

## Call for Proposals

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### Materials Science and Engineering: 9th Workshop for Early Career Investigators

Ceramic Materials – From Fundamentals to Applications

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) organises the ninth Workshop for Early Career Investigators in the area of Materials Science and Engineering with a focus on “Ceramic Materials – From Fundamentals to Application”. Workshops for Early Career Investigators serve to prepare researchers at an early stage of their scientific careers for outlining their first independent research projects and to provide mentoring for managing their own DFG projects. These workshops are intended to attract outstanding early career researchers to interdisciplinary fields of research. An additional important aim is to address the need for future generations of excellent scientists within interdisciplinary research areas.

The development of innovative ceramic materials is a key element in the design of sustainable and resource-efficient industries of modern society. From a socio-ecological, technical and economic point of view, ceramic materials today have the extremely important function of an “enabling material”. High-tech systems in energy and environmental technology, automotive and aerospace engineering, medical sciences, information and communication technology, electrical engineering and process engineering are impossible without key enabling materials and components based on ceramics.

The fundamental understanding of ceramic materials with regard to significant structure-property correlations on different spatial and time scales, the future of direct manufacturing and production processes and efficient modelling and simulation methods are decisive prerequisites for innovation in ceramics engineering.

Current challenges in ceramics research include, but are not restricted to, ceramic processing by programmable design and assembly, by understanding and predicting defects across time and length scales as well as functionalising defects for unprecedented properties, and by discovery of multimaterial systems for extreme environments. It is anticipated that these challenges can only be overcome by enhanced basic understanding and, once met, will ultimately enable advancement in multiple sectors, including energy, environment, manufacturing, security, and health care.

The promotion of highly qualified early career scientists within this very interdisciplinary field of research is therefore of particular importance. Together with a mentoring programme, the Workshop for Early Career Investigators “Ceramic Materials – From Fundamentals to Application” aims

to give excellently trained early career scientists the opportunity to design, plan and conduct their own research projects for the first time, implementing highly original fundamental research in areas of future technology.

The workshop serves to qualify early career researchers by lectures, seminars and excursions and intends to broaden their specialist and methodological knowledge in the field of ceramic research and related areas. The workshop participants will be coached and advised by internationally renowned experts on the development of their own research proposals. The discussion and information exchange with other early career researchers will serve the promotion, networking and further training of upcoming academic talents in the field of ceramic research and will thereby contribute to the strengthening of scientific excellence in the research field of ceramic materials.

This workshop will cover the fields of ceramic materials with novel structural and functional properties, and will be divided into the following topics:

- Understanding the mutual influence of structural parameters on the structure-property correlations, with specific emphasis on the component's design and construction.
- Detection and control of point, line and volume defects as well as the resulting structural anomalies for the control of specific materials properties. In this way, ceramic materials with a precisely defined defect distribution on defined space, time and dimension scales should exhibit novel microstructure / phase combinations resulting in novel macroscopic properties. Applying state-of-the-art imaging and spectroscopy methods is anticipated.
- Focus on processing paradigms that allow for precisely controlling composition, structure, and assembly of ceramics in a well-defined way over multiple length scales, e.g. by guided colloidal assembly and 3D printing methods. The combination of advanced ceramic processing methodologies is also expected to enable multi-material platform technologies targeted on integrating polymers or metals.

### **Course of the Workshop for Early Career Investigators**

In a first step of the application process, candidates submit a 3-page outline for a DFG research proposal in one of the areas described above. The outline should describe the project idea, a general concept of the proposed project, and preliminary work. Selection of the candidates will be carried out by an expert panel. Up to 15 candidates will be invited for participation, based on the significance of the project within the research area, the quality of the project idea (originality, feasibility) as well as on previous scientific achievements. Proof of outstanding past achievements (degree, preferably a doctorate, in a relevant field; awards where applicable) as well as at least one publication in a high-ranking scientific journal are expected.

#### ***Part I: Workshop***

The workshop will be held in November 2018 over four working days at the Graduate Centre, Saarland University, Saarbrücken. An essential feature of the workshop is the scientific interaction and cooperation between the participants and the international experts, on the basis of lectures, seminars and excursions. In this context, the participants critically reassess their project outlines and then discuss revised project concepts. During the retreat, there will be alternating presentations by the international experts and the early career investigators, and sessions dedicated to coaching and networking in order to enable the early career scientists.

### ***Part II: Review Colloquium***

No later than 27 February 2019 the participants will submit their full DFG proposals, which they developed from their initial project outline. In spring 2019, the DFG will organise a one-day review colloquium, where the applicants present their full proposals to a review panel. Based on the recommendations of this panel, the final funding decision will be made in summer 2019 by DFG's Statutory Bodies.

### ***Part III: Exchange of Experience***

About a year after the funded projects have started, a one-day meeting of the grantees is planned to allow for exchanging experiences. This meeting will take place at a suitable location in Germany. The organisers of the workshop as well as a DFG representative will again give advice on project management.

### **Route to the Workshop for Early Career Investigators**

This workshop for early career investigators is targeted at doctoral candidates shortly before completing their dissertation (doctoral examination planned for no later than February 2019) and at graduates who have completed their academic training (received their doctorates) after February 2016. An intention to pursue an academic career is expected. Only first-time applicants to DFG are eligible to apply. However, previous DFG proposals for research fellowships, publication and travel expenses, or for the establishment of a scientific network are not considered first proposals. For the future full DFG proposals, please observe the DFG Guidelines on the Duty to Cooperate (DFG form 55.01) for members of non-university institutions.

Interested early career investigators apply to the coordinator for participation in the workshop.

Applications containing

- a CV including a complete publication list, and
- a 3-page project outline for a future DFG research proposal

must be submitted as a .pdf document in English no later than **31 August 2018** by e-mail to [g.falk@nanotech.uni-saarland.de](mailto:g.falk@nanotech.uni-saarland.de).

Submitted applications will be evaluated by an expert panel based on the following criteria:

- significance of the project within the research area,
- quality of the project idea (originality, feasibility), and
- previous scientific achievements.

The intended project duration may be one, two or three years. Future full DFG proposals may comprise the full spectrum of modules available for the "Research Grants" funding line, including temporary positions for principal investigators (i.e. for funding of the candidate's own academic position). Proposals for Research Fellowships to conduct a project at a research institution outside Germany are possible as well.

Invitations for participation in the Workshop Part I will be sent out from 24 September 2018. Workshop Part I will take place from 13 to 16 November 2018 in Saarbrücken.

Cost of travel (train, 2nd class), accommodation and subsistence will be covered. Candidates are expected to contribute an amount of €100 for costs not covered by the DFG.

**Further Information**

The "Guidelines on the Duty to Cooperate" (DFG form 55.01) can be found at:  
[www.dfg.de/formulare/55\\_01](http://www.dfg.de/formulare/55_01)

For scientific enquiries concerning the scope of the programme, please contact the workshop's coordinator:  
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