UNIVERSITY OF DUISBURG-ESSEN:
A STRONG PARTNER IN RESEARCH AND EDUCATION

Information for Applicants

W2 Professorship

"Medical Technology Systems"

Faculty of Engineering
I. THE UNIVERSITY OF DUISBURG-ESSEN

Located in the heart of the Ruhr metropolis, the University of Duisburg-Essen (UDE) is one of the youngest and largest universities in Germany. The courses range from the humanities and social sciences over economics and business studies all the way to the engineering sciences and natural sciences (including medicine). It's also wellknown in the international scientific community.

Top positions
This is reflected by the top positions the UDE has recently achieved in international rankings. In a global comparison of the performance of the best universities founded since the turn of the millennium, the UDE came in third. In the Times Higher Education Ranking, it holds down 19th place among the best 150 universities worldwide younger than 50 years old.

Main research areas
The research carried out at the UDE covers a broad spectrum including four cross-departmental main research areas: nanosciences, biomedical sciences, urban systems and transformation of contemporary societies. More than 43,000 students from over 130 countries are enrolled at the UDE in a total of over 230 courses of study. An important objective of the UDE’s diversity management program is to offer equal opportunities to young people from non-academic backgrounds.

Partnerships & coalitions
As an academic global player, the UDE cultivates partnerships with more than 100 universities all over the world. It is a member of the University Alliance Ruhr (UA Ruhr), a strategic coalition formed by the three universities in the Ruhr area. The UA Ruhr operates liaison offices in North America, Russia, and Latin America.

Learn more:
https://www.uni-due.de/imperia/md/content/dokumente/ppt/ppt_praesentation_ude_en.pdf
II. THE FACULTY OF ENGINEERING

FACULTY OF ENGINEERING.
ALL ENGINEERING DISCIPLINES UNDER ONE ROOF.

The Faculty of Engineering at the University of Duisburg-Essen has a unique profile. Nowhere else in Germany are engineering sciences so close together as at the University of Duisburg-Essen. Four departments teach and research under one roof: Civil Engineering\(^1\); Electrical Engineering and Information Technology\(^2\); Computer Science and Applied Cognitive Science\(^3\); and Mechanical and Process Engineering, including Industrial Engineering\(^4\). In addition, the interdepartmental institute Center Automotive Research (CAR)\(^5\) currently has seven chairs from all departments conducting research and teaching in the field of mobility, automotive technology and automotive economics. The faculty thus has an integrated spectrum of engineering disciplines that is unique in Germany and meets every requirement for modern, innovative, and interdisciplinary university education and research in the field of engineering sciences.

With about 11,600 students – about one third of them from other countries – the faculty is a strong and in-demand partner for regional and cross-regional industry. Our graduates enjoy a high reputation due not only to their broad professional competence, but also to the special interdisciplinary and international design of our study programmes. Classic courses such as mechanical engineering, electrical engineering, materials technology, civil engineering and informatics are complemented by ultra-modern interdisciplinary programmes such as nanoengineering, applied cognitive and media science, medical engineering or industrial engineering. In addition, social skills are addressed that are particularly trained through teamwork and interaction with international students. Our integrated international bachelor's and master's degree programme “International Studies in Engineering (ISE)” should be particularly highlighted: with 50% English lectures, its global character and versatility makes it popular not only with international students but also with German speaking students.

We have developed a sustainable support system for our new students that ensures a seamless transition from school to university education. They have the opportunity to assimilate the contents of their studies in small groups alongside lectures in the first three semesters, enabling them to complete the demanding engineering programme quickly to a high standard. In addition, intensive laboratory practicals teach the use of the technologies of the future right from the start. The conversion of all diploma degree programmes into consecutive bachelor’s and master’s degree programmes was completed in the winter semester 2007/2008, while maintaining the internationally respected quality of the German diploma degree.

On the research side, with an investment volume of more than 60 million euros for equipment infrastructure the Faculty of Engineering has excellent opportunities to develop cutting-edge technologies and conduct basic research. With seven DFG Collaborative Research Centers completed and one ongoing, as well as a DFG Research Training Group and six DFG-funded

\(^1\) https://www.uni-due.de/bauwissenschaften/de/
\(^2\) http://www.eit.uni-duisburg-essen.de/
\(^3\) https://www.uni-due.de/iw/inko/en/
\(^4\) https://www.uni-due.de/maschinenbau/en/
\(^5\) https://www.uni-due.de/car/
research units, the faculty is one of the best addresses in Germany and internationally for research in the fields of nanotechnology and material sciences. Further focal research areas are

- Nanotechnology,
- Combustion research,
- Mechatronics,
- Automotive Technology and Economy,
- Energy and Environmental Technology,
- Communication Systems,
- Microelectronics and Medical Technology,
- Information Technology
- Product Engineering and Materials Technology,
- Civil Engineering,
- Computational and Applied Cognitive Sciences,
- Industrial Engineering,
- Logistics.

By concentrating on these areas, the faculty has achieved a high international reputation which is documented in numerous research projects. In addition, there are affiliated institutes and other associated Institutes which collaborate closely with the faculty and have an annual total research turnover of more than 35 million euros:

- Development Centre for Ship Technology and Transport Systems (DST),
- Institute for Mobile and Satellite Communication (IMST),
- Institute for Energy and Environmental Technology (IUTA),
- IWW Water Center (IWW),
- Center for Fuel Cell Technology (ZBT),
- Fraunhofer Institute for Microelectronic Circuits and Systems (Fraunhofer IMS),
- Gas-und Wärme-Institut (Gas and Heat Institute) (GWI),
- Center of Rotating Equipment (CoRE).

The faculty and the affiliated and associated institutes have proven to be excellent partners for complex technological solutions and for the recruitment of excellently trained engineers.

In order to promote cooperation between the departments and institutes and to increase external visibility, the faculty has established the four research profiles Tailored Materials, Human-Centered Cyber-Physical Systems, Smart Engineering and Energy and Resource Engineering.

The Erwin L. Hahn Institute, a cross-university interdisciplinary research institution for the research and application of magnetic resonance imaging, imaging in the neurosciences and in medical diagnostics and therapy, is of particular interest for the field of medical technology systems.
III. THE DEPARTMENT OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

From classic electrical engineering to nanoengineering to medical technology

More than 1,800 students are enrolled in the courses of study of the Department of Electrical Engineering and Information Technology. The attractive range of subjects covers the "classical" topics of electrical engineering and information technology, enables interdisciplinary studies in "NanoEngineering" and "Medical Technology" and offers the international study programme "International Studies in Engineering". With the complete conversion to consecutive Bachelor's and Master's degrees, the department is ideally equipped for the future in the area of teaching and promoting young researchers. The fact that the department's offerings are also attractive for women is demonstrated by the above-average proportion of female students, currently above 21%, and in the Bachelor's degree course in Medical Technology, which has recently started, it is even 58%. Contrary to general trends, student numbers have risen in the current semester as a result of active advertising in schools.

The work in the Department of Electrical Engineering and Information Technology is shared by 22 professors in 13 chairs – highly motivated scientists, most of whom were appointed during the last 10 years; the average age is correspondingly low. Solidly financed and excellently equipped, the department covers all aspects of electrical engineering and information technology, from power engineering to communications technology, microelectronics and medical technology to nanotechnology.

The acquisition of a Collaborative Research Centre in Terahertz Technologies (SFB/TRR 196, MARIE), the participation in further Collaborative Research Centres and a Research Training Group, numerous DFG and EU projects as well as various industrial co-operations demonstrate the extensive research activities in the department. This is made possible by outstanding facilities such as the Center for Semiconductor Technology and Optoelectronics (almost 500 m² clean room), the high-voltage laboratory and the fire detection laboratory.

The connection to non-university research institutions, such as the Fraunhofer Institute for Microelectronic Circuits and Systems or the internationally renowned Institute for Mobile and Satellite Communication, is particularly noteworthy. Here, a vivid exchange of knowledge regarding projects, bachelor and master theses as well as through the lecturers from these institutes can be found. The head of the Fraunhofer Institute and three of his managers hold professorships at the university at once. Intensive cooperation with Jülich Research Centre (FZ Jülich) has been established through two joint professorships.

The Department of Electrical Engineering and Information Technology at the University of Duisburg-Essen is ideally prepared for the increasing competition among universities regarding qualified education of students as well as for future cooperation with national and international partners from science and industry.
IV. INCORPORATION OF THE PROFESSORSHIP "MEDICAL TECHNOLOGY SYSTEMS" IN THE DEPARTMENT

The call for a professorship "Medical Technology Systems" aims to represent the systemic aspect of medical technology in research and teaching. This addresses the increasing penetration of medical devices and processes by computer technology, using novel systems, services and analytical as well as treatment methods. These topics are currently changing the field of research in medical technology and will continue to do so in the long term. It has an impact on the forms of work and possibilities in hospitals and doctors' surgeries, especially in the area of telemedicine. Here, completely new forms of cooperation are foreseen through networking and tele-cooperation, that address high demands on technical implementations: availability and security as well as mapping of traditional medical competencies into technical, computer-aided systems. This also includes assistance systems to maintain the independence of elderly and physically disabled persons (AAL) and new methods of patient care within the framework of point-of-care (PoC).

Within the Department of Electrical Engineering and Information Technology, there are numerous opportunities for research cooperation with academic staff whose research and teaching have an affinity to medical technology. These include, for example, the fields of communications technology (►BAN), communications technology systems (►MRT), high-frequency technology (►MRT), general and theoretical electrical engineering (►MRT, microfluidics, tissue models), optoelectronics (►Retina Implant), automation technology (►Rehabilitation), computer engineering (►Tele-medicine, tele-cooperation) and electronic components and systems (►Biosensorics, implants, EEG, AAL). The professorship "Medical Technology Systems", which is dedicated to medical technology, will be located in an independent chair, whereby it is expected to play an integrative role with regard to the field of medical technology – naturally with active support from the aforementioned specialist areas.

Through the Electronic Components and Systems department, there is also a close connection to the Fraunhofer Institute for Microelectronic Circuits and Systems, which carries out pioneering research in many areas of medical technology – e. g. with the InHaus Centre in AAL and Hospital Engineering areas - and represents a unique selling point for the Duisburg location. A professorship in the field of communication systems provides another opportunity for cooperation with the Central Institute for Engineering, Electronics and Analytics (ZEA), which occupies a central position at Jülich Research Centre and in this capacity is also involved in numerous medical technology research activities. In addition, the Erwin L. Hahn Institute offers excellent interdisciplinary cooperation opportunities with a 7T MRI system.

Further information:  
https://ti.uni-duisburg-essen.de/ti/en/  
https://www.inhaus.fraunhofer.de/en.html  
https://www.fz-juelich.de/zea  
https://hahn-institute.de/en
V. REQUIREMENTS FOR THE PROFESSORSHIP

The professorship "Medical Technology Systems" belongs to the Department of Electrical Engineering and Information Technology (EIT). It represents the systemic aspects of medical technology in research as well as in teaching, especially in the two (consecutive) study courses B.Sc./M.Sc. "Medical Technology".

1. Research

Research will focus on forward-looking topics in the field of systemic medical technology. For this purpose, we are looking for an outstanding personality who is internationally proven in one or more of the following areas:

- Information systems and components of telemedicine
- Rehabilitation systems, hospital engineering, assistance systems (AAL)
- Medical sensor networks (e.g. BAN)
- Computer Engineering in Personalized Medicine (PoC)
- Embedded Systems for Medical Technology
- Computer systems and components for imaging diagnostics

The position holder is expected to continue to publish in international peer-reviewed journals and to apply for research projects with a high level of third-party funding. Interdisciplinary cooperation with other departments within and outside the faculty is expected.

2. Teaching

In teaching, it is expected to offer courses in the elective/compulsory area of the Master's degree programmes as well as to teach fundamentals in the Bachelor's degree (technical computer science). In particular, it is expected to offer pivotal courses in the Master's profile "Telemedicine" and to be responsible for the further development of the bachelor's/master's degree courses in medical technology. The teaching load is 9 SWS, i.e. 9 hours (of 45 minutes each) per week.

3. Significance and temporal extent of the activities

The professorship is advertised as a full-time position. The position holder establishes a scientific working group in the field of "Medical Technology Systems" linked to other departments that are active in the field of medical technology.

The importance of the professorship "Medical Technology Systems" consists in the realization of two important co-operations. One refers to the medical faculty, with which the collaboration is to be strengthened in terms of a bridge professorship. The second co-operation involves a desired collaboration with the Fraunhofer Institute for Microelectronic Circuits and Systems (IMS) in the field of medical technology, e.g. in the context of AAL and Hospital Engineering (Inhaus2).
VI. EQUIPMENT

The W2 professorship "Systems of Medical Technology" has workplaces (laboratories) and office space at its disposal in order to admit employees from budget- and third-party-funded research projects to the working group.

In addition to the professorship, the holder of the position has direct access to a secretary (half-time employment), a technician (half-time employment) and a research assistant for a limited period of time. From October 2021, a further research assistant position will be available. An additional (staffed) permanent scientific staff position serves to support the holder of the position in offering corresponding degree courses in the Bachelor's/Master's degree programme "Medical Technology" as well as in raising and implementing R&D projects.

Further details shall be discussed and agreed in the appellate proceedings.
VII. LEGAL FRAMEWORK

With the Act on Higher Education in North Rhine-Westphalia (Hochschulgesetz - HG) of September 10th, 2014, the university system was amended with effect from October 1st, 2014. Since then, the universities have been legally responsible corporations under public law that are supported by the region. State funding is based on their tasks, the agreed objectives and the services provided. Universities have a general budget and are not subject to orders from the Ministry for Innovation, Science, Research and Technology of the region of North Rhine-Westphalia.

Official status of university teaching staff
If the legal requirements are met, professors are generally employed as civil servants for life. Professors can also be engaged in an employment relationship based on private law.
Further information (laws, ordinances, etc.) is available at https://www.uni-due.de/verwaltung/recht.
VIII. SALARY

As of 1 January 2005, the C salary system formerly applying in Germany to all newly appointed professors was superseded by a performance-oriented salary system. This new salary system is part of a recent condition-of-service reform (“Dienstrechtsreform”). The formerly standard seniority grades were replaced in the W salary system (W stands for the German “Wissenschaft”, meaning “Science”) by a system of fixed basic salaries (W2 or W3) and “performance bonuses”. From 1 January 2005, the W salary system applies to all newly recruited professors and to those who change to the W salary system.

Performance-related salary components may also be awarded, on the occasion of appointment and tenure negotiations (appointment and tenure bonuses), for special achievements in research, teaching, art, further training and development of young academics (special performance bonuses) and for carrying out functions or special duties within the framework of university self-management or university administration (functional performance bonuses). Under certain circumstances, research and teaching allowances may be paid out of funds provided by private third parties.

Any temporary appointment-related performance bonuses agreed in the context of appointment negotiations will be linked to agreements on goals and performance.

Appointment-related performance bonuses agreed in the context of appointment negotiations will be negotiated individually with the Rector of the University of Duisburg-Essen.

Information on the legal basis for the W salary system can be found on the internet at the following addresses:
https://www.finanzverwaltung.nrw.de/de/beamten-und-beamte
https://www.hochschulverband.de/435.html