UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Information for applicants for the W3 professorship in Materials Process Informatics and Data-Driven Process Engineering

at the Faculty of Engineering and as part of the Research Center Future Energy Materials and Systems

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1. The University of Duisburg Essen (UDE)

We are a young, innovative university located in the heart of the Ruhr metropolis. We pride ourselves on outstanding research and teaching, think in terms of opportunities rather than limitations and develop ideas with a view to the future. Diversity is an integral part of our culture as we promote potential and are committed to upholding genuine equity in education.

Duisburg campus

Located in the heart of the Ruhr metropolis, the University of Duisburg-Essen (UDE) is one of Germany's youngest universities and also among its strongest in research. The courses range from the humanities, social sciences and educational sciences via economics and business studies all the way to the engineering sciences, computer sciences and natural sciences (including medicine).

UDE embodies responsibility for the future. Our values – openness and internationality, diversity, equal opportunity and sustainability – guide our actions, research, teaching and learning.

UDE's research profile is distinguished by the strategic identification, consistent promotion and systematic advancement of promising, innovative ideas – and this is true of both fundamental and applied research and extends to the transfer of knowledge into industry and society. Our many internal and affiliated institutes also bear witness to this.

The cornerstones of UDE's research profile are the University-wide strategic research areas, which are shaped and advanced by numerous researchers in twelve faculties and fourteen inter-faculty research centres. Cooperative research projects have just as vital a place here as excellent individual research.

With innovative and digitally supported teaching and learning concepts, UDE enables research-based learning from the start. The University offers around 38,000 students from 130 countries a wide range of courses of study, including teacher training.

UDE is considered a paradigm throughout Germany of how equity in education can be implemented at a university with a strong track record in research. Numerous measures and projects are in place to support talented young people and offer them prospects. UDE considers itself a vibrant environment of diversity and openness where students, researchers and staff can realise their potential and willingness to perform.

In a strategic partnership, UDE is affiliated with Ruhr University Bochum (RUB) and TU Dortmund University. Together, they form the University Alliance Ruhr (UA Ruhr) and collaborate closely to achieve excellence in research and teaching together. With more than 110,000 students and almost 14,000 researchers, the UA Ruhr is one of the largest and best-performing academic hubs in Germany. The UA Ruhr's top-level international research on pressing issues of the future has been consolidated under the umbrella of the Research Alliance Ruhr.

In addition, the UDE maintains partnerships with over 100 universities around the globe and is a founding member of the Aurora European university network, which offers cross-border study programmes.

Learn more: https://www.uni-due.de/imperia/md/content/dokumente/image_broschuere_en.pdf

UDE as an employer

Seal of quality from the German Association of University Professors and Lecturers

The University of Duisburg-Essen bears the German Association of University Professors and Lecturers' (DHV) seal of quality for the fair and transparent nature of its appointment proceedings; this seal was first earned in August 2014, with successful re-audits in 2017 and 2022.

Learn more: https://www.uni-due.de/verwaltung/berufungsmanagement/

Family-friendliness

UDE systematically promotes and improves the ability of all its members to balance family life with research, work and studying, which it underscored as early as 2010 with its successful participation in the family-friendly university audit (*audit familiengerechte hochschule*). In 2022, UDE joined the *Verein Familie in der Hochschule e.V.* (family in higher education association) and established the UDE-wide *Netzwerk Familie** (family network). This was followed in 2024 by participation in the *North Rhine-Westphalia state programme Vereinbarkeit Beruf & Pflege* (reconciling work and care).

The Diversity Support Center at UDE offers support through the Family Service Office. Its offerings include personalised consultation on topics related to care, its own daycare facilities, flexible caregivers in emergencies and a holiday activity programme.

Learn more: https://www.uni-due.de/diversity/en/

Onboarding and Dual Career Service

The Onboarding team within the Appointment Management Department provide advice for getting started at UDE and can connect you with UDE's other consultation services. They also organise the Dual Career Service, which offers career assistance for both you and your partner.

Learn more: https://www.uni-due.de/en/dual_career.php

Coaching and further training

We see ourselves as a university of potential and work to ensure that all UDE members can contribute and develop their talents and abilities. This includes a wide range of opportunities to develop leadership skills along with coaching for line managers.

Learn more: https://www.uni-due.de/pe/personalentwicklung

Promoting good health in the workplace

UDE's occupational health management service works to provide a healthy and pleasant work environment as well as a culture of cooperation and trust. Staff at UDE can take advantage of a broad spectrum of in-person and online options to promote good health, comprehensive sport and fitness offerings provided by the University sport services, balanced meals in the canteens for good nutrition on campus, and many other opportunities.

Learn more: https://www.uni-due.de/pe/gesundheitsmanagement

2. Faculty of Engineering and Research Center Future Energy Materials and Systems

Faculty of Engineering

ALL RELEVANT ENGINEERING DISCIPLINES UNDER ONE ROOF

The Faculty of Engineering at the University of Duisburg-Essen provides a unique profile. Nowhere else in Germany are engineering sciences so close as at the University of Duisburg-Essen. Three departments teach and conduct research under one roof: Civil Engineering, Electrical Engineering and Information Technology and Mechanical and Process Engineering, including Industrial Engineering. Furthermore, the interdepartmental Mobility Transformation Institute (MOTION) was established, in which research and teaching in the field of mobility, automotive engineering and automotive economics is currently carried out by chairs from all departments. As a result, the faculty has an integrated spectrum of engineering disciplines that is unique in Germany and meets all requirements for modern, innovative, and interdisciplinary university education and research in the field of engineering sciences.

With more than 7.300 students – about 44 % of them from foreign countries – the faculty is a strong partner for the regional and cross-regional industry. Graduates of our study programs enjoy a high reputation due to their broad professional competence as well as due to the special interdisciplinary and international orientation of our study programmes. Classical study courses such as mechanical engineering, electrical engineering, metallurgy and metal forming, and civil engineering are complemented by modern interdisciplinary study courses such as nanoengineering, 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)" with 50 % English lectures is attractive due to its global character and versatility not only for international students but also for German speaking students.

We have developed a sustainable support system for our first-year students that ensures a seamless transition from school to university education. They have the opportunity to learn the contents of their studies in small groups within the first three semesters, enabling them to quickly complete the demanding engineering study at a high level. In addition, there are intensive laboratory courses that convey how to use the technologies of the future right from the start.

With an investment volume of more than 60 million Euro for equipment infrastructure, the Faculty of Engineering has excellent opportunities to develop cutting-edge technologies and conduct basic research. With six concluded and four running DFG-Collaborative Research Centers, three running DFG-Research Training Groups as well as six DFG funded Research Units the faculty is the best address in Germany and the international science community for research in the fields of nanotechnology and material sciences. Beside of that the topics

- Energy and Environmental Process Engineering,
- Nanotechnology,
- Combustion Science,
- Mechatronics,
- Automotive Engineering and Management,
- Communication Systems,

- Microelectronics and Medical Technology,
- Information Technology,
- Product Engineering and Materials Technology,
- Civil Engineering,
- Industrial Engineering,
- Logistics

are the focus of research activities.

By focusing on these areas, the faculty has achieved a high international reputation, which is documented by numerous research projects. In addition, there are the affiliated institutes and other associated institutes

- 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 (GWI),
- Center of Rotating Equipment (CoRE),

which collaborate closely with the faculty and have an annual total revenue of more than 35 million Euro. 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.

To promote cooperation between the departments and institutes and to increase visibility the faculty has established three research profiles, which are “Tailored Materials”, “Human-Centered Cyber-Physical Systems” and “Energy and Resource Engineering”.

Research Center Future Energy Materials and Systems

Since 2021, the University Alliance Ruhr (i.e., the consortium of the University of Duisburg-Essen, the Ruhr University Bochum, and the Technical University Dortmund) bundles cutting-edge, international research on pressing issues facing the future under the umbrella of the **Research Alliance Ruhr** within four Research Centers and one College for Social Sciences and Humanities. The Research Alliance Ruhr is a testament to the Ruhr area’s transformation into a vibrant metropolis of knowledge and has been facilitated by the Ruhr Conference, an initiative of North Rhine-Westphalia. Unprecedented career opportunities are unfolding in the alliance for excellent scientists and scholars from all over the world.

The Research Center Future Energy Materials and Systems (RC FEMS) is one of the research centers of the Research Alliance Ruhr. It is dedicated to advancing the science and engineering of next-generation materials essential for energy conversion, storage, transport, and the production of energy carriers. Its goal is to drive breakthrough discoveries and innovation through close collaboration between newly appointed professors and the dynamic research environment of the three universities in the Ruhr area. Three research pillars build the program of the RC FEMS:

1. **Fundamental Understanding of Materials Properties and Processes**
2. **Design of New High-Performance Materials**
3. **Integration into Future Energy Solutions**

By understanding and shaping the complex interplay between energy and materials across disciplines and scales, RC-FEMS aims to be a driving force in transforming the energy landscape – enabling resilient, scalable, and environmentally responsible solutions for the challenges of tomorrow.

3. Department of Mechanical and Process Engineering

From nanosciences to classical mechanical engineering to autonomous/highly automated vehicles and systems.

Approximately 3,900 students are enrolled in the degree programs of the Department of Mechanical and Process Engineering. The attractive range of subjects covers the "classical" topics of mechanical engineering, enables further interdisciplinary studies in “Industrial Engineering” or "Automotive Engineering & Management" and offers the international study program "International Studies in Engineering". Participations in other interdisciplinary courses round out the program. The fact that the department's offer is also attractive to women is demonstrated by the above-average ratio of female students. It is currently over 16 %. The high attractiveness of the Master's programs in particular is reflected in the steadily growing interest shown by Bachelor's graduates from other universities who are moving to Duisburg from all over Germany.

The work in the Department of Mechanical and Process Engineering is shared by 27 professors in seven institutes - highly motivated scientists, most of whom have only been appointed in the last 10 years.

The Department of Mechanical and Process Engineering of the Faculty of Engineering is well prepared for future technological challenges of the national and international industries. The breadth of subjects represented is also reflected in the diversity of teaching and research interests: energy and process engineering, product engineering and logistics, mechatronics, marine engineering and nanotechnology. The department's own institutes work closely together with four affiliated institutes and emphasize the application-oriented character of engineering research.

The Department of Mechanical and Process Engineering at the University of Duisburg-Essen is excellently positioned both with regard to the increasing competition or cooperation among colleges and universities and for future cooperation with national and international partners from science and industry. Due to the nationally and internationally active industrial companies located in the region, there are also numerous opportunities to tackle and implement application and basic research topics.

4. Information about the open position

As part of the Research Alliance Ruhr, the Research Center Future Energy Materials and Systems (RC FEMS) invites applications for the following position at the Faculty of Engineering (Department of Mechanical and Process Engineering) at the University of Duisburg-Essen:

Full professorship (W3 salary level as defined in the North Rhine-Westphalian regulations for the W salary range (*Landesbesoldungsordnung* W)) in
Materials Process Informatics and Data-Driven Process Engineering

The position is to be filled as soon as possible.

YOUR RESPONSIBILITIES

The successful candidate will establish a cutting-edge, internationally visible research programme at the intersection of process engineering, data science and materials development. This professorship focuses on the advancement of materials process informatics, emphasising the design, optimisation and automation of synthesis and transformation pathways for the production of advanced materials. In contrast to materials informatics, which primarily targets the prediction and discovery of materials based on property databases, this role highlights process informatics: leveraging data to enhance process understanding, design, efficiency, scalability and reproducibility.

Key responsibilities include initiating and leading interdisciplinary, collaborative research projects with national and international visibility; acquiring competitive third-party funding; actively contributing to the strategic development of the RC FEMS and the Research Alliance Ruhr; and engaging in academic self-governance.

The teaching load is reduced to four (45-minute) teaching units per week. The successful candidate is expected to actively contribute to English-language instruction in master's degree programmes.

YOUR QUALIFICATIONS

Applicants must be internationally recognised researchers with a strong track record in one or more of the following areas:

- **data-driven process development:** application of machine learning and AI to analyse and optimise process parameters in high-temperature gas-phase synthesis and other advanced processing technologies; development of predictive models using real-time process data (e.g., digital twins)
- **automation and self-driving laboratories:** implementation of high-throughput and automated experimentation workflows to accelerate materials process discovery; digitalisation of laboratory environments

- **process-property relationships:** investigation of how synthesis and processing conditions influence materials structure and properties; development of computational frameworks for process design
- **experimental validation and scale-up:** integration of simulations and experiments to validate processes and scale them for industrial relevance
- **sustainable processing:** development of environmentally friendly, energy-efficient process technologies aligned with the principles of green chemistry and the circular economy

Applicants are expected to have experience in leading research groups and supervising doctoral candidates and to have an excellent publication record. Willingness to engage in collaborative research within RC FEMS (www.rc-fems.de), the interdisciplinary Center for Nanointegration Duisburg-Essen (www.cenide.de), the Faculty of Engineering (https://www.uni-due.de/iw) and the UA Ruhr (www.uaruhr.de) is expected.

Expertise in leadership of research groups as well as publications in peer-reviewed journals and successful acquisition of competitive, externally funded projects are mandatory. Strong organisational skills, the ability to cooperate with other researchers and the willingness to independently initiate and guide large research proposals are also required.

In addition, criteria for the appointment are based on Sections 36 and 37 of the North Rhine-Westphalia Higher Education Act (*Gesetz über die Hochschulen des Landes Nordrhein-Westfalen*, HG NRW).

ATTRACTIVE ENVIRONMENT

The Research Center Future Energy Materials and Systems is dedicated to developing new materials that are urgently needed for energy carrier generation as well as energy conversion, storage and transport in a targeted, rapid and sustainable manner. The goal is to understand fundamental properties and relevant processes in the generation and use of complex materials in order to develop building blocks for a sustainable, future-proof energy system. This integrative approach combines interdisciplinary expertise with scientific creativity, enabling RC FEMS to make a decisive contribution to the energy systems of tomorrow – founded on innovative materials. To this end, twelve new professorships are currently being established. The Research Center is linked to all three member universities of the University Alliance Ruhr. We offer you an excellent scientific environment and attractive opportunities for collaboration with renowned international, national and regional partners. The professorship advertised here will be closely associated with the Faculty of Engineering and the Center for Nanointegration (CENIDE) at the University of Duisburg-Essen.

The University of Duisburg-Essen aims to promote the diversity of its members (https://www.uni-due.de/diversity/en/). It strives to increase the proportion of women in its academic staff and therefore strongly encourages women with relevant qualifications to apply. If two candidates are equally qualified, women will be given preference as stipulated in the Equal Opportunities Act of North Rhine-Westphalia (*Landesgleichstellungsgesetz*; LGG

NRW). Applications from qualified candidates with disabilities or equivalent status as defined in Section 2 (3) of Book IX of the German Social Code (*Sozialgesetzbuch*; SGB IX) are encouraged.

Applications should include the usual documents (CV including information on both your academic and professional experience; a list of academic publications; copies of relevant certificates; a description of your research profile and the resulting perspectives for RC FEMS; a teaching and learning concept that takes the University of Duisburg-Essen's profile into account; information on your teaching activities, your involvement in academic self-governance and external funds that you have obtained to date).

5. Legal framework

Universities are state-funded bodies under public law with legal capacity. State funding is based on the university's tasks, the obligations agreed upon in university contracts and the university's performance. They have a global budget and are not subject to individual instructions from the Ministry for Culture and Science of the state of North Rhine-Westphalia.

If the legal requirements are met, professors are appointed as permanent civil servants as a rule. Professors can also be appointed on the basis of an employment contract under private law.

When awarding a junior professorship, it is to be noted that individuals who already meet the hiring requirements for a university professorship due to having completed a habilitation or another reason cannot be considered.

Further information (in German):

- Contacts
  www.uni-due.de/verwaltung/organisation/peo_professoren.php
- Regulations on the appointment proceedings
  www.uni-due.de/imperia/md/content/zentralverwaltung/bereinigte_sammlung/2-10-mai12.pdf
- Information on the appointment and hiring process
  www.uni-due.de/verwaltung/berufungsmanagement/

6. Salary

The salary of university teaching staff is stipulated by the North Rhine-Westphalian system for the remuneration of civil servants. These staff members fall under the W salary range, which contains the bands W1, W2 and W3.

Basic salaries can be supplemented with (performance) bonuses in bands W2 and W3. These performance-based salary components can be awarded

- as a result of appointment and retention negotiations (appointment and retention bonuses),
- for special achievements in research, teaching, art, further education and supporting early career researchers (special achievement bonuses),
- for assuming functional or special responsibilities as part of the University's self-governance or University management (functional bonuses).

In certain circumstances, so-called teaching and research bonuses may be paid from private third-party funds.

During appointment and retention negotiations, performance bonuses can also be agreed for a fixed period of time if they are linked to target and performance agreements.

Appointment bonuses are to be negotiated on an individual basis with the Rector of the University of Duisburg-Essen as part of appointment negotiations.

Please find a table showing the current remuneration (in North Rhine-Westphalia) for the salary bands W1, W2 and W3 at:

- https://www.finanzverwaltung.nrw.de/sites/default/files/asset/document/grundgehaelter_a_b_r_und_w.pdf

You can find information on the W salary range (in North Rhine-Westphalia) and the legal foundations for it on the following webpages:

- www.uni-due.de/verwaltung/organisation/peo_links.php
- https://www.research-in-germany.org/en/jobs-and-careers/info-for-senior-researchers/career-paths/professorship/professor-university.html

Further information (in German) can be found in the regulations on awarding performance-related bonuses:

- www.uni-due.de/imperia/md/content/zentralverwaltung/bereinigte_sammlung/3_60.pdf