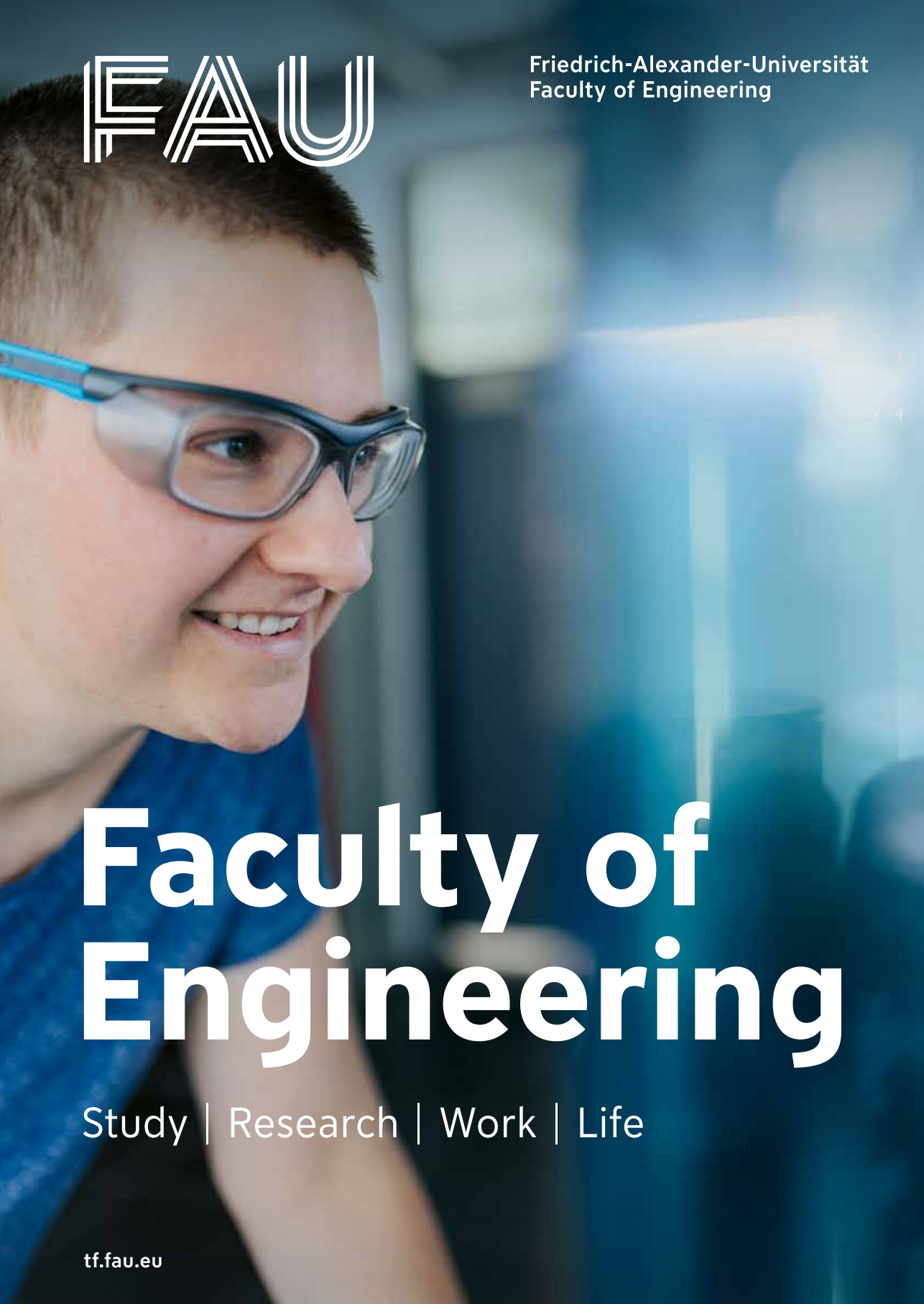

FAU

Friedrich-Alexander-Universität
Faculty of Engineering

Faculty of Engineering

Study | Research | Work | Life

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The Faculty of Engineering offers groundbreaking research and innovative teaching. As one of the largest faculties at FAU, it sets standards and drives scientific discovery for a future of limitless opportunities.

1 FAU – diverse, passionate, innovative

Moving knowledge – now and in the future

Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) is not only one of the largest but also one of the leading research universities in Germany. We stand for innovation, diversity, and passion – values reflected in the University's top positions in national and international rankings. FAU is renowned for its interdisciplinary excellence in teaching and research. Numerous alliances with renowned partners from research, industry and society enable FAU to put knowledge in motion and carry out groundbreaking work in pioneering areas of research.

The most innovative university in the world

FAU is considered the most innovative university in the world. Innovation is in its DNA – evidenced through groundbreaking pioneering achievements such as the MP3 standard, gastroscopy and the mathematics behind computed tomography. FAU is continuing in this vein in the 21st century. One outstanding example is the research conducted at FAU Profile Center Solar. Here, scientists are working on the vision of photovoltaic systems based on autonomous technologies combining sustainability, diversity of design and flexibility that are set to redefine the entire life cycle now and in the future. Also worth mentioning is research into physiological mechanisms for neurotechnology applications in medical engineering. The combination of sensors, advanced signal processing and AI algorithms allow intuitive control of neuro-orthoses.

Focus on people

FAU is an open and diverse university that encourages mutual appreciation and respect. It offers scope for researchers and students to further their personal skills and expertise and promotes a climate where freedom, a cosmopolitan outlook and equal opportunities flourish. FAU thrives on the passion and dedication of everyone who researches, studies, teaches and works here. With their unique talents, skills and different perspectives they not only shape the future but also have a decisive impact on FAU at all levels.

Worth knowing: FAU was founded in 1743 and has a long academic tradition lasting over 280 years. As a leading research university, we have enjoyed groundbreaking success in a wide range of subjects. With our outstanding innovation ecosystem that connects research, industry and society, FAU is one of the leading educational institutions in the world.

Studying at FAU

With over 275 degree programs, FAU offers a diverse and inspirational learning environment and a vibrant student community. The Erlangen-Nuremberg region is characterized by its high quality of life, cultural diversity and charming natural surroundings, making it an attractive place to study. Close connections to regional and international companies, extramural research institutions and cultural institutions all invite students to broaden their horizons, to network with others and to consider academic issues from various perspectives. In addition, the FAU Academy offers an excellent range of continuing education courses for life-long learning. By nurturing close partnerships with over 500 universities across the globe, FAU actively encourages students to gain valuable international experience.

Research at FAU

An open-minded approach lets ideas flourish. At FAU, we respect the different cultures in different subjects and value both individual and collaborative research. FAU's academic strengths are reflected in our key research priorities

- **Exploring** principles of nature
- **Targeting** environmental and economic challenges
- **Understanding** norms, cultural practices and social formations
- **Developing** future technologies
- **Engineering** transformative health care

and in the respective Profile, Research and Competence Centers.

In following our strengths, our researchers are prepared to tackle the greatest challenges of our times. At FAU, research is not restricted to laboratories and libraries, it is a dynamic process driven by collaboration and dedication. Following the FAU motto "Moving knowledge", research at FAU is a lively and interdisciplinary exchange that continually results in new findings and advancements in society.

Exploring

Targeting

Understanding

Developing

Engineering

*FAU is more than a university –
it is a vibrant community where researchers,
lecturers, staff and students can contribute
their own unique talents and perspectives.
People who develop their ideas and
inspire the future with passion and
commitment are recognized and valued.*

A strong environment with strong partnerships

Innovation thrives on strong partnerships and trusting collaborations. FAU maintains an extensive network with connections to science, business and society, going beyond institutional and geographical borders. This includes research collaborations with international companies such as Siemens, Schaeffler or adidas, as well as close links to extramural research institutions including various Helmholtz and Fraunhofer institutes. Membership of networks such as the European University Alliance EELISA also encourages collaboration. All these collaborations and initiatives that benefit students and researchers alike lead to new procedures, technologies and services that can be rapidly transferred into practice.

Ecosystem based on innovative start-up culture

FAU encourages a culture of innovation where ideas lead to successful start-ups. Embedded in the economically strong Nuremberg Metropolitan Region, FAU offers the perfect environment for start-ups. FAU provides both students and researchers with comprehensive advice and support when it comes to launching a company of their own. The start-up center ZOLLHOF in Nuremberg is a beacon of excellence, acting as a driver and pacemaker in the FAU innovation ecosystem. At ZOLLHOF, founders profit from reasonably priced office space, practical assistance and a strong network of companies and entrepreneurs. Other partners in this ecosystem include the open innovation laboratory JOSEPHS in Nuremberg city center or the Digital Health Innovation Platform (d.hip) in Erlangen.

High quality of life in the city and the region

Erlangen, Nuremberg and the whole Metropolitan Region not only offer outstanding prospects in science and business but also a high quality of life. Both locations of FAU have their own special charm. Erlangen is home to approximately 100,000 people, with 25,000 of them students. This high percentage of young people gives Erlangen a special flair, making it an exciting and vibrant university town. Nuremberg, with over 500,00 inhabitants, is the second largest city in Bavaria, has an impressive historical old town, offers a number of green spaces, and is one of the cities with the highest quality of life in the whole of Germany. With Franconian Switzerland and the Franconian lakes on the doorstep, there is plenty for outdoor enthusiasts to get excited about. And the area is a paradise for beer lovers, with the largest concentration of breweries in Europe and numerous beer gardens.

Friedrich-Alexander-Universität

5 faculties

- Faculty of Humanities, Social Sciences, and Theology
- Faculty of Business, Economics, and Law
- Faculty of Medicine
- Faculty of Sciences
- Faculty of Engineering

#people

- 41,000 students
- 650 professors
- 16,000 employees

#education

- 275 degree programs
- 10 double degree programs
- 35 degree programs in English
- 9 degree programs for professional development

#research

- 271 million euros in third-party funding
- 17 collaborative research centers*
- 24 research training groups*
- 8 Leibniz Prizes, 11 Humboldt Professorships

*involving FAU

#outreach

- #1: Global leadership in innovation (THE Impact Ranking 2024)
- #2: Patent applications in Germany (European Patent Office 2024)
- Home to the ZOLLHOF – TechIncubator (#4 in Germany according to FT Europe 2024)
- On average, more than 110 inventions, more than 60 patent applications and more than 30 start-ups (as of 2020)

fau.eu

The Faculty of Engineering offers excellent teaching focused on the interface between science and society combined with in-depth methods training and an applied approach.

2 The Faculty of Engineering – home to a pioneering spirit

Faculty of Engineering

The Faculty of Engineering at FAU has an excellent reputation, both in Germany and abroad. Thanks to this faculty, FAU integrates the disciplines offered by a technical university into a university which offers the entire spectrum of academic disciplines. The faculty has six different departments.

Its key research priorities are digital transformation and electronics, energy – environment – climate, materials and processes, medical engineering and optical technologies. The Faculty of Engineering focuses both on fundamental scientific research and on topics that are commercially and technologically relevant. Interdisciplinary dialog between the subjects and organizational units ensures that the faculty always ranks highly in international rankings.

This acclaim is also reflected in student numbers, with more than 10,000 young people currently studying in over 40 Bachelor's or Master's degree programs at the Faculty of Engineering. The range of subjects on offer reflects current developments in our modern world and includes everything from established disciplines such as chemical and biological engineering, electrical engineering, mechanical engineering and materials engineering to nanotechnology, clean energy processes and artificial intelligence. Many of these degree programs are interdisciplinary and the Faculty of Engineering cooperates closely with the Faculty of Sciences, the Faculty of Business, Economics, and Law and the Faculty of Medicine.

The Faculty of Engineering is organized into six departments:

- Artificial Intelligence in Biomedical Engineering (AIBE)
- Chemical and Biological Engineering (CBI)
- Electrical Engineering (EEI)
- Computer Science (INF)
- Mechanical Engineering (MB)
- Materials Science and Engineering (WW)

3 Studying at the Faculty of Engineering

Degree programs (B.Sc./M.Sc./LA)

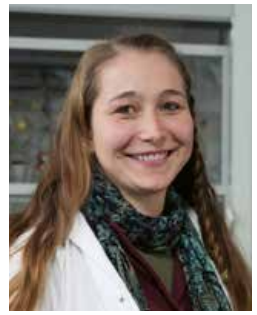
- Advanced Materials and Processes (M.Sc.)
- AI Material Technology (B.Sc.)
- Artificial Intelligence (B.Sc./M.Sc.)
- Autonomy Technologies (B.Sc./M.Sc.)
- Chemical and Biological Engineering (B.Sc./M.Sc.)
- Chemical Engineering – Sustainable Chemical Technologies (B.Sc./M.Sc.)
- Clean Energy Processes (B.Sc./M.Sc.)
- Communications and Multimedia Engineering (M.Sc.)
- Computational Engineering (B.Sc./M.Sc.)
- Computer Science (B.Sc./M.Sc./LA)
- Computer Science/IT Security (degree program for working professionals, B.Sc.)
- Electrical Engineering (B.Sc./M.Sc.)
- Electromobility ACES (B.Sc./M.Sc.)
- Energy Technology (B.Sc./M.Sc.)
- Industrial Engineering and Management (B.Sc./M.Sc.)
- Information and Communication Technology (B.Sc./M.Sc.)
- Information Systems (B.Sc.), offered by the Faculty of Business, Economics, and Law
- International Production Engineering and Management (B.Sc.)
- Life Science Engineering (B.Sc./M.Sc.), as of winter semester WS 25/26
  Biotechnology (B.Sc./M.Sc.)
- Materials Science and Engineering (B.Sc./M.Sc.)
- Mechanical Engineering (B.Sc./M.Sc.)
- Mechatronics (B.Sc./M.Sc.)
- Nanotechnology (B.Sc./M.Sc.)
- Technical Vocational Education and Training (B.Sc./M.Sc.)

Elite degree program

- Advanced Optical Technologies (M.Sc.)

» By studying Industrial Engineering and Management at the Faculty of Engineering at FAU, I learned to understand complex connections between various areas and to develop new ideas with a diverse and international mix of fellow students. At the same time, I have fond memories of the fellowship among students and the shared experiences that made this time so special. «

André Schwämmlein
Co-founder and CEO of Flix SE
Studied: Industrial Engineering and Management



» Studying at FAU was a decisive time in my life during which I discovered hidden interests and passions. Discovering my passion and a world full of opportunities sparked my entrepreneurial spirit. FAU not only awakened this dream, but also encouraged me to make it a reality. «

Katja Wadlinger
Co-founder & Head of R&D (at AMPERIAL Technologies GmbH)
Studied: Nanotechnology & Advanced Materials and Processes (MAP)

» My degree program gave me an introduction to the area of research in which I am now completing a doctoral degree. Through group work, I learned that working as a team is not only more enjoyable but also more efficient. A good memory I have is of sitting in the sun with friends working on exercises. «

Nora Gourmelon
AI Newcomer 2023, "AI for Earth"
Studied: Computer Science

» Looking back at my time as a student, what I remember most is the time I spent in the Formula Student team "High Octane Motorsports", and at Fraunhofer IISB. Participating in this while studying Electrical Engineering offered a valuable combination of theory and practice. It is opportunities like this that make the University so special for me. «

Fabian Bodensteiner
Managing Director of Worldcoin Europe
Studied: Electrical Engineering

4 Research at the Faculty of Engineering

Partner research institutions

- Fraunhofer Institute for Integrated Systems and Device Technology (IISB)
- Fraunhofer Institute for Integrated Circuits (IIS)
- International Audio Laboratories Erlangen (AudioLabs)
- Helmholtz Institute Erlangen-Nürnberg for Renewable Energy (HI ERN)
- Max Planck Institute for the Science of Light (MPL)

Partnerships

The Faculty of Engineering has partnerships with various companies, including adidas, Audi, Bayer, BMW, Bosch, Brose, Daimler, Datev, Diehl, Federal Mogul, Infineon, MAN, Porsche, Schaeffler, Siemens, Siemens Healthineers

Key research priorities

Digital transformation and electronics
Digital transformation and electronics at the Faculty of Engineering focuses on creating knowledge in engineering science for digital transformation and advancing applied research in embedded, cyberphysical and mechatronic systems. The research covers a wide spectrum ranging from electronic components to highly-integrated circuits and technologies. In the areas of digital transmission and audio and video signal processing, the faculty sets global standards and incorporates artificial intelligence into designing electronic systems and biomedicine. Another focal area involves computer-assisted simulation of material development and process optimization.

Energy – Environment – Climate
Sustainable environmental protection and climate action means rethinking value added chains and material cycles, in particular in terms of providing and using energy. With its key research priority of *Energy – Environment – Climate*, the Faculty of Engineering focuses on research into the energy transition, including the production, transformation, storage and integration of renewable energies. In collaboration with Fraunhofer Institutes and the Helmholtz Institute, research is conducted into photovoltaics, electrolysis, fuel cells and hydrogen storage.

Materials and processes
New materials and related process technologies form the basis for future industrial innovation. With its key research priority of *materials and processes*, the faculty conducts interdisciplinary research into developing functional and structural materials, investigating all length scales from atoms to finished components. Discovering new materials and processes at the Faculty of Engineering benefits from innovative methods from the areas of material research, optimization, high performance computing, artificial intelligence and 3D printing.

Medical engineering
The key research priority of *medical engineering* is integrated into an excellent research environment at FAU. Researchers from the Faculty of Engineering make an important contribution to topics such as the analysis of medical images, biomaterials, digital health, and medical robotics. Close collaboration with Uniklinikum Erlangen and partners such as Siemens Healthineers encourage the efficient transfer of technology. At the newly established Department of Artificial Intelligence in Biomedical Engineering, the focus is on using artificial intelligence in medical engineering.

Optical technologies
Optical technologies have a long tradition at the Faculty of Engineering and FAU. Aspects of current research include advanced imaging methods, laser-based additive production processes, optical metrology for combustion processes and nanomaterials, computational optics and applications for photonics in medicine.

Faculty of Engineering

6 Departments

- Artificial Intelligence in Biomedical Engineering
- Chemical and Biological Engineering
- Computer Science
- Electrical Engineering
- Materials Science and Engineering
- Mechanical Engineering

#people

- 10,000 students
- 1,800 graduates per year
- 119 professors
- 1,670 employees

#education

- 45 degree programs
- 1 Elite degree program

#research

- 5 Research focus areas
- 109 million euros in third-party funding
- 6 collaborative research centers, 5 research training groups
- 5 partner research institutions

#outreach

- On average, more than 90 inventions, more than 50 patent applications* and more than 15 start-ups (as of 2020)

* Applications mentioning inventors from the relevant faculty
** Start-ups with founders from two faculties are counted to both faculties

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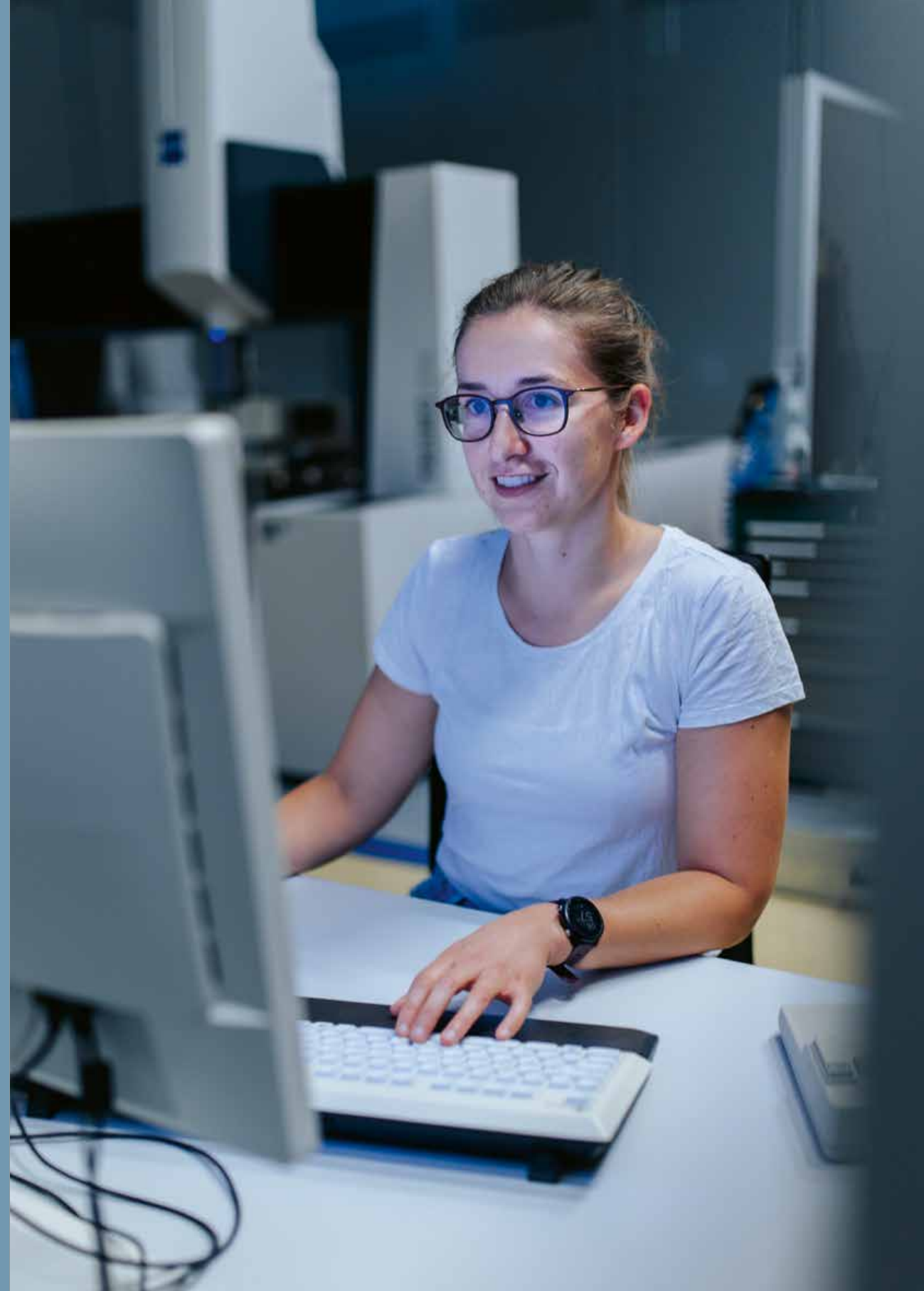


5 Departments at the Faculty of Engineering

Artificial Intelligence in Biomedical Engineering

The Department of Artificial Intelligence in Biomedical Engineering focuses on the growing importance of AI in (bio)medical technologies and makes a contribution to advanced medical care of the future. Its key research priorities cover computer-assisted imaging, intelligent robotic assistants, surgical robots, secure AI, neural interfaces and AI as a diagnostic tool.

Chemical and Biological Engineering

As its name suggests, the Department of Chemical and Biological Engineering combines chemistry and biology with methods of process engineering. The department focuses on pioneering research into sustainability and sustainable processes in all areas of industry. It specializes in research and in developing solutions in the area of biotechnology, process optimization, circular economy, energy efficiency in industrial processes, efficient use and transformation of renewable energies, and energy storage.

Computer Science

The Department of Computer Science has been a driving force in the development of future technologies in the IT sector for over 50 years and is known as a reliable source of highly-qualified IT experts. In today's industrial and information society, computer science has an ever-increasing significance as an interdisciplinary and integral field in engineering. The department addresses this development with a future-oriented approach in research and teaching, reflected in the various key research priorities.

Electrical Engineering

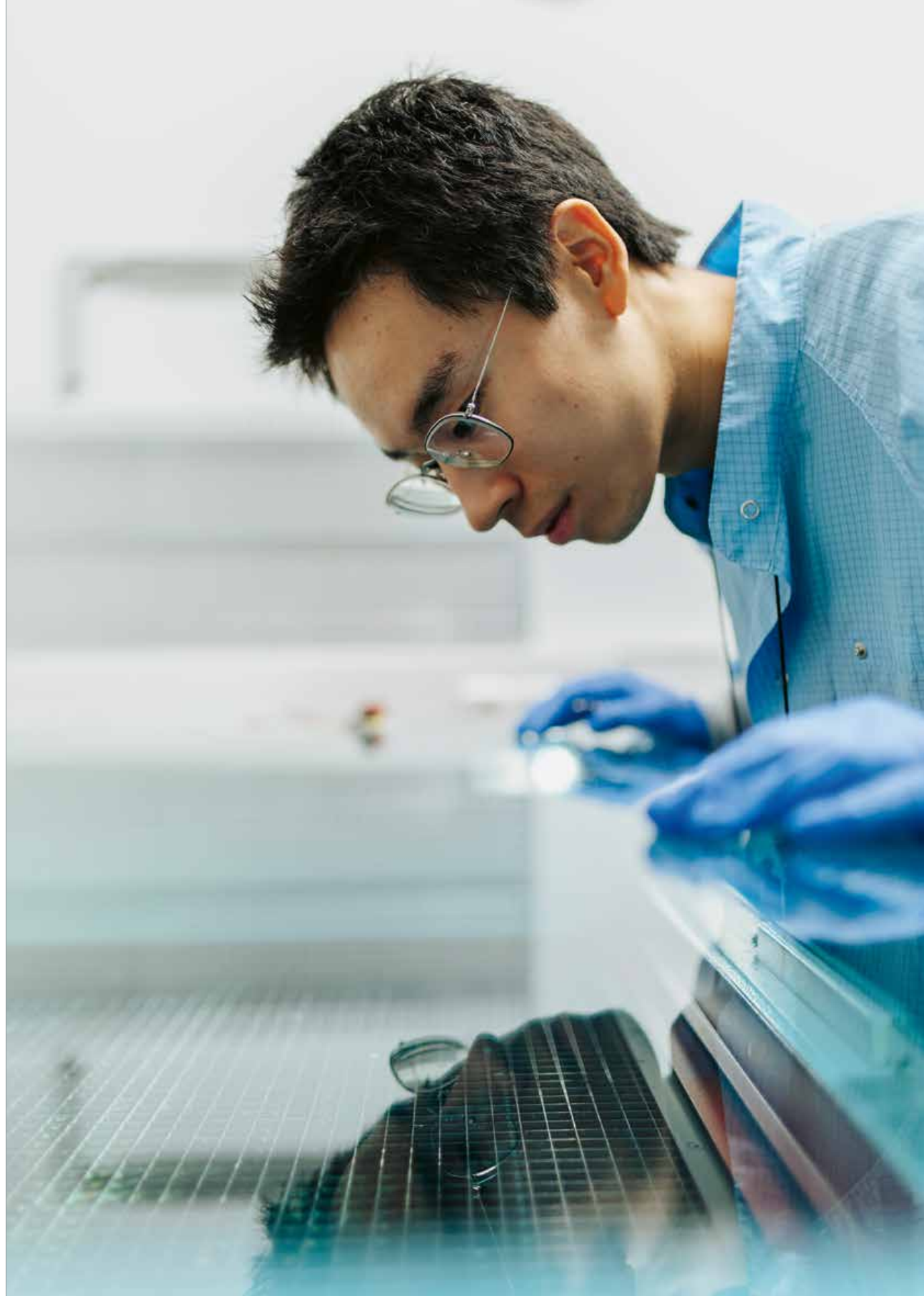
Research at the cutting-edge of technology: the Department of Electrical Engineering covers all major research areas in this specialist area. It tackles the challenges of the future: energy transition, new forms of mobility, the role of communications engineering, chips and their manufacture, artificial intelligence, robotics and more.

Materials Science and Engineering

The Department of Materials Science and Engineering, the largest of its kind in Germany, covers the entire range of research into materials science and engineering. Gaining a precise understanding of properties of materials and learning to influence them is the basis for sustainable solutions. Key research priorities focus on energy supply, environmentally friendly materials, high throughput methods and AI-supported material development. From highly heat resistant alloys to nano and biomaterials and high-tech ceramics: modern materials and processes are required in virtually all industrial sectors.

Mechanical Engineering

The Department of Mechanical Engineering focuses on the development of methods and technology in future-oriented fields of mechanical engineering, specializing particularly in the areas of production engineering and product development. Future topics arise from the aim of making a sustainable contribution to the challenges faced by our society. Following the key research priorities of the Faculty of Engineering and FAU, the department focuses on pioneering research areas in medical engineering, urban mobility and production engineering.



We cultivate partnerships to companies, research institutions, and schools and are open to new ideas.

We tackle complex challenges with passion and conviction.

Contact

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See the Faculty in action!

Follow us on Instagram! @tf.fau

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