

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

Information for candidates  
applying for the  
**Chair of Arithmetic Geometry**  
at the  
Faculty of Mathematics

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## I. THE UNIVERSITY OF DUISBURG-ESSEN

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

The University of Duisburg-Essen is located in a region boasting the highest concentration of universities in Europe. Some 33,700 students are enrolled here and, with a total 3,640 academic and non-academic staff members, the university clearly occupies an important position among employers in the region. Established on January 1, 2003, the result of the merger between two previously independent institutions – the University of Duisburg and the University of Essen (both of which were first founded in 1972) – the U of D-E is the youngest university in North Rhine-Westphalia.

This new twin-campus university in the center of the Rhine-Ruhr region has made good use of opportunities given to strengthen and showcase its research and teaching potential, a potential recognized well beyond the borders of the region. Offering a broad range of subjects, the U of D-E has already notched up a good name for itself — in fields as disparate as social sciences, economics, the humanities, design, engineering and natural sciences, including medicine.

Students can graduate on the basis of the traditional degree structure in education and medicine. Or they can obtain a new Bachelor's or Master's degree in a growing number of disciplines. A high priority is given to expanding these consecutive – mainly interdisciplinary – courses since they meet international standards and attract students from far and near. Furthermore, the University offers working professionals ("mature students") a number of attractive courses which, thanks to the modern integrated e-learning methods on offer, are geared to the learning speed of the individual student.

The University has four main research areas:

- nano sciences
- genetic medicine and medical biotechnology
- urban systems, logistics and transport, and
- empirical education research.

Staff here are fortunate in being able to draw on the excellent work carried out in the past by numerous research groups.

Due to various projects focusing on both pure research and practical applications in nanotechnology, the U of D-E has also gained an enviable reputation throughout Germany and further afield. This is a key area in which the University aims to become the top-ranked university in North-Rhine Westphalia and thus establish itself over the coming decades. The chances of success are excellent: four special research programs and two postgraduate programs are dedicated to the nanosciences. Research on smart materials, for example, is particularly exciting -- materials that can "remember" their original form and thus open up new perspectives in the world of control engineering. Materials with tailor-made optical, electronic, magnetic and mechanical properties also play a major role in the fundamental changes that traditional production processes are undergoing.

Research in the field of genetic medicine includes the subject of genetic diagnostics. The aim: to help doctors assess morbidity risks and predict the course the diseases may take.

Activities here include the study of different kinds of reaction to pharmaceuticals. In much the same way, the University is increasingly attempting to forge links with representatives from the faculties of physics, chemistry and engineering sciences — and go beyond the traditional bond between medicine and biology. In the newly founded Center of Medical Biotechnology, the focal points of interdisciplinary studies are: tumor research, tissue and organ replacement, molecular recognition and digital image recognition.

With the U of D-E situated in one of Europe's largest conurbations, our engineers, economists, natural scientists and social scientists are looking into the future of urban systems and working on feasible concepts for the sustainable development of the human habitat within the context of the structural transformation, the modernization, of the Ruhr as a whole. For this purpose, we need to merge the many ecological, economic and sociological points of view into a holistic viewpoint and develop viable political strategies. Some of the key areas on which our many research teams are currently focusing their activities are: urban traffic planning, mobility patterns in passenger and freight traffic, an intelligent integration of waste and traffic management into urban infrastructure, and water quality assessment on a reliable basis.



Meanwhile, staff from the fields of empirical education research, teaching methodology and educational psychology are working on the development of a more competitive education system in Germany — this being a widely discussed topic since the recent PISA survey. The University, which is one of North-Rhine Westphalia's leading centers for teacher training anyway, is also a center of educational research, a fact neatly illustrated by the unique support we get from the German Science Foundation. The Foundation is hoping that the simultaneous set-up of a research unit and a postgraduate program will soon yield significant results.

U of D-E institutes – and a cluster of institutes in the vicinity – already have impressive results to show by way of practice-oriented projects, with support coming not just from the engineering department but also from the humanities and the social sciences. Yet more proof of the University's commitment to the "real world" can be seen in the number of tasks being taken on in the continuing education sector. Indeed, we have set up our own special institute with a wide and varied curriculum in terms of vocational qualifications.

During its founding phase, the University's innovative management also attracted a large amount of attention mainly because of the broad-based project approach taken to quality development. All the faculties and central institutions of the University have their products, services and processes regularly reviewed by the University's own Center for University and Quality Development. Leading the way on the first round of evaluation were the University Library, the Rector's Office and the Faculty of Social Sciences.

## II. THE FACULTY OF MATHEMATICS

The Faculty of Mathematics is located on both campuses, Duisburg and Essen. It guarantees its students the possibility to study towards a full Bachelor or Master degree on each campus independently. However, the students might profit from a wider range of courses offered at both campuses. Normally, a member of teaching staff is supposed to teach only at one of the campuses.

The faculty offers degree programs to obtain a Bachelor and Master degree at both campuses and a teaching qualification for all school-forms at the Essen campus. In Duisburg students can also enroll in programs leading to a Bachelor or Master degree in Techno-Mathematics or Economathematics. Both campuses offer a PhD program, also for international students, within the frame of the International Graduate School of Mathematics (IGS).

The Faculty of Mathematics also provides mathematical courses in other departments such as Chemistry, Physics, Economy, etc.

The scientific staff of the faculty carries out its research in 26 working groups with the following main areas:

- Algebra/Geometry/Number theory
- Analysis
- Optimization
- Numerical Mathematics
- Stochastics
- Didactics of Mathematics

The internationally recognized Institute of Experimental Mathematics (Institut für Experimentelle Mathematik, IEM) which is situated in Essen works in close cooperation with the Faculty of Mathematics.

The quality of the faculty's research activities is documented by its success in highly competitive programs for research funds such as those by the DFG (Deutsche Forschungsgemeinschaft) and the BMBF (Bundesministerium für Bildung und Forschung). Examples in the area of applied mathematics are the successful engagement of Prof. Rösch, Prof. Schultz and Prof. Siebert in the DFG-priority program "Optimization with Partial Differential Equations" or the participation of the working group around Prof. Klawonn in the fund raising for the purchase of a Cray computer for scientific computing. In the area of pure mathematics, highlights are the departments successful collaboration in the DFG Transregio-Sonderforschungsbereich (collaborative research centre) 45 "Periods, moduli spaces and arithmetic of algebraic varieties" jointly with Bonn and Mainz, as well as the ERC-Grant of Prof. Hélène Esnault. A rather unique success is the award of an Alexander-von-Humboldt Chair to Prof. Marc Levine sponsored by the Alexander von Humboldt Foundation. The Faculty of Mathematics at the University Duisburg-Essen was listed number 7 in the DFG's research ranking from 2006. The strength of the faculty's research is also documented by the current CHE-research ranking from December 2009. It rates the faculty among the top research faculties in Germany in the area of mathematics.

At present, a number of Professorships at the faculty are vacant and we experience a generation shift. We intend to use this process to create a new research area "Analysis/Numerical Mathematics/Optimization", which shall be located on both

Campuses, emerging from the old main research areas Analysis and Numerical Mathematics. The new research field is intended to be interdisciplinary and to foster research cooperation with other faculties.

In the domain of teaching, the faculty intends to improve conditions for students. Often students majoring in mathematics abandon this subject during their first semesters (especially students aiming to become teachers). To lessen this number the faculty has recently created a center for individual consultation and support, the LuDi (Lern- und Diskussionszentrum Mathematik, the Learning and Discussion center of Mathematics). The results of a first survey show that the students highly appreciate the LuDi and it is always well-attended.

### **III. THE ESSEN SEMINAR FOR ALGEBRAIC GEOMETRY AND ARITHMETIC AS PART OF THE FACULTY OF MATHEMATICS**

The research groups in the area of algebraic geometry, arithmetic and number theory at the campus Essen and the Institute for Experimental Mathematics form the “Essen Seminar for Algebraic Geometry and Arithmetic”, one of the core research areas of the faculty of mathematics. At the moment it consists of the research groups of

- Prof. Dr. G. Böckle (until August 31, 2010)
- Prof. Dr. H. Esnault
- Prof. Dr. U. Görtz (IEM)
- Prof. Dr. G. Hein
- Dr. M. Kerz
- Prof. Dr. M. Levine
- Prof. Dr. G. Wiese (IEM)

The Essen Seminar is characterized especially by its large number of post-docs and PhD students. To a large extent these are financed by third-party funded projects such as the Transregio-Sonderforschungsbereich 45 (together with Mainz and Bonn), the ERC Advanced Grant of H. Esnault, the A.-v.-H. professorship of M. Levine and further, smaller projects. Therefore with the Essen Seminar the University of Duisburg-Essen has one of the largest groups in this field in all of Germany.

We strongly pay attention to bringing forward scientific exchange between the research groups, for example by the weekly joint research seminar and the colloquium.

The members of the Essen Seminar have numerous international collaborators, in the US and France and other countries which are well-established in the scientific community, as well as in countries as China, Turkey and Vietnam which are in the process of developing their scientific potential to full strength.

## **IV. JOB REQUIREMENTS/DESCRIPTION OF THE CHAIR**

### **1. Research activity**

The research activities of the applicant should have their focus on Arithmetic Geometry and/or Number Theory and should be connected to the topics of the Sonderforschungsbereich/TR 45 "Periods, moduli spaces and arithmetic of algebraic varieties" with a distinct orientation towards arithmetic. The holder of the position is expected to be an internationally visible scientist and should contribute to shaping the scientific profile of the Faculty of Mathematics.

### **2. Teaching**

The teaching load is 9 Semesterwochenstunden (9 hours per week during the terms). The holder of the position is expected to teach regular courses in the Faculty of Mathematics, including beginner's courses and courses for prospective teachers, as well as service courses in other departments.

### **3. Further requirements**

We expect the holder of the position to pursue collaboration with the other research groups of the Essen seminar and other research groups in neighboring fields in the Faculty of Mathematics, and to join our activities towards third-party funded projects, in particular the Transregio-Sonderforschungsbereich 45. He/she should contribute to further sharpening the profile of the Essen seminar, and commit himself/herself to the training of PhD students.

The position is located at the campus Essen.

## **V. STAFFING AND FACILITIES**

The endowment of the position, including scientific personnel, is subject to negotiations with the university and the faculty of mathematics.

The holder of the Professorship participates in the existing premises and technical facilities available to the department. Aside from a personal office, offices for scientific staff shall be allocated. The holder of the position will also participate in the yearly allocation of funds to the faculty according to a department-wide distribution system.

## VI. LEGAL FRAMEWORK

With the passing of the Higher Education in North-Westphalia Act (German abbreviation: HG) dated October 31<sup>st</sup> 2006, the university system was radically restructured as of January 1<sup>st</sup> 2007.

Operating under German law, the universities are defined legally as public corporations supported by the State of North Rhine-Westphalia. State finance is based on the tasks of the universities, agreed goals and performances delivered. They have a global budget and are not subject to the instructions of the North Rhine-Westphalian Ministry of Innovation, Science, Research and Technology.

### Legal status of the academic staff

Assuming legal prerequisites are met, professors in Germany are usually employed on a civil-servant basis (= full tenure). However, employment on the basis of a contract under private law is also possible.

Junior professors can receive civil-servant status for the duration of three years. That civil-service contract may be extended for a further period of three years in the course of the third year, assuming the agreement of the junior professor and assuming that he or she has shown his or her worth as a university teacher. Otherwise, the civil-servant status can be extended for the duration of up to one year, assuming the agreement of the junior professor. In the course of the sixth year, the civil-servant status of the junior professor can be extended for a further period of three years, assuming the agreement of the junior professor and assuming that he or she has shown his or her worth as a university teacher. Junior professors may also be employed on the basis of a contract under private law.

For further information (laws, directives etc.), please visit [http://www.uni-due.de/zentralverwaltung/peo\\_links.shtml](http://www.uni-due.de/zentralverwaltung/peo_links.shtml) .

## VII. SALARY

Effective January, 1, 2005, the C salary scale that used to apply in Germany to all newly appointed professors made way for a performance-oriented salary scale. As such, the new salary scale is part of a recent conditions-of-service reform. The formerly standard seniority grades were replaced by a W salary scale (where W in German stands for *Wissenschaft* or "science") that provided for a system of basic salaries (W2, W3) plus "performance bonuses". As of January 1, 2005, then, the W salary scale thus applies to all newly appointed professors and to those who transfer to the W salary scale.

Special arrangements apply to junior professors assigned to the W1 salary scale.

For professors on either W2 or W3 pay scales, the 2009 monthly basic salaries are € 4,143.03 (W2) and € 5,027.01 (W3). The pay scales are set according to public law.

Provision is also made for performance-related salary components — "performance bonuses". These can be allocated on different grounds: as the result of appointment and tenure negotiations ("appointment and tenure bonuses"), for special achievements in research, teaching, art, continuing education and next-generation staff development ("special performance bonuses") and for carrying out functional or special responsibilities within the framework of university self-management or university administration ("functional performance bonuses"). Furthermore, under certain circumstances, research and teaching allowances may be paid from third-party funds.

Within the framework of appointment negotiations, any appointment-related performance bonuses are to be negotiated on an individual basis with the Rector of the University of Duisburg-Essen.

Similarly, within the framework of appointment negotiations, any appointment-related performance bonuses are to be negotiated on an individual basis with the Rector of the University of Duisburg-Essen.

More information, both general and legal, about the W salary scale can be found on the Internet at:

[http://www.uni-duisburg-essen.de/zentralverwaltung/peo\\_links.shtml](http://www.uni-duisburg-essen.de/zentralverwaltung/peo_links.shtml)

[http://www.lbv.nrw.de/beztab/besoldung\\_01032009/beso\\_abrw\\_010209.pdf](http://www.lbv.nrw.de/beztab/besoldung_01032009/beso_abrw_010209.pdf)

## **Appendix: Job Advertisement**

The Faculty of mathematics at the University of Duisburg-Essen, Campus Essen, invites applications for the following open position:

### **Full Professorship (W3 BBesG) in Arithmetic Geometry**

The holder of the position will represent the field of Arithmetic Geometry in research and teaching. The research activities of the applicant should have their focus on Arithmetic Geometry and/or Number Theory and should be connected to the topics of the Sonderforschungsbereich/TR 45 "Periods, moduli spaces and arithmetic of algebraic varieties". He/she is expected to be willing to join activities towards further research projects in this direction. The holder of the position should contribute to shaping the scientific profile of the Faculty of Mathematics. He/she is expected to teach regular courses in the Faculty of Mathematics as well as service courses in other departments, and to commit himself/herself to the training of PhD students and to supporting the scientific activities of the Essen Seminar for Algebraic Geometry and Arithmetic.

The requirements, according to German university regulations (§ 46 Hochschulgesetz NRW), are in particular a university degree, a PhD degree, and additional scientific qualifications obtained as a junior professor, or as documented by a post-doctoral degree such as a habilitation, or through research activity at a university, a non-university research institute, in business, management or some other social sector.

For its work in gender mainstreaming, the University of Duisburg-Essen has been awarded the "Total E-Quality Award". It wishes to increase the number of female scientific employees and therefore particularly encourages appropriately qualified women to apply.

Physically handicapped persons with equivalent qualifications, competence and achievements will be given preferential treatment.

Applications, together with the usual supporting documents (Curriculum vitae, list of academic publications, evidence of academic and professional background, certified copies of examination certificates, details of previous teaching activities and of participation in university committees) are to be submitted until June 24<sup>th</sup>, 2010 to

Universität Duisburg-Essen  
Fakultät für Mathematik  
Herr Univ-Prof. Dr. Gebhard Böckle  
Universitätsstr. 2  
45141 Essen