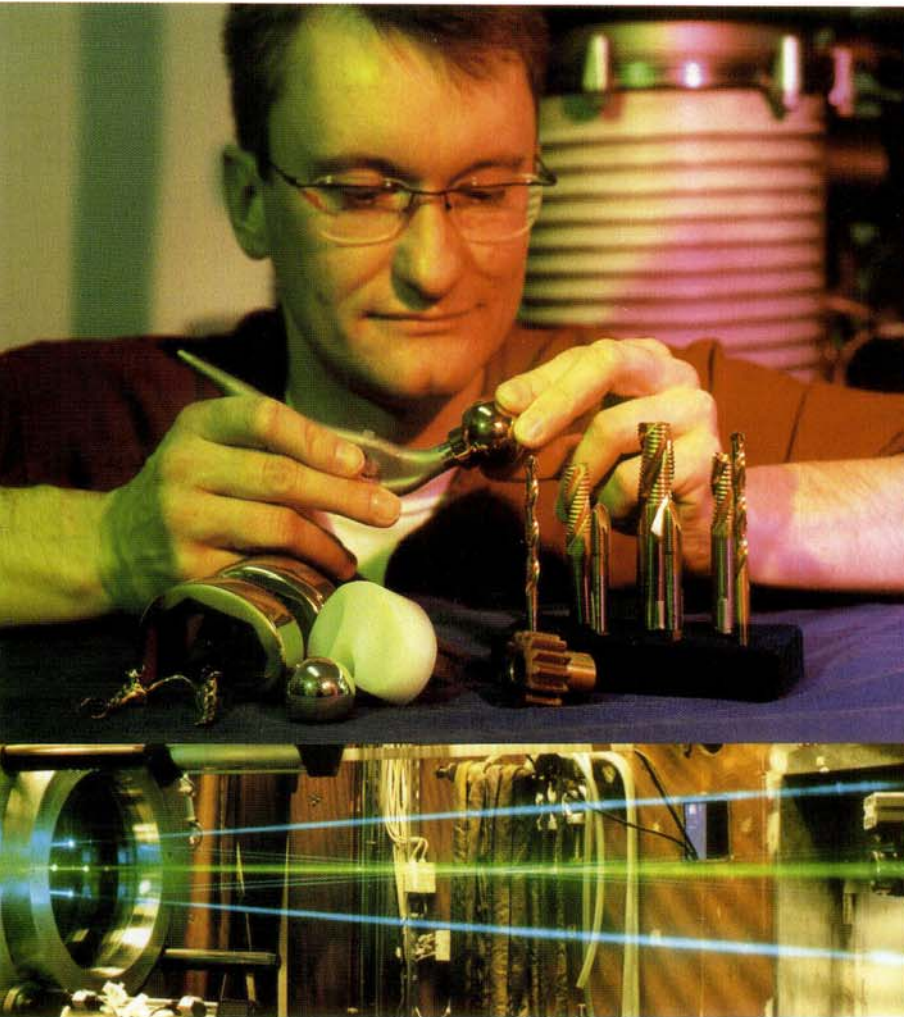


**MECHANICAL  
ENGINEERING**  
at **RWTH** Aachen University



A **DEGREE  
COURSE**  
with a **FUTURE!**

# PLANNING the future

Progress with tradition: virtually a trademark of RWTH Aachen University! A history spanning 125 years of tradition has given RWTH Aachen University a firm foundation of scientific competence which forms the basis for progressive, practical teaching and research. Innovative thinking, responsible action, successful developments – these are characteristic of RWTH Aachen University, combining technical with cultural variety. Against this background, RWTH Aachen University educates people in a profession which like no other is concerned with the challenges of the future: the engineer.



Lightweight construction using reinforced polymers: a monocoque bicycle frame.

## VARIETY

Mechanical engineering provides the key to help solve problems in all areas of our life. Thus, mechanical engineering tackles questions of development, manufacturing and operation in very different fields such as energy supply or food production. Other areas include environmental protection, production equipment, traffic engineering and drinking water supplies. Mechanical engineering designs our future.



Sports car.

## INTERDISCIPLINARITY

In view of the variety of applications, the work of the mechanical engineer is based on a wide range of different scientific disciplines such as mathematics, mechanics, physics, chemistry and other natural sciences, the neighbouring sciences of electrical engineering and computer science, furthermore industrial engineering and ergonomics and social sciences. This interdisciplinarity, a necessary and at the same time interesting facet of the degree course, is very much encouraged at RWTH Aachen University.

## PRODUCTION MANAGEMENT OR DEVELOPMENT AID

Mechanical engineers work in research, development, production and distribution. You will find them wherever innovative solutions are needed: in research laboratories, in the machine room, building a desalination plant in the Gulf region or a solar plant in the desert. They investigate material processing with lasers or develop new possibilities in high-temperature technology using new materials. They work in environmental protection, in their own engineering office or in world-wide companies, as experts, test pilots or consultants, in patent engineering or in development aid.

## PROSPECTS

Variety, competence, responsibility ... and one more important decision criterion: The mechanical engineer's profession has a safe future! Even in times of cyclical fluctuations, the profession offers excellent prospects. Because a boom needs innovation and new ideas, an upswing needs engineers, particularly the creative impulses of young engineers. With a solid base of academic education, the world is and will remain the engineer's oyster.



Spacecraft model in the German-Dutch wind tunnel DNW (model length: 6 m).

Cover pictures:

Surface coating for wear protection: Here a dental and a knee prosthesis, a gearwheel as well as cutters and drills with extra long tool life.

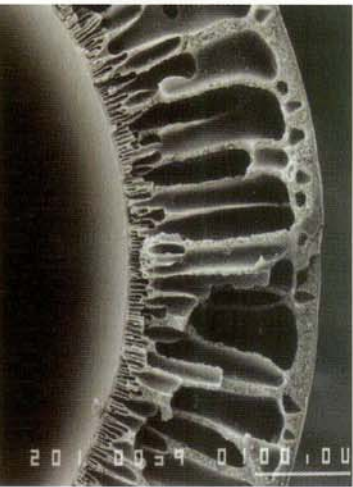
Application of contactless laser optical measuring methods at the combustor of a coal dust combustion plant.



Diesel soot – no thanks! Electrically regenerating ceramic filter plugs in a pilot test.  
Photo: Peter Winandy

# STUDYING the future

The engineering degree at the Faculty of Mechanical Engineering of RWTH Aachen University is ranked very highly. The quality of research and education at RWTH Aachen University enjoys an excellent international reputation. Since its foundation in 1870, the Faculty of Mechanical Engineering has grown to become one of the largest at RWTH Aachen University and one of the most important in Germany. The faculty employs approx. 50 professors, over 600 scientists and graduate students studying for a doctorate and 500 non-scientific employees in workshops, laboratories and administration, distributed among 37 departments.



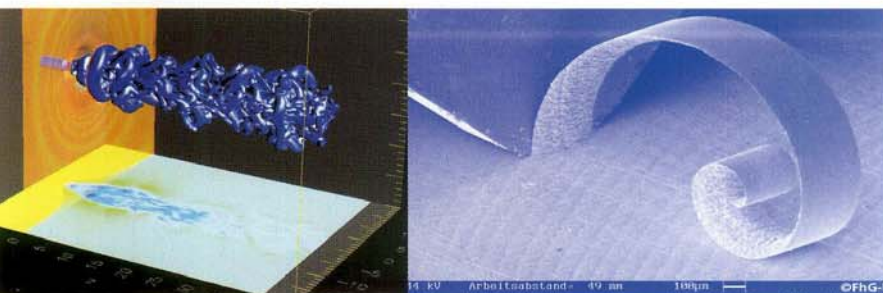
A hollow fiber under the scanning electron microscope. The diameter is about 200 micrometers.

## WORLD-WIDE REPUTATION

The faculty owes its good reputation not least to the close connections between science and industry. Today more than ever before, a practical scientific education offers the best career opportunities. Cooperation between university and industry functions efficiently and productively at RWTH Aachen University.

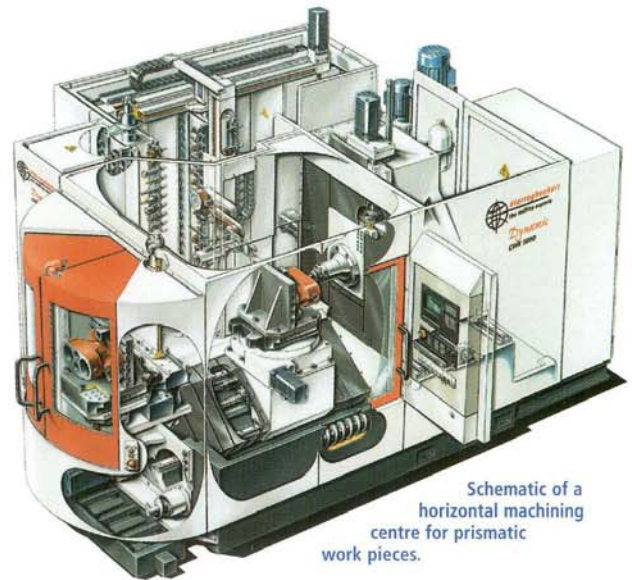
## RESEARCH

The Faculty of Mechanical Engineering offers an ideal environment for the early integration of students into research. They take part in current research projects during their project, diploma or state-approved theses. Furthermore, more than half of them work as student assistants at university departments. The Faculty of Mechanical Engineering cooperates closely with the Research Center Jülich, the Fraunhofer Institutes, the German Aerospace Center and other research institutions and technical-scientific associations. Nationwide, the Faculty of Mechanical Engineering receives more sponsorship through research contracts from industry, etc. than any other. This reflects the high standard of its practical research work.



Computer simulation of a flow in a slim vortex whose core is being destroyed by the influence of an axial pressure field.

Chip removal in mechanical processing with diamond tools, seen in a scanning electron microscope.



Schematic of a horizontal machining centre for prismatic work pieces.

## FOREIGN CONTACTS

Many departments cooperate world-wide with famous research institutions in their special field of research. Various exchange programmes offer the chance to complete their project work or diploma theses at universities or companies abroad. Thanks to grants and the good contacts to partner universities in many countries of the world, students can study for a time at a foreign university.

## NEW STUDENTS

The Faculty of Mechanical Engineering takes care of future students in many projects and events – often in co-operation with other faculties and the vice-chancellor's office. Examples:

- Do-Ing in Aachen ([www.do-ing.rwth-aachen.de](http://www.do-ing.rwth-aachen.de)) pays special attention to female candidates in engineering sciences.
- Schnupperstudium, an opportunity for girls to learn more about the degree course ([www.frauen-rwth-aachen.de.vu](http://www.frauen-rwth-aachen.de.vu)).
- DIES ACADEMICUS – Study Information Day of RWTH Aachen University.
- Competition for school students organised by the Materials Science Forum ([www.rwth-aachen.de/WeFo](http://www.rwth-aachen.de/WeFo)).
- Chemical Engineering Day.
- RWTH ScienceTruck – on its way all over Germany with exhibits from the fields of engineering and natural sciences.

## STUDIES

Over 5,000 students currently study mechanical engineering at RWTH Aachen University. The courses are split into Preliminary and Major Studies. The Preliminary Studies teach the fundamentals of mathematics, physics, chemistry, electrical engineering, computer science, thermodynamics, materials science, mechanics, engineering design, and machine elements. The content of the lectures is discussed in more detail in exercises and laboratory work. Individual tuition has been successfully supported for many years through tutor programs. After the Preliminary Studies, the student can choose to specialise in a course of Major Studies where he/she can expand and apply his/her knowledge.

Courses in Major Studies are offered in the following fields of specialisation:

- Production Engineering
- Design Engineering and Development
- Chemical Engineering
- Plastics and Textile Technology
- Energy Engineering
- Transportation Engineering
- Fundamentals of Mechanical Engineering.

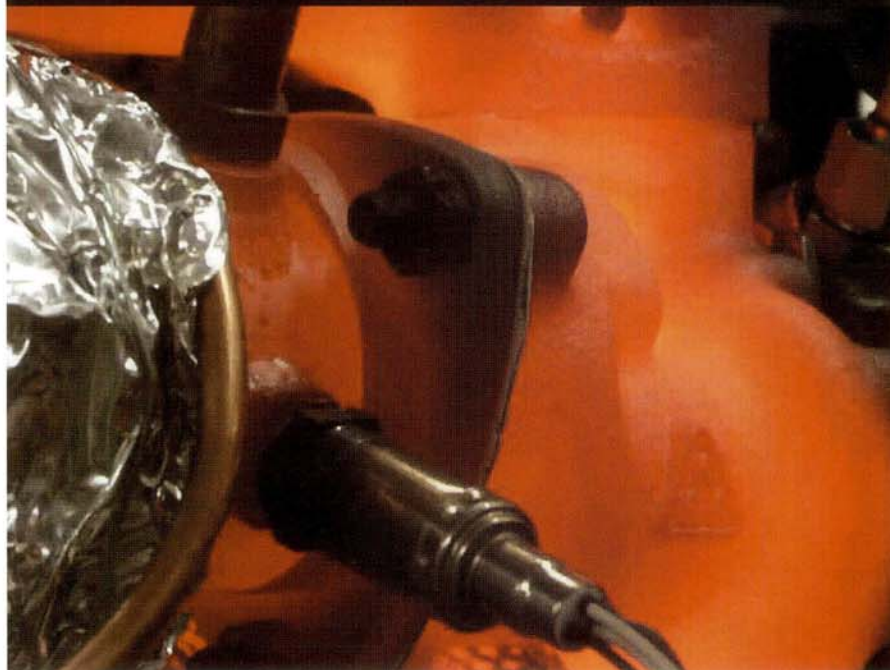
These fields of study with their specialisations and optional subjects give students enough room to plan their own individual degree course (see next page). Furthermore, the wide range of faculties at RWTH Aachen University offers various possibilities for additional interdisciplinary qualifications, e.g. in economics, foreign languages or the humanities.

## COMMITMENT

The Faculty Student Association actively represents the students' interests. It helps, advises, organises, and is the first point of contact for students. Every student can commit him/herself in this organisation. The Faculty Student Association has representatives in the academic committees and voices students' ideas and concepts. In this way it helps design the curricula and examination regulations.



Electron beam welding.



Turbo charger.

# FIELDS OF STUDY and SPECIALISATIONS

## PRODUCTION ENGINEERING

Production Engineering offers the specialisations Manufacturing Technology, Materials Engineering, and Microsystems Technology. The main focus is on manufacturing all kinds of materials and products. The students learn about constructional or machine processing, different test methods and quality management systems, though also about logistics and business management.

## DESIGN ENGINEERING AND DEVELOPMENT

This field of study offers a method-oriented and a product-oriented emphasis. Both are concerned with the development and construction of new and the improvement of existing products. The application of creativity techniques, solution catalogues, and other tools enables the students to fulfil any given task and to work in many different branches after their degree.

## CHEMICAL ENGINEERING

Chemical Engineering offers seven fields of specialisation: Mechanical Process Engineering, Thermal Unit Operations, Chemical Process Engineering, Power Generation and Heat Transfer, Process Systems Engineering, Environmental Protection Processes, and Biochemical Engineering. The main task is the conversion of materials. These may be materials in their natural form, though also intermediate or waste products. In addition, chemical engineers have to model and control processes and take their effects on man and environment into consideration.

## PLASTICS AND TEXTILE TECHNOLOGY

Plastics Technology deals with the manufacture, processing and use of plastics. This comprises the development of products as well as the further development of processing techniques.

Textile Technology places an emphasis on the development and construction of machines and processes for the manufacture and treatment of fibres, threads as well as textiles made of synthetic and natural resources for clothing and technical applications.

## ENERGY ENGINEERING

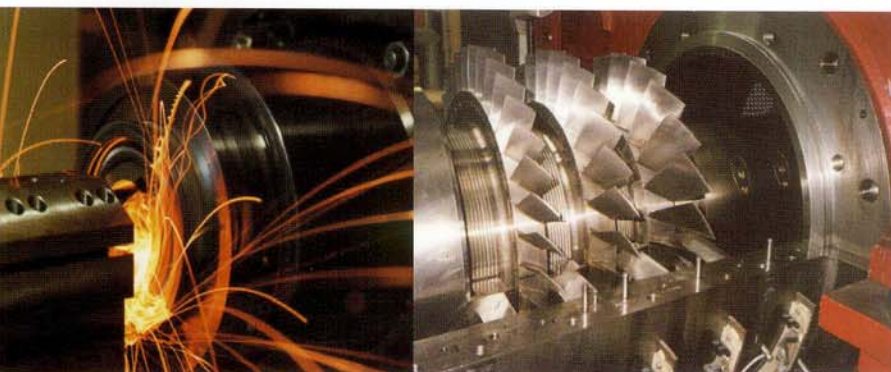
The main focus of Energy Engineering is on the efficient and environmentally sound conversion, provision, and saving of energy. Students learn about the appropriate methods and facilities for its conversion, storage, and transportation. At Aachen University, energy engineering is divided up into the specialist fields of Thermal Engineering, Turbomachinery/Jet Propulsion, Combustion Engines, Reactor Safety & Reactor Technology, and Power Plant Technology.

## TRANSPORTATION ENGINEERING

Transportation Engineering is arranged into the specialisations Automotive Engineering, Mechanical Conveying/Rail Vehicles, and Aeronautical and Space Vehicle Engineering. In general, it deals with the conversion of drive energy into movement. The fundamentals and applications of the respective vehicles, their aggregates, and the different traffic engineering applications are taught.

## FUNDAMENTALS OF MECHANICAL ENGINEERING

Studying fundamentals means a stronger bias toward research and development. Thus, the focus of this specialisation is more on the basics of natural and engineering sciences. In addition, students have the opportunity to include interdisciplinary elements in their curriculum or may choose a field of specialisation which is not amongst those described above.



Machining: Turning.

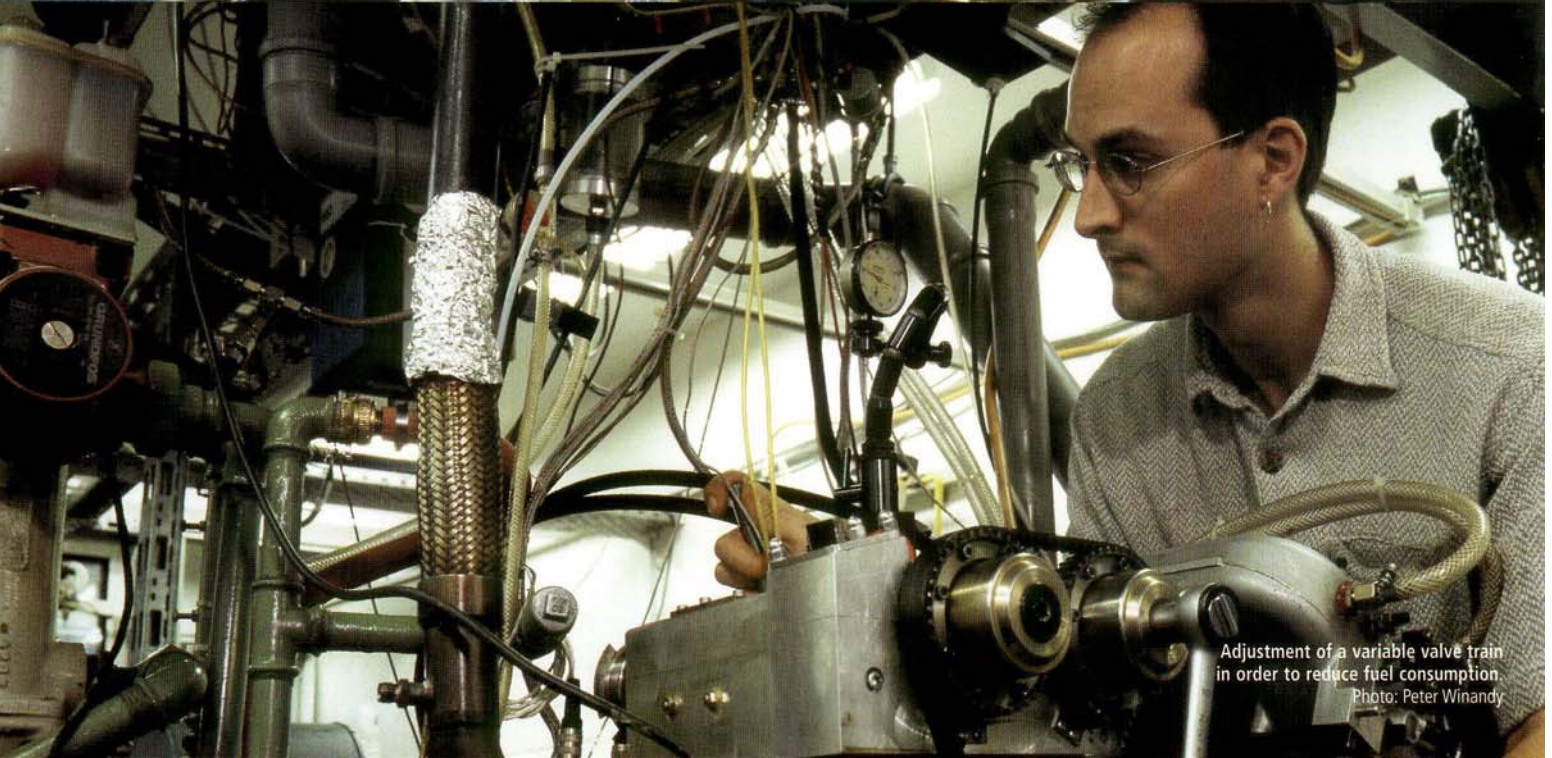
Three-stage axial compressor (open) for investigation of advanced design concepts for compressor blades.



Visual inspection of a combination of different fibers for usage in the automotive industry, in aerospace engineering, and for sports goods.  
Photo: Peter Winandy



Production site.



Adjustment of a variable valve train in order to reduce fuel consumption.  
Photo: Peter Winandy

# FUTURE in Aachen



In the heart of the city: The main building of RWTH Aachen University.



View through the Roman Arch onto the Cathedral of Aachen.  
Photo: City of Aachen



The people of Aachen have their own sign of recognition, "Klenkes", the little finger raised up, which was once used in picking out damaged needles in the needle industry. Photo: Peter Winandy



The Rursee is a popular place to visit not far from Aachen.  
Photo: District of Aachen

More than 30,000 students are enrolled at the RWTH. Besides the classic disciplines of a technical university such as mathematics, natural sciences and engineering, economics, the humanities and medicine are also represented.

With a budget of over 400 million Euro per year, the RWTH is the largest University of Technology in Germany, and with around 9,000 people on the payroll, the university is the biggest employer in the region. The variety of people who study and work here makes the RWTH an ideal place for meetings and cultural activities. Offers range from university sports to the university orchestra. Numerous student clubs from the film studio to gliding make sure that RWTH does not remain an ivory tower of learning at the end of lectures.

## SPARKLING VARIETY

Aachen, the border town of the Euregio with 250,000 inhabitants, has a flair all of its own. Located where the three countries of Germany, Belgium and the Netherlands meet, with the Eifel on its doorstep and the North Sea only a short drive away. 40,000 students at the Aachen universities dominate the historic city centre and the student district, "Pontviertel". The main building

and many departments of the RWTH are within a stone's throw of the lively city centre. Just like the rest of the town, the housing market has also adapted to the students, so that there is a good supply of inexpensive flats and student dormitories.

## SCENE

In summer, the market place is a popular meeting place in this pedestrianised and cyclist-oriented town. Aachen offers a sparkling variety of different theatres and museums, and a wide range of concerts from classic to rock & pop. Countless music cafés, pubs and discotheques and numerous cinemas brighten up the student's "nightlife". Not to mention the shopping streets, sports facilities, etc., etc....

Students not only study in Aachen. They enjoy living here.

## YOU WOULD LIKE TO STUDY MECHANICAL ENGINEERING?

At RWTH Aachen University you receive a sound and internationally approved education in this enthralling, multi-faceted field of study – and you enjoy life in an attractive city.

Help shape and design our future.

Go for Mechanical Engineering at RWTH Aachen University!

Do not hesitate to contact us. We will be pleased to advise you or to send you further information.

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