UNIVERSITÄT DUISBURG ESSEN

Offen im Denken

Information for applicants for the
Junior Professorship

‘Electroenergetic Functional Materials’

in the Department „Electrical Engineering and Information Technology“ of the Faculty of Engineering

Universität Duisburg Essen
Forsthausweg 2 • 47051 Duisburg und Universitätsstraße 2 • 45141 Essen
www.uni-due.de

I. THE UNIVERSITY OF DUISBURG-ESSEN

Open-Minded!

We are one of the youngest universities in Germany and think in terms of unlimited possibilities instead of possible limitations. Located in the heart of the Ruhr metropolis, we have 11 faculties working to develop ideas with a future. We are strong on research and teaching, embrace diversity, promote academic potential and fight for genuine educational equality.

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. 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.

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.

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.

More information:
https://www.uni-due.de/imperia/md/content/dokumente/ppt/ppt_praesentation_ude_en.pdf

II. FACULTY OF ENGINEERING
All Engineering Disciplines under one Roof

The Faculty of Engineering Sciences at the University of Duisburg-Essen provides a unique profile. Nowhere else in Germany are engineering sciences as close as at the University of Duisburg-Essen. Four departments teach and research Civil Engineering, Electrical Engineering and Information Technology, Computer Science and Applied Cognitive Science and Mechanical and Process Engineering, including Industrial Engineering, under one roof. 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 about 11.600 students – about one third of them from other countries – the faculty is a strong partner for the regional and cross-regional industry. Graduates of our study programmes 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, materials technology, civil engineering and informatics are complimented by modern interdisciplinary study courses such as nano engineering, 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)" with 50% English lectures which 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 experiments that convey how to use the technologies of the future right from the start. The conversion of 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.

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 seven concluded and one running DFG-Collaborative Research Centers as well as six DFG funded research units the faculty is the best address for research in the fields of nanotechnology and material sciences. Beside of that the topics

- Nanotechnology,
- Combustion Science,
- Mechatronics,
- Communication Systems,
- Microelectronics and Medical Technology,
- Information Technology,
- Product Engineering and Materials Technology,

- Civil Engineering,
- Computational and Cognitive Sciences,
- 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.

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

III. DEPARTMENT OF ELECTRICAL ENGINEERING AND INFORMATIION TECHNOLOGY
From classical electrical engineering to NanoEngineering

The work in the Department of Electrical Engineering and Information Technology is shared by 17 professors at 14 chairs - highly motivated scientists, many of whom have been appointed for the last ten years; the average age is correspondingly low. Sound-ly financed and excellently equipped, the department covers all aspects of electrical engineering and information technology, starting with electrical energy technology through communication technology, microelectronics and medical technology up to nanotechnology.

Participation in Collaborative Research Centers and a Research Training Group, as well as numerous DFG and EU projects, as well as diverse industry collaborations, demonstrate the extensive research activities in the department. This is made possible, among other things, by outstanding facilities such as the Center for Semiconductor Technology and Optoelectronics (nearly 500 m2 of clean room), the high-voltage laboratory or a fire detection laboratory.

Particularly noteworthy is the connection to non-university research institutions, such as the Fraunhofer Institute for Microelectronic Circuits and Systems, the Research Center Jülich or the Institute for Mobile and Satellite Radio Technology. There is a lively exchange of knowledge about projects, bachelor's and master's theses and lec-turers from these institutes. For example, the head of the Fraunhofer Institute and three department heads also hold professorships at the university. The intensive co-operation with Forschungszentrum Jülich is supported by two professorships in the field of photovoltaics and sensor technology as well as another recently appointed professorship in the field of battery technology.

The Department of Electrical Engineering and Information Technology at the University of Duisburg-Essen is excellently positioned, both with regard to the increasing competition among universities for qualified student training and for future cooperation with national and international partners from science and industry.

About 1,400 students are enrolled in the study programs of the Department of Electrical Engineering and Information Technology. The attractive range of subjects covers the "classical" subjects of electrical engineering and information technology, enables the interdisciplinary study courses "NanoEngineering" and "medical technology" and offers the international study program "International Studies in Engineering". Due to the complete conversion to consecutive bachelor and master degrees, the department is well prepared for the future in the field of teaching and promotion of young researchers. That the offer of the department is also attractive for women, proves the above-average proportion of female students. It currently stands at over 17% (in the master's degree program in nanoengineering it is even 29%). Contrary to the general trends, student numbers in the current semester have risen through active advertising in schools.

IV. THE CENTER FOR NANOINTEGRATION DUISBURG-ESSEN (CENIDE)

The Center for Nanosciences CENIDE has been networking the research and teaching activities of the University of Duisburg-Essen (UDE) since 2005, which deal with the nanodimension. The know-how of more than 70 research groups from the natural and engineering sciences as well as medicine comes together here: the spectrum ranges from basic research to the production and processing of functional nanomaterials. Thus, CENIDE is one of the largest research groups for nanosciences in the German-speaking area and cooperates i.a. closely with Max Planck institutes, For-schungszentrum Jülich and well-known industrial companies. Further information can be found at www.cenide.de. One focus of research in the field of materials for energy technology takes place in the

research building ‘NanoEnergieTechnikZentrum’ (NETZ), which opened in 2013. Infrastructurally, it supports an overall research pro-gram for the utilization of nanoscale materials for use in energy technology, in particu-lar battery materials, active photovoltaic materials, thermoelectrics, light emitters and catalysis. The research building NETZ, with approximately 4000m2 of highly modern laboratory and office space, provides the necessary infrastructure for the synthesis and characterization of nanostructures for energy technology applications and is available for central interdisciplinary cooperation. It is also possible to cooperate with external working groups in specially equipped laboratories and to offer services for the synthesis of nanoscale materials in quantities far beyond the laboratory scale for pro-cessing industries and cooperation partners.

Within the NETZ building is the Center for Nanoanalytics, ICAN, as the central service facility (Core Facility) of the University of Duisburg-Essen. ICAN is assigned to CENIDE personnel and organizational. The facility also has a large number of (nano) analytical measurement instruments and spectrometers for characterization on the nanometer scale, which are operated decentrally in different working groups.

V. REQUIREMENTS FOR THE POSITION *‘ELECTROENERGETIC FUNCTIONAL MATERIALS’*

1. Research

The position of ‘Electroenergetic Functional Materials’ (W1 tenure track) is primarily concerned with the development and processing of modern electrical functional materials into components. Of particular interest are above all functional materials, which are used in the field of electrical energy conversion and / or storage. The focus should be on materials such as lighting technology, thermoelectrics or energy storage in SuperCaps, as well as new fields of application such as the electromechanical or the spectral energy conversion are of interest. In addition to the pure material properties, the goal is to process these materials into novel electro-energetic elements with high efficiency and thus ultimately to support the transfer of fundamental material developments into practical application. This includes a close link between the processing processes of the predominantly nano- and micro-scale materials, their electrical, thermal and / or optical connection and the characterization of both the material properties and the components. At the same time, the professorship should assume a bridging function between material syntheses on the one hand and system-oriented users on the other.

The following already existing expertise at the UDE form an important basis for this professorship:

- **Material synthesis:** Especially nanoscale functional materials are of central importance here, in this area the UDE has an undisputed unique selling point by CENIDE
- **Characterization:** The UDE has a very well-equipped service facility for the structural characterization of nanoscale functional materials with the ICAN (Interdisciplinary Center for Analytics on the Nanoscale)
- **Photovoltaics:** A W2 professorship ‘Photovoltaics with nanostructured materials’ was set up according to the Jülich model between Forschungszentrum Jülich and UDE.

- **Electrochemical fields of application:** Numerous groups in the faculties of chemistry, physics and engineering are active in the field of catalysis, fuel cells and battery research. There are also close cooperations in these areas with the Ruhr-Universität Bochum (RUB) and the Center for Fuel Cell Technology (ZBT) in Duisburg.

A link with the above-mentioned topics in the sense of initiating research collaborations is desirable, while a strong thematic overlap is of limited interest.

Scientific Impact

The link between materials science and electrical engineering is the targeted utilization of new material properties for optimized functionality of systems. A gain in knowledge at this interface is only possible through well-founded research and the development of new processing methods combined with in-depth knowledge of the function and application. In this case, the feedback of the requirements for the application to the material development and the corresponding processes for the processing is an important prerequisite. Here it is desirable to enhance the expertise available at the UDE in order to identify the outstanding research and development potential of nanosciences (CENIDE, NETZ) with engineering and especially electrical engineering (electronic materials, nanostructure technology, semiconductor technology, optoelectronics) to link. In addition, a close collaboration with the W1 professorship ‘Printable Materials for Signal Processing Systems’ is conceivable, which has recently been set up in the faculty.

The professorship should exploit the potential of linking research topics with high national and international visibility at the UDE, thereby pursuing a highly visible research agenda at a high level.

2. Teaching

The professorship is included in the interdisciplinary study programs NanoEngineering (IngWi) and Energy Science (Physics) as well as for specialization courses in the master's programs in electrical engineering and information technology. In particular, it should strengthen the training in the field of functional materials with regard to material and component characterization, processing methods, and structure-property relationship with a special focus on electro-energetic applications both through lectures and internships. Participation in fundamental lectures is also planned. Due to the interdisciplinary position of the professorship, it can play a central role in structured doctoral programs (IMPRS SURMAT, planned DFG Research Training Group).

3. Further requirements

The post holder is expected to actively engage in interdisciplinary research collaborations between the institute and the university and to successfully recruit and run third party funded research projects. It is assumed that he / she publishes his / her work in international, peer-reviewed journals.

VI. STAFFING AND FACILITIES

Die Professur wird organisatorisch innerhalb der Fakultät für Ingenieurwissenschaften in der Abteilung Elektrotechnik und Informationstechnik verankert. Die Professur erhält

Büro- und Laborflächen im NETZ am Campus Duisburg, da sich ihre thematische Ausrichtung hervorragend in die NETZ-Forschungsagenda einfügt. Durch die Lokalisierung im NETZ ist eine direkte Anbindung an die dort lokalisierte Synthese von Nanomaterialien, an die Beschichtungstechnologie sowie die weiteren Forschungsarbeiten zum Einsatz von nanostrukturierten Materialien in energietechnischen Anwendungen teilhaben. Zudem kann die Professur auf die in ICAN gebündelten Methoden der Nanoanalytik zurückgreifen, die sich größtenteils ebenfalls im NETZ befinden. Die Verortung der Professur im NETZ ermöglicht zudem eine enge Kooperation mit der Fakultät für Physik, die in direkter Nachbarschaft zum NETZ gelegen ist.

Die Professur wird mit einer ½ TVL E13 Folgestelle ausgestattet. Darüber hinaus gehende Einzelheiten sind im Laufe des Berufungsverfahrens abzustimmen und zu vereinbaren.

The professorship is organizationally anchored within the Faculty of Engineering in the Department of Electrical Engineering and Information Technology. The professorship will receive office and laboratory space in the NETZ at the Campus Duisburg, as its thematic orientation fits perfectly into the NETZ research agenda. The localization in the NETZ enables a direct connection to the localized synthesis of nanomaterials, the coating technology as well as the further research work on the use of nanostructured materials in energy-related applications. In addition, the professorship can draw on the methods of nanoanalytics bundled in ICAN, most of which are also in the NETZ. The location of the professorship in the NETZ also enables close cooperation with the Faculty of Physics, which is located in the immediate vicinity of the NETZ.

The position will be equipped with a ½ TVL E13 research position. Further details are to be agreed during the appeal procedure.

VII. LEGAL FRAMEWORK

The Law on the Higher Education in North Rhine-Westphalia (Higher Education Act - HG) from 16.09.2014, the university system has been fundamentally reshaped from 1.10.2014.

The universities are defined by the state supported, unincorporated public bodies. State funding is based on their duties, the agreed objectives and the services provid-ed. They have a global budget and are not subject to transfer relationship with the Ministry of Innovation, Science, Research and Technology of North Rhine-Westphalia.

Legal status of the high school teachers and university teachers

Professors are employed by the statutory requirements, basically public officers for life. Professors can also be employed on a contract under private law.

Junior professors are appointed for a period of three years to public offer in time. The public officer status of junior professor is to be extended with his or her consent during the third year for another three years if he or she has proved to be a university professor. Otherwise, the public officer can be extended with the consent of the junior professor by up to one year. During the sixth year the public officer of a junior professor can be extended with his or her consent by one year if he or she has proved to be a university professor. Junior professors are also engaged in a contract under private law.

For further information, (laws, directives etc.), please visit https://www.uni-due.de/verwaltung/organisation/peo_professoren.php (in German)

VIII. SALARY

On 1 January 2005, the C-grade for professors was replaced for all newly appointed professors by a performance-oriented remuneration. It is part of the service law reform. The formerly standard seniority grades in the salary scale W (W for 'science') replaced by a system of basic salaries (W2, W3) plus "performance bonuses". The W salary scale shall apply from 1 January 2005 for all newly appointed professors and those who transfer to the W salary.

The current pay tables for grades W1, W2 and W3, see
http://www.lbv.nrw.de/beztab/beso.php (in German).

In addition, performance-related salary components, so-called performance bonuses. You can on the occasion of appointment and tenure negotiations (appointment and tenure bonuses), for outstanding achievements in research, teaching, art, training and professional development (special performance bonuses) and for the performance of functions or specific tasks within the university self-management or the university management (functional performance bonuses) will be awarded. For third-party funds, research and teaching allowances may be paid in certain circumstances.

Temporary performance bonuses are subject to the conclusion of target and performance agreements within the framework of appointment and tenure negotiations.

In the framework of appointment negotiations, any appointment-related performance bonuses are negotiated individually with the Rector of the University of Duisburg-Essen.

Information and legal bases the W salary scale available on the Internet at the following address: www.uni-due.de/verwaltung/organisation/peo_links.php (in German)

IX. Attachment: Advertisement

We are one of the youngest universities in Germany and think in terms of unlimited possibilities instead of possible limitations. Located in the heart of the Ruhr metropolis, our 11 faculties develop ideas with a future. We are strong on research and teaching, we embrace diversity, promote academic potential, and we fight for genuine educational equality.

The University of Duisburg-Essen is in search of the brightest minds

We seek to attract outstanding early career academics, affording our junior professors the best opportunities for their academic and personal development. We support young academics individually, offering the assistance of the Graduate Center (GC Plus), the Tenure-Track-Program (TT Plus) and Human Resources Development (PE Plus). Wherever numerous leading minds connect and cooperate, everyone involved will benefit. That is why we coordinate our research and teaching within the Research Area Ruhr; a network interlinking the University of Duisburg-Essen, the Ruhr-University Bochum and the TU Dortmund University.

Within the framework of the “Bund-Länder-Programm zur Förderung des wissenschaftlichen Nachwuchses” – the federal and state program for the enhancement of junior scholarship and research – twenty-three tenure-track junior professorships will be advertised. Currently, we are in search of eligible candidates for the following Tenure-Track Junior Professorship at the Faculty of Engineering:

Junior Professor in

"Electroenergetic Functional Materials"

(Salary Class Group W1 LBesO W - with Tenure Track as per W2)

We are looking for an excellent junior scientist with an area of expertise in electrical nano- and microstructured functional materials, their processing and application in the area of energy conversion/ storage or energy harvesting, like: materials for thermoelectric energy conversion, materials for SuperCaps, materials for electromechanical converters, materials for optical converters or materials for lighting or display applications. The planned research activities should complement the already existing research fields of photovoltaics, Li-ion batteries and fuel cells. In addition to material characterization, component processing is expected. The willingness to engage in interdisciplinary cooperation and to participate in future major research collaborations is a prerequisite. Links to the Center for Nanointegration Duisburg-Essen (www.cenide.de), the NanoEnergieTechnikZentrum (www.uni-due.de/cenide/netz) and the Faculty of Physics are of particular interest.

In the field of teaching, the applicant supports the studying programs in Electrical Engineering, NanoEngineering and Energy Science, offering for example lectures and practical courses in the field of lighting, modern energy converters or process technologies.

What we expect: Publications in the field of expertise in peer-reviewed journals, especially in leading international journals.

Experience in the procurement of competitive third-party funding, involvement in international research as well as relevant international experience are desired. Furthermore, experience in leadership in science is beneficial.

The University of Duisburg-Essen places great emphasis on excellence in teaching. Candidates must present their teaching methodology, showing its relevance to the research profile of the University of Duisburg-Essen.

Applicants must show aptitude for participation in academic self-administration.

The hiring requirements comply with § 36 of the Higher Education Act of North Rhine-Westphalia (HG).

Teaching requirements currently are four hours of teaching during the first, and five hours of teaching during the second employment stage of the Junior Professorship. Employment is contingent on the presentation of the corresponding requirements for temporary civil service. The duration of employment complies with § 39 Sect. 5 HG.

The University of Duisburg-Essen promotes the diversity of its members (https://www.uni-due.de/diversity). It strives to increase the percentage of women in its academic staff and therefore emphatically invites qualified women to apply. In the case of equal qualifications, female candidates will be considered with preference (Equal Opportunities Act). As per § 2 Sect. 3 SGB IX, applications by candidates with a disability or equivalent status are especially welcome.

Applications with the usual documents (CV, list of publications, documentation of academic and professional development, copies of relevant documents and certificates, an exposé of the applicant's research profile with reference to its relevance for the University of Duisburg-Essen, a list of successful external grant applications, a list of courses taught and a teaching philosophy, an enumeration of experience in academic self-administration) should be sent within a month after this advertisement appears to the Dean of the Faculty of Engineering:

Dean of the Faculty of Engineering of the University of Duisburg-Essen

Univ.-Prof. Dr.-Ing. Dieter Schramm

Forsthausweg 2

47057 Duisburg

Germany

(dekanat@iw.uni-due.de)

Further information on the University of Duisburg-Essen and the Faculty of Engineering can be found under

https://www.uni-due.de/iw/de/ and https://www.uni-due.de/cenide/