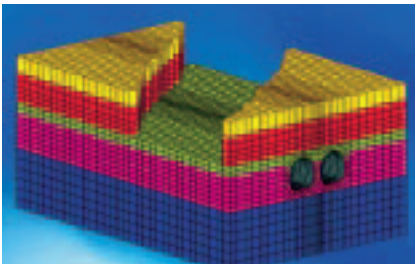
TUM-Professor Ernst Otto Fischer receives the Nobel Prize from His Majesty King Carl XVI Gustav in Stockholm, December 1973.



Faculty of Civil Engineering and Surveying

High-tech
and practical relevance

When a civil engineer builds something it has to last for decades or longer. A sound knowledge of statics and building mechanics, the most modern building materials, machinery and methods is indispensable.



When it comes to building-, bridge- and road-construction, civil engineering hydraulics, construction of tunnels and galleries, traffic engineering, drinking-water supply, sanitation and waste management, teamwork is called for everywhere. The civil engineer not only co-operates with geodesists, geological engineers and architects but also with



plants, and with chemists and mineralogists in building materials development.

There are many career prospects in construction companies, with institutions and with consulting engineers, in the civil service or in a freelance capacity, and the pursuit of



careers abroad has been a long tradition with German civil engineers.

Attractive courses of study

The degree courses at the TUM are among the shortest in length in Germany. Highly recommendable is the dual diploma at the TUM and the elite university École Nationale des Ponts et Chaussées in Paris. The faculty maintains numerous international cooperations.

mechanical engineers in plant construction, with hydrologists and biologists in the protection of water bodies, with chemists and biologists in waste-water purification and the construction of sewage-treatment

Students on study courses leading to a diploma in civil engineering and construction-materials engineering



can already work for the faculty's testing agencies, laboratories, experimental stations and research institutes. Graduates of the interdisciplinary Computational Mechanics Master Programme are much sought-after experts for computer-based simulations in civil engineering as well as mechanical engineering, automobile manufacture and aircraft construction.

Geodesy – without the rod and pole

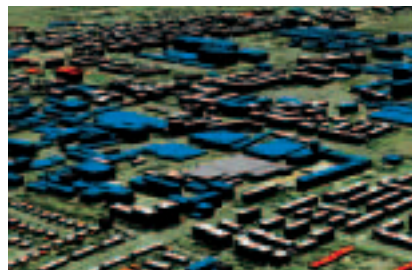
Geodesists use state-of-the-art technologies such as automatic measuring systems, satellite and aircraft sensors, data processing, informatics, cartography. There are many new spheres of activity – ranging from terrestrial survey and engineering methods of land survey, land management, geo-information systems, computer cartography right down to remote sensing and satellite geodesy.

Geodesists provide the basic information for the planning and execution of construction projects. They work as planners and decision-makers in land re-organisation and in rural and regional development. Our environment and its geographi-

cal changes are represented by means of maps and multi-dimensional animations. Geodesists also observe the earth and analyse natural and climatic phenomena.

In the fast lane to a career

It takes only nine semesters to complete the Diploma course in Geo-



desy and Geo-information. Also very popular is the international Master's Degree in Land Management and Land Tenure, which is taught in English.

Practice-oriented careers are available in the construction and engineering industries, architecture and informatics, banks and insurance companies, as well as public authorities. In research geodesists collaborate with geographers, geologists, geophysicists, hydrologists, oceanographers, physicists and astrophysicists.

Geologists get to the bottom of things

Geologists are „natural scientists“ in the true sense of the word: they examine the properties and development of the earth, its rocks and its life. This makes them much sought-after specialists throughout the world - in tunnel construction, rock



construction, foundation engineering, in consulting engineers' offices, in construction companies or in the natural-resources industry. Geo-engineers work side by side with geo-technicians, construction and mining engineers, surveyors and mechanical engineers.

Faculty of Civil Engineering and Surveying

<http://www.bv.tum.de>

Faculty of Architecture

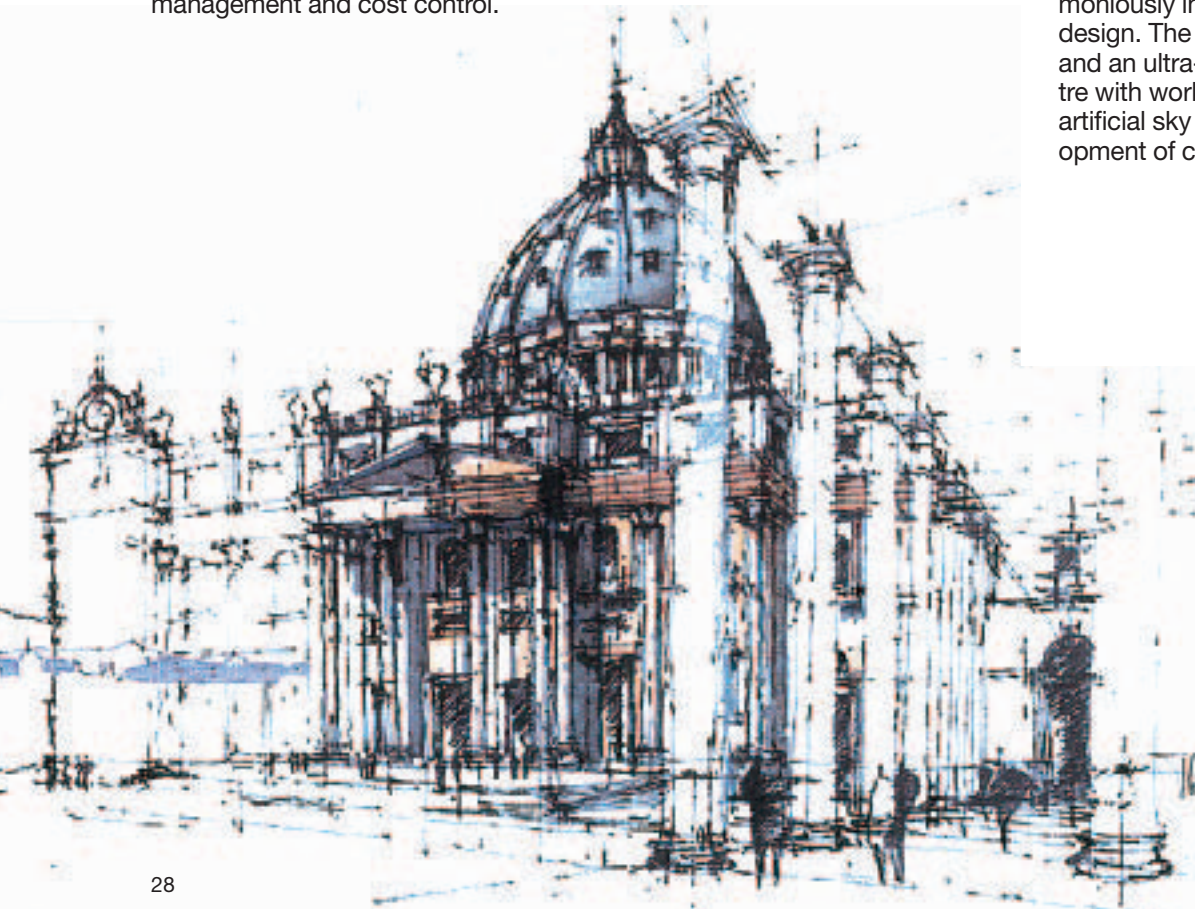
Designing the new, preserving
the old

People who become architects are time-travellers: from the exploration of antique buildings through the planning of buildings to the designing of our built environment. Artistic talent, creativity and an education in art history are just as important in this context as a sound knowledge of structural design and technology, urban development and housing, management and cost control.

Extensive theoretical and practical training, a close association with technical subjects and a strong future professional relevance are the reasons why TUM graduates enjoy an excellent reputation. Some of the professors are internationally renowned architects from various European countries with their own architect's offices.

Engineer and artist

The studies foster the synthesis of a technical and aesthetic education. Architects, physicists and mechanical engineers develop, for example, new concepts for energy-saving construction, solar electricity plants and daylight simulation as well as methods for integrating them harmoniously into the constructional design. The faculty has CAD rooms and an ultra-modern technical centre with workshops, solar station, artificial sky and a hall for the development of construction robots.





International novelty at the TUM: Diploma in restoration

The faculty offers the only university chair worldwide for the study of restoration, art technology and preservation. The training of restorers is backed by a wide range of scientific skills (chemistry, physics, informatics, mathematics). The faculty collaborates with the world-famous restoration workshops, the Münchner Restaurierungswerkstätten.

Nearby art museums and connections to distant places

Munich's three big Pinakothek art galleries are situated directly opposite the faculty – places for science and demonstration. The Königsplatz with its two museums of antiquity is an easy walk away, as well as the Lenbachhaus and the avant-garde subterranean “Kunstbau” – designed, of course, by a TUM professor.

In 2002, the TUM Museum of Architecture – the largest collection of its kind in Germany – received new showrooms in the nearby „Pinakothek der Moderne“, the country's most highly frequented art gallery. The Museum of Architecture takes advantage of the unique combination of archives, teaching and

research at the Faculty of Architecture and presents its work to a wide public.

A lively exchange of students with the University of Illinois, the EPFL Lausanne, Technical University of Delft, with Madrid, Strasbourg, Bath (UK), Paris, Oslo, Greece and Turkey provides a multi-cultural aura. The



well-cultivated contacts ultimately also create competitive advantages for the graduates: they can work all over the world.

Excellent career opportunities

There are many openings for architects – in their own architect's offices, in building, regional planning and urban development, in landscape architecture, preservation of historical monuments, informatics, building materials and administration, interior design, furniture and product design. The number of architects working for construction companies, developers and building management companies is increasing as well.

Faculty of Architecture

<http://www.ar.tum.de>

TUM Museum of Architecture

<http://www.architekturmuseum.de>

Faculty of Mechanical Engineering

Visions for the future and technical responsibility

The modern engineer works in research and development, production, marketing and distribution. Important fields of work along with simulation methods, materials and production methods are microsystems and software development. Many managers in industry are engineers. Their influence on the economy and society is growing constantly. To a greater extent, therefore, they re-

quire business knowledge, leadership skills and a sense of responsibility towards nature and mankind.

A magnet for scientists and students

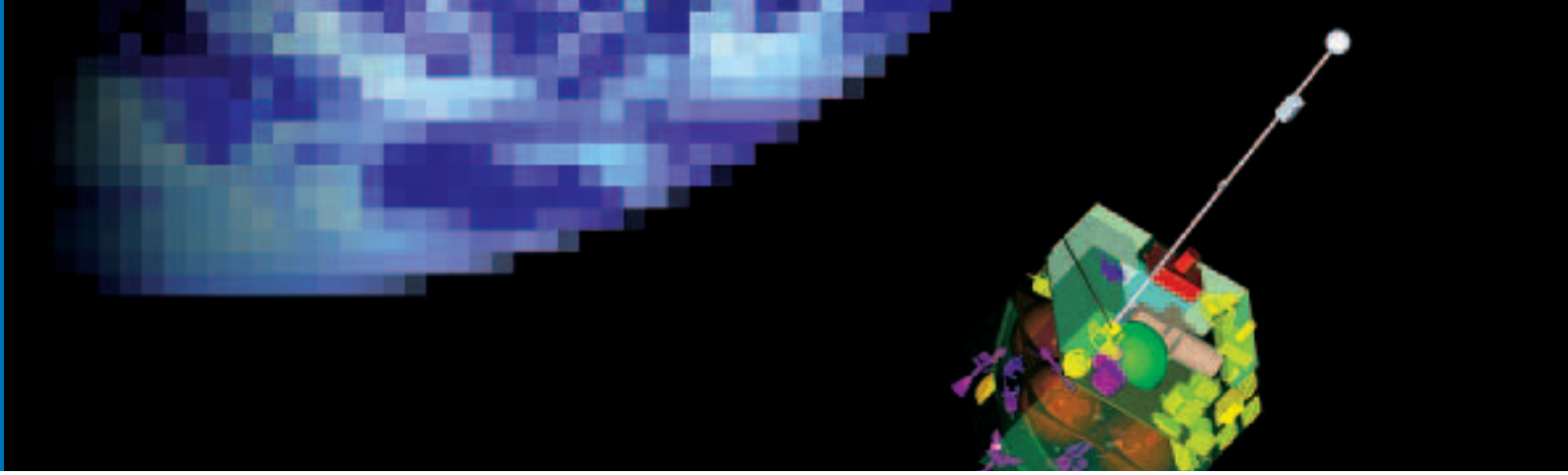
Europe's most modern complex of buildings on the Garching campus offers a unique learning and research environment. The architectural concept is geared to openness, encounter and communication. Some of the highlights are the multimedia equipment and the PC technology in the lecture halls, laboratories and workrooms, 24-hour open access to the Internet, technical equipment, machinery and pilot plants based on state-of-the-art industrial standards.

Practically relevant studies and individual orientation

Research and practice are combined in numerous sponsored projects funded by industry. First year students at the TUM are trained in time management, working techniques and learning methods. This intensive support is reflected in an average length of study that is among the shortest in Germany.

After they have completed the basic course, a unique study model enables students to configure their

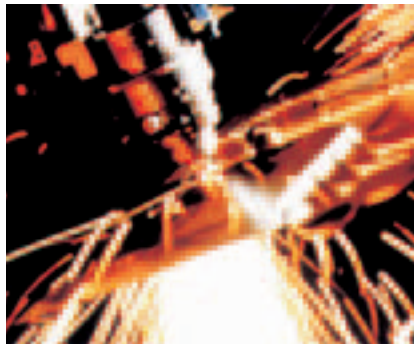
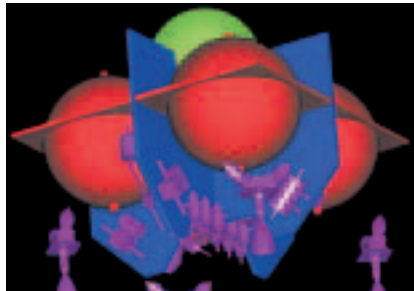




own customised main course of study. The main fields of study are selected by combining two modules chosen from a range of 20 teaching units. One orientation of a particularly interdisciplinary nature, for example, is achieved through a combination with the Information Technology module or the Mechatronics module.

International contacts

Students studying to become engineers can take a dual diploma at the TUM and the prestigious École Centrale de Paris, also at the universities of Stockholm and Madrid. For some special subjects like aviation and astronautics, there are additional networks to renowned American universities. The TUM is also a member of T.I.M.E., an international network of elite universities. Of interest from an international point of view are the Bachelor and Master study courses.



Industry seeks TUM graduates

A TUM engineer does not have to look for an employer – the employer looks for him: jobs in industry for students about to graduate, job offers during the traineeship period, interviews with head-hunters in the faculty's corridors – these are nothing unusual. And those who want to establish their own business can help to shape the technology transfer to small-scale industry in one of the TUM offshoots.

In 2003 the regional research centre “Ingolstadt Institute of the Technische Universität München” (INI.TUM) was inaugurated. This cooperative project is supported by the AUDI AG and the city of Ingolstadt.

Faculty of Mechanical Engineering

<http://www.mw.tum.de>

Faculty of Electrical Engineering and Information Technology

Hard and software
for micro- and macrosystems

Hardly any other field changes as quickly as electrical engineering and information technology. Today this discipline is working on the development, production, distribution and management of electrical and information technology systems of every kind – from transistors, computers, mobile phones, electric motors right up to the power station.

Sound methodical knowledge: the key to creativity and versatility

A broad basic knowledge is enhanced by important non-technical skills like social competence, knowledge of business administration and knowledge of foreign languages. To raise its applicability levels, basic knowledge is selectively widened through specialised knowl-

edge from a selected subject - most often in concert with industry. TUM graduates enjoy a reputation of being able to work anywhere and everywhere, to be intellectually adaptable and at the same time to think in terms that are practically relevant. In numerous rankings the faculty always holds top positions and the length of studies, eleven semesters including the dissertation, is the shortest in Germany.





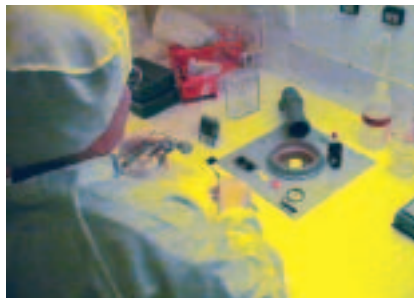
Interdisciplinary knowledge for new fields of application

TUM engineers learn to think in interdisciplinary terms as soon as they start their studies. In all advanced study courses, i.e. in information and communications technology, automation and industrial information technology, electronics, mechatronics and energy systems, they collaborate with information scientists and mathematicians, physicists and chemists and mechanical engineers. Inter-faculty research specialisations include the development of new materials, medical engineering and software engineering.

A cosmopolitan approach through internationalisation

Institutes and departmental chairs cultivate intensive contacts to universities and research institutes around the globe. The good relations to South-East Asia, most of all China, deserve special mention here.

There are dual diploma agreements with the École Centrale de Lille, the École Nationale Supérieure des Télécommunications de Bretagne and the École Centrale de Paris. The international Bachelor of Science and Master of Science degrees are, of course, offered as well. The faculty also provides two-year courses of further study for Master's degrees in Communications Engineering and



Microwave Engineering which are held exclusively in English.

The proximity of the TUM to the research and development departments of industry enables students, students about to graduate and graduate students reading for a doctorate to do application-oriented research, to learn how to work in a cost-effective manner and to transfer smoothly to industry. They have especially good prospects in the fields of microelectronics, wireless communications, optical communications technology, automation, energy, communications, software and computer technology, multimedia and mechatronics.

Faculty of Electrical Engineering and Information Technology

<http://www.ei.tum.de>

Faculty of Informatics

Knowledge-manager
and high-tech developer

Today, the young discipline of informatics has developed into a pace-setter of our highly industrialised society. TUM researchers have been involved right from the beginning - starting with the first "Program-Controlled Electronic Computer" – "Programmgesteuerte Elektronische Rechenanlage München/PERM" – in 1952.

In 2002, together with the Faculty of Mathematics, the Informatics Department moved into an ultra-modern building on the Garching Campus. The close proximity to the faculties of mathematics and mechanical engineering and the central institute of medical engineering fosters the interdisciplinary approach.

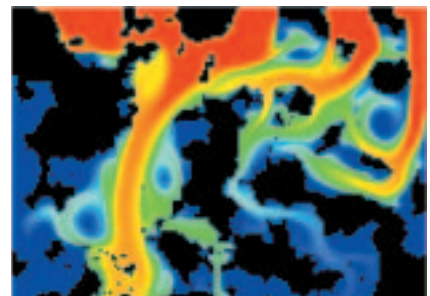
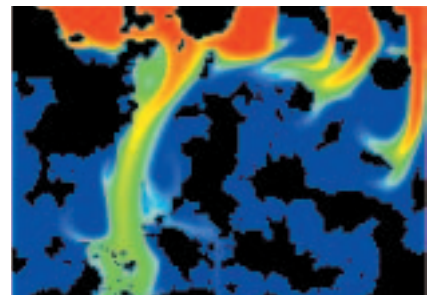
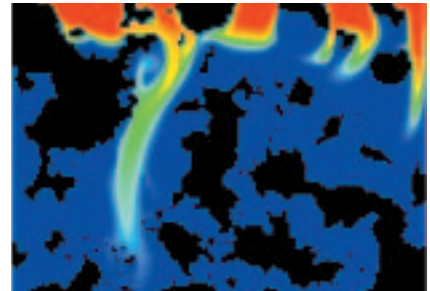
TUM informatics studies: ideal start for researchers and practitioners

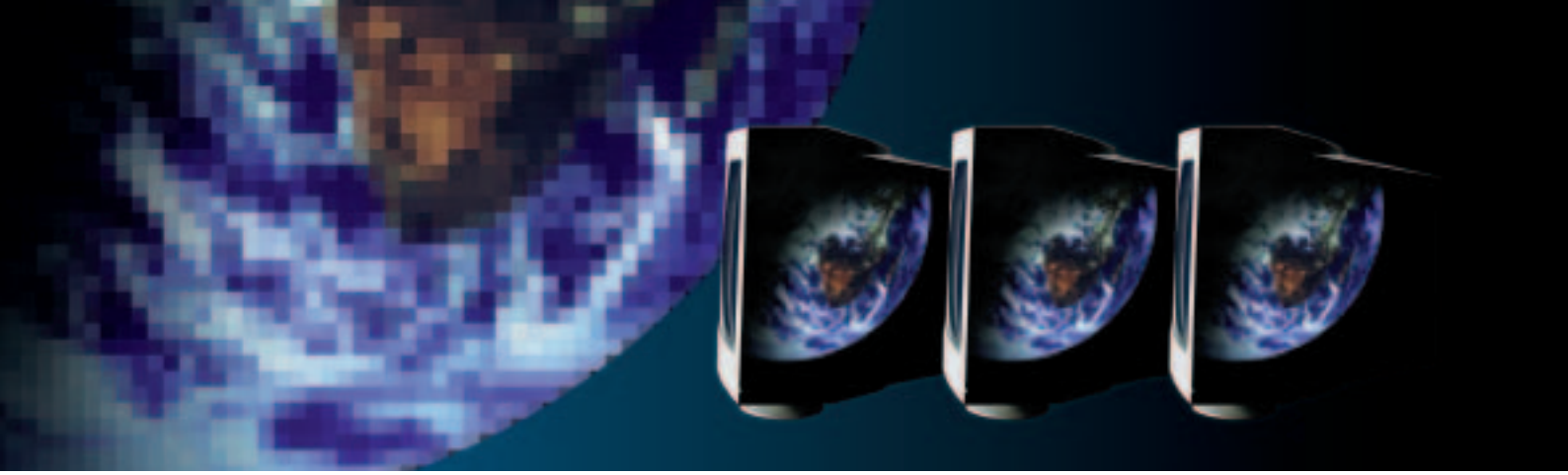
Today there is hardly an industry that can do without informatics – and the job opportunities are just as varied. TUM graduates design and maintain information systems for big corporations, program robots, set up data networks for linking banks, develop traffic management systems or simulate complicated technical and administrative processes.

The main emphasis of research at the TUM is on software engineering, parallel, distributed, mobile systems, algorithms, scientific calculation, knowledge-based systems, embedded systems and robotics.

TUM information scientists: versatile, team-players, competent, international

Along with the central subjects Practical Informatics, Technical Informatics with systems programming and Theoretical Informatics, the Diploma in Informatics also offers the subsidiary subjects of





business science, electrical engineering, theoretical medicine and mathematics. Further elective subjects are biology, physics, logic and philosophy of science, architecture, traffic and town planning, psychology and music.

The faculty attaches special importance to teaching social and economic competence. All students receive a basic education in economics and management, law, communication and the ability to work in a team. Practically oriented classes geared to the needs of industry prepare for future co-operation with the business world. Informatics has the highest proportion of foreigners of all faculties, with well over 30 per cent.

Much sought-after graduates - successful business founders

The TUM responds flexibly to new demands and requirements. In past years, for example, it established new courses of study in Bioinformatics, and Business Informatics as well as a departmental chair for "Applications in Medicine". The faculty

also participates in the interdisciplinary Computational Science and Engineering (CSE) Master's programme. English is the language used to teach here.

Today, information scientists are among the most sought-after employees – in Munich's "Isar Valley", a concentration of high-tech industries, there have been considerably more vacancies than graduates at the TUM for years.

Applications-oriented research at the TUM often results in marketable products. With support from the university a large number of talented graduates have successfully established their own companies.



Faculty of Informatics
<http://www.in.tum.de>



Science of Life for Life Science Centre Weihenstephan for Nutrition, Land Management and Environmental Studies

At the Science Centre Weihenstephan, around 100 professors teach and research the themes of the century: nutrition, land management and environment. All life sciences are represented: agronomics, forestry and environmental sciences, dietetics and nutrition sciences as well as food technology. And at the centre of it all is biology with a special emphasis on molecular biology and biochemistry.

Food - nutrition - health

One leitmotif is the food chain - from initial production through methods of land cultivation, the production of food and animal feed, plant and livestock breeding, right down to food

safety. The newly established Central Institute for Nutrition and Food Research, supported by generous donations, bundles competences and establishes contacts to other faculties.

Land use

The multi-functional demands placed on land use lead to conflicts of interests – especially against the background of a fast-growing world population. Weihenstephan makes important contributions to this complex subject. It is planned to develop even further the interdisciplinary networking of landscape planning and landscape architecture with the fields of architecture, civil engineering and economics. The range covers everything from landscape archi-

ture through environmental planning to eco-engineering.

Environment

Weihenstephan holds an outstanding position in interdisciplinary environmental research. The Ecology Department treats ecosystems as interactive structures of organisms, populations and symbioses and studies their relationships to the environment.

Agronomists working in this field are looking for ecological production methods; genetic engineering in plant breeding helps to make plants more resistant to pests and thus to reduce the consumption of pesticides.





A new type of matrix structure

Traditional faculties have been replaced by research departments and study faculties. The new structure facilitates interdisciplinary cooperation and makes it easier to adapt teaching methods more flexibly. The news is spreading about how well this matrix structure is functioning: renowned universities at home and abroad have taken over the idea.

Innovative courses of study

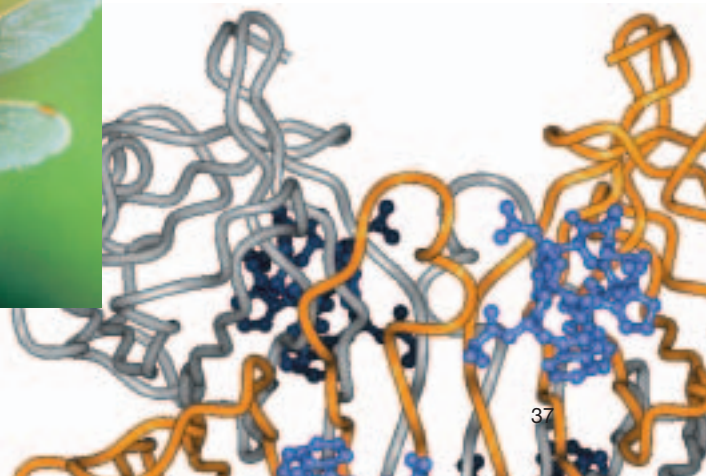
The courses of study build on biology and put an emphasis on the fundamentals of natural science. Practical experience can be gathered at the university's own experimental stations.

The wide range of courses comprises biology, molecular biotechnology, brewing and beverage technology, dairy science and technology, agronomics, horticulture, forestry and wood science, landscape architecture and landscape planning, biochemistry, bioinformatics, the technology and biotechnology of food, eco-engineering.



The Molecular Biotechnology study course is unique in its natural-science orientation and its emphasis on biomolecular structures and functions. The new Nutrition Science course comprising the subjects of biomedicine, food science and public health deals with the molecular and cellular basics of nutrition in the context of health and quality of life. The English-taught Master's degree course in Sustainable Resource Management has a strong interdisciplinary orientation and is especially intended for students from abroad.

Science Centre Weihenstephan
<http://www.wzw.tum.de>



Faculty of Medicine

Problem-oriented research,
teaching and medical care

The medical faculty, established in 1967, has acquired an excellent reputation in a short period of time. Every year, its students rank among the leaders in the nation-wide benchmarking. Medical care for patients enjoys an international reputation. The TUM Medical Faculty comprises the University Hospital –



Klinikum rechts der Isar –, the Biederstein Campus, the German Heart Centre, the Schwabing Children's Hospital and the Polyclinics for Preventive and Rehabilitative Sports Medicine and Sports Orthopaedics of the university sports complex.

A clear research profile

Today research concentrates on six interdisciplinary fields:

- Allergies, environment and nutrition,
- Molecular imaging, neuro-imaging and cerebral functions,
- Individualisation of tumour therapy,
- Infection and immunity,

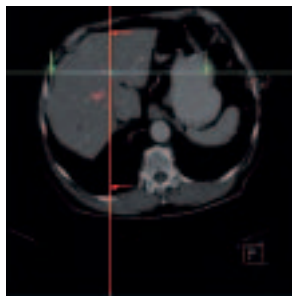
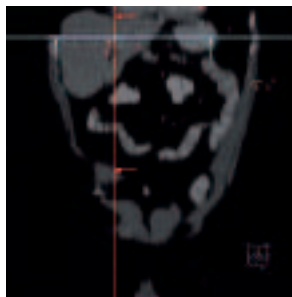
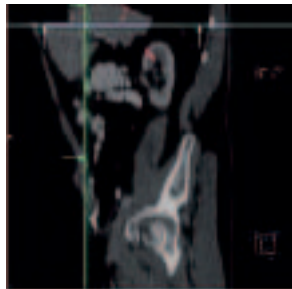
- Biomedical technologies,
- Molecular cardiology and vascular biology.

These emphases are reflected by the special fields of research (SFB) at the Faculty of Medicine:

- Mechanisms of fast cell activation (SFB 391),
- Target structures for selective immunosuppression (SFB 456),
- Facultative Microbial Pathogenesis and Innate Immunity (SFB 576).

Third-party-funded clinical research groups are regularly set up to investigate further topics.





In 2004 the university founded its own integrated research unit “Bio-medical Engineering” that intensifies the networking of medicine and the natural, life and engineering sciences, which are excellently developed at the TUM. This form of co-operation, which is unique in Germany, will apply itself to latest research topics in the field of biotechnology, life science electronics, molecular visualisation and interventional therapy.

Leading position of TUM medicine

Not only the students but also the researchers hold top positions: the Faculty of Medicine has thus been able to constantly increase its inflow of external funds. TUM medicine holds a top position in Germany when it comes to citation frequency.

Patient-oriented medical care in Disease Management Centres

Medicine at the Klinikum rechts der Isar has succeeded in establishing patient-oriented clinical medical care in the form of centres like the Cancer Centre on analogy with the main fields of research. There are organisational structures with a clear allocation of responsibility and competences of the participating institutions: each centre has a node, i.e. common rooms for an interdiscipli-

nary polyclinic and interdisciplinary case discussions (e.g. tumour-board). These centres overcome the organ- and therapy-oriented organisation of the disciplines, which is based on historical developments in medicine, but is not always efficient. The principle of the problem-oriented approach is implemented in teaching as well.

Nutritional medicine: prevention is better than cure

One specialty is nutritional medicine that so far has been largely neglected in Germany, despite the fact that many diseases are caused by an unhealthy diet. To make some progress in this field the “Else-Kröner-Fresenius-Zentrum für



Ernährungsmedizin” was established in 2003 from trust funds as a joint teaching, research and consultation centre of the Faculty of Medicine and the Weihenstephan Science Centre.

Faculty of Sports Science

Managers for health,
leisure and the media

Sport plays an important role when it comes to keeping oneself healthy and in the development of one's personality, as a leisure activity and communal experience. And it even plays a role in politics that should not be underestimated. Sport is after all "big business". So, in 2002, the Technische Universität München expanded its existing sports centre into a faculty of sports science.



Ideal preconditions

The offer of courses and research is unique in Germany. The departmental chair for Sports, Media and Communication offers extensive training in sports journalism, advertising, merchandising and sponsoring, in electronic sports-data processing and in the exploitation of rights of use. Sports and health promotion deals with sports physiology, popu-

lar sport, health care and a healthy sports diet in co-operation with the Medical Faculty, the TUM's Klinikum rechts der Isar, the German Heart Centre and the Weihenstephan Science Centre.

The Sports Equipment Engineering department tests and develops sports clothing, equipment, materials and facilities in co-operation with the Faculty of Mechanical Engineering. The special field of Theory and Practice of Sports assumes a key function when it comes to the transfer of knowledge of sports and its practical application.





The departmental chairs for Sports Orthopaedics and Sports Traumatology and Preventive and Rehabilitative Sports Medicine are closely connected with the renowned Klinikum rechts der Isar of the TUM and are supplemented by a biomechanics department. There are also professorships for training and kinetics, sports education, sports psychology, sports sociology, as well as sports economics and sports management.

Apart from the diploma qualifications, the Bachelor's and Master's degrees and teaching for elementary schools, secondary schools, secondary modern schools, grammar schools and vocational schools, one TUM specialty is training for non-academic sports teachers.

As a Centre of Excellence, the Bavarian Research and Technology Centre for Sports Science - Bayerisches Forschungs- und Technologiezentrum für Sportwissenschaft (BFTS) – accommodated in a new building 2000 square metres in area, bundles high-tech co-operations with other faculties and sports associations, sports clubs, Olympic training centres and high-performance-sports centres.



Studying with a view of the Olympic Tower

Covering an area of 45 hectares, the large central university sports complex - Zentrale Hochschulsportanlage (ZHS) – in the Olympic grounds is one of the most beautiful and most generously proportioned university sports complexes in Europe. University sports in general from all of Munich's universities can benefit from the excellent equipment as well.

The career prospects for interdisciplinary sports scientists are brilliant. There is a large number of vacancies in the fields of sports, media and communication. Sport equipment engineers can make a career for themselves in research and development, marketing or consultation. Graduates specialized in the subject Health Promotion are much sought-after by spa clinics, hospitals and rehabilitation centres, in public administration and health insurance companies.

Faculty of Sports Science
<http://www.sp.tum.de>

Faculty of Economics

Business people
with technical competence

In the year 2002, all fields of teaching and research in business administration and management were combined into one joint faculty, supplemented by the arts, and the cultural and social sciences. The orientation towards technology, management and life sciences gives TUM economics its unique profile.

The courses in business administration make targeted use of their proximity to the engineering and natural sciences. As a result, the next generation of executives receive practically relevant training and acquire expert and methodical knowledge while becoming familiar with other approaches.



TUM-specific: business people with a technical background

“Technology- and Management-Oriented Business Administration (TUM-BWL)” at the TUM aims at training graduates for executive duties. This requires an understanding of socio-technical and scientific-economic connections. This is guaranteed from the very start by broad interdisciplinary networking and the combination of theory and practice.





Increasingly popular: MBA

The two-year “Management-Oriented Graduate Course in Business Administration” (MBA) is based on the model of the “Master of Science in Business Administration” (MBA) of American and European universities. It is intended for graduates in engineering, natural sciences or informatics. The teaching provides a sound knowledge base from business administration, psychology, industrial science, statistics, corporate research, commercial law, social law and patent law. Some lectures are held by top managers from multinational enterprises.

The students' own initiative

Members of the TUM Business Club e.V. are students of the Technische Universität München who organise additional activities associated with the MBA programme in close cooperation with the university and industry. The aim is to breathe more life into MBA training and to develop it further through enterprise, team spirit and creativity.



The service company TUMorrow GmbH is also run exclusively on student dedication and commitment. Working for the TUMorrow GmbH provides MBA students with direct contacts to industry and practically relevant experience through the organisation and implementation of projects.

Faculty of Economics
<http://www.wi.tum.de>



Central Institutes

Interdisciplinary interfaces

Central institutes are assigned to the university management. Their purpose is to develop focal study points between the classic disciplines.

Heinz Maier-Leibnitz Research Neutron Source (FRM-II) <http://www.frm2.tum.de>

The Heinz Maier-Leibnitz research reactor (FRM-II) which went into operation in 2004 is the modern successor to the legendary "Atomic-Egg" (FRM) from the year 1957, which was the nucleus of the internationally renowned Garching research cluster. The ultra-modern research neutron source is a Central Scientific Institution of the TUM and is used by different disciplines for approx. 70 percent basic research and 30 percent application-oriented work. The broadly based scientific environment ensures that it is used intensively and in a variety of ways.

The neutron source supplies a high thermal flux density thus guaranteeing even better measuring times and new experiments. As far as the quality of its radiation is concerned, it is one of the world's strongest sources. Numerous instruments are just as innovative. Ten instruments of the basic equipment alone merit the name 'world innovation'. The Research Neutron Source is open not only to experimenters of the TUM but also to the international community of neutron researchers.

Central Institute for Fundamental Research in Semiconductor Electronics – Walter Schottky Institute <http://www.wsi.tum.de>

With an area of 2400 square metres, the Walter Schottky Institute (WSI) was founded in 1988 to improve the interrelationship between fundamental physical research and the development of semiconductor elements. Research ranges from fundamental physical questions to the development of new components in the field of nano- and opto-electronics and sensor technology. Interdisciplinary working methods are characterised by a reciprocal relationship between materials technology, basic research and component development.

There are co-operations with other TUM research groups in the fields of physics, electrical engineering and IT, chemistry, biochemistry and informatics as well as with other universities, industrial research laboratories, and Fraunhofer and Max Planck Institutes.

Central Institute for Medical Engineering <http://www.zimt.tum.de>

Medical engineering is a cross-section of a number of subjects that has created hundreds of thousands of highly qualified jobs in Germany and has made major contributions to clinical medicine in the field of diagnostics and therapy. With its faculties for life sciences, chemistry, electrical engineering, informatics, mechanical engineering, medicine

and physics, the TU Munich offers ideal preconditions for this subject. At the core of the interdisciplinary Central Institute for Medical Engineering (ZIMT) is the Chair of Medical Engineering.

The attractive Master's degree in Medical Engineering opens up interesting career prospects as medical information officer, medical electronics engineer, cardio-engineer or medical-engineering pharmacist. Research focuses on biocompatible materials such as implants made of metal and synthetic materials, tissue replacement systems and degradable materials.

Central Institute for Nutrition and Food Research <http://www.ziel.tum.de>

With its interdisciplinary Central Institute for Nutrition and Food Research (ZIEL) the TUM is facing the future topic of food quality.

Modern nutrition science is based on molecular-biological and biochemical knowledge about the human metabolism and uses biotechnological and genetic engineering methods to develop new approaches to nutrition, medicine and pharmaceuticals. It examines the subject of food from production through processing down to the bio-functionality of its ingredients.

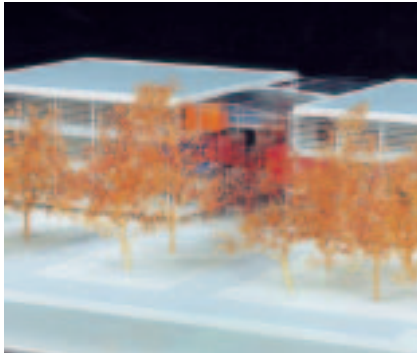
The Else-Kröner-Fresenius Foundation has created four professorships for nutritional medicine. A polyclinic and a clinic for nutritional medicine were established at the TUM's Klinikum rechts der Isar.

Along with extensive activities in the fields of experimentation, research and the preparation of expert opinions, the Central Institute devotes itself to further training for physicians.



Central Institute for Education
<http://www.pa-lb.ws.tum.de>

All teacher-training activities at the TUM are coordinated and integrated in a sensible and meaningful way by the Central Institute for Education. This also raises the awareness of all faculties to the role of teacher training. The university is committed to the Bavarian school system and consequently to a modern form of teacher training.



There are also further and advanced training courses for teachers of science and engineering subjects supported by trust funds and in cooperation with practising teachers in schools.

Central Institute Carl von Linde Academy
<http://www.cvl-a.tum.de>

The inventor of modern refrigeration technology and professor of our university Carl von Linde (1846-1934) was very successful in forging links between science and industry. The Carl von Linde Academy, which was opened in 2004 and is funded by the Linde corporation, seeks to communicate these skills to the students at the TUM.



From top to bottom:
 Research Neutron Source (FRM-II),
 Central Institute for Nutrition and Food
 Research, Walter Schottky Institute,
 Central Institute for Medical Engineering

The objective of its cultural studies is to foster an open-minded attitude to scientific cultures, to accelerate the interdisciplinary transfer of knowledge and skills and to strengthen the sense of responsibility. The teaching offer is based first and foremost on philosophy and ethics, the study of civilisation and the social sciences, as well as science research and science teaching methods. It encompasses teaching contents for all students, in-depth teaching contents for a selected circle of particularly suitable students and university teaching courses for academic staff. The Carl von Linde Academy also offers advanced and further education courses.

Central Institute for the History of Technology
<http://www.zigt.ze.tu-muenchen.de>

The Central Institute for the History of Technology is housed in the Deutsches Museum. Central to the Institute's activities is the exploration of the historical perspective of technology along the dimension of the arts and social sciences. One major precondition for this is the understanding of the development of society in terms of its cultural history and the processes of change.

In various ways the Central Institute for the History of Technology builds bridges between the engineering and natural sciences on the one hand and the arts and the social sciences on the other: in Master's and Magister degree courses, in interdisciplinary teaching and in joint research projects with scientific institutions at home and abroad.

Media Centre
<http://www.mz.ze.tu-muenchen.de>

For the first time in Bavaria, the Technische Universität München has bundled all media competences into one Central Scientific Institution. The Media Centre works as a competence centre with a special emphasis on multi-media applications and provides support for the members of the university with regard to the conception, production and use of media in research, teaching and studies. One mainstay in the range of services offered are lectures and seminars on the topics of media design, media production and media teaching methods.

Field stations and co-operative partners

There are numerous field stations grouped around the TUM campus-triangle Munich - Garching - Weihenstephan where students get acquainted with practice-oriented research. These competence centres enjoy an excellent reputation among experts that goes far beyond the borders of Bavaria.

Also, TUM has entered into strategic co-operations with renowned research institutes and experimental stations, which are of benefit to both partners. TUM is therefore present as a regional factor throughout Bavaria.



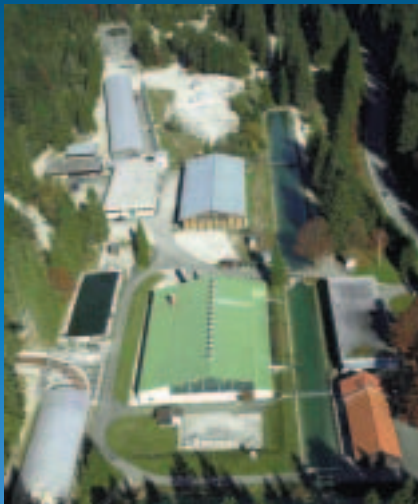
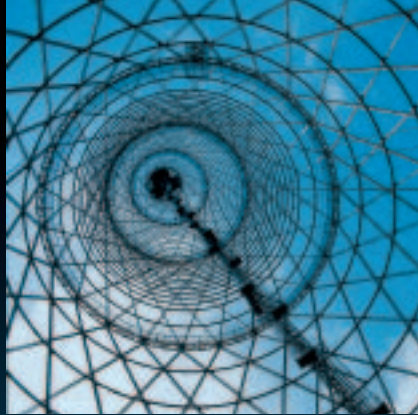
TUM field stations and institutes

- **Ingolstadt Institute der Technischen Universität München**
(Ingolstadt Institute of the Technische Universität München)
<http://www.ini.tum.de>
- **Versuchsanstalt für Wasserbau und Wasserwirtschaft Obernach**
(Research Institute for Engineering Hydraulics and Water Resources Management)
<http://www.wb.bv.tum.de>

- **Fundamentalstation Wettzell für Satellitengeodäsie**
(Base Station for Satellite Earth Surveys, Wettzell)
<http://tau.fesg.tu-muenchen.de/~fesg/web/index.php>
- **Limnologische Station Iffeldorf**
(Limnological Station, Iffeldorf)
<http://www.limno.biologie.tu-muenchen.de>
- **Produktionstechnisches Anwenderzentrum Augsburg des Instituts für Werkzeugmaschinen und Betriebswissenschaften (iwb) der TUM**
(Augsburg Production-Engineering Applications Centre of the Institute for Machine Tools and Business Administration (iwb) of the TUM)
<http://www.iwb-augsburg.de>
- **Bayerische Staatsbrauerei Weihenstephan**
(Bavarian State Brewery, Weihenstephan)
www.weihenstephaner.de

TUM Co-operative partners

- **Kompetenzzentrum für Nachwachsende Rohstoffe Straubing**
(Competence Centre for Renewable Raw Materials, Straubing)
<http://www.konaro.bayern.de>
- **Milchwirtschaftliche Untersuchungs- und Versuchsanstalt Kempten**
(Dairying Analytical Laboratory and Research Institute, Kempten)
<http://www.muva.de>
- **Forschungs- und Kompetenzzentrum Bauchemie Trostberg**
(Research and Competence Centre for Construction Chemistry, Trostberg)
<http://www.bauchemie-tum.de>







TUM Garching
Campus with new
and old research
neutron source
(FRM-II and FRM)

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