



PADERBORN
UNIVERSITY

Research and Funding Opportunities

Jenny Aloni Center
for Early Career
Researchers





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Welcome to Paderborn University!

Paderborn University conducts excellent research in five interfaculty key research areas:

- Intelligent Technical Systems
- Optoelectronics and Photonics
- Sustainable Materials, Processes and Products
- Digital Humanities
- Transformation and Education

These key research areas are characterised by cutting-edge research infrastructure, highly distinguished expert researchers, and a productive research environment as exemplified by multiple coordinated research projects.

If you would like to conduct your own research at Paderborn University, we would be happy to assist you!





Paderborn University's 5 Key Research Areas

1. Key Research Area 'Intelligent Technical Systems'

Intelligent technical systems are highly complex products, characterised by a close interaction between hard- and software. System functionality is continually improved by moving functionality into software modules. This increases the life span as well as the adaptability of the products, but it also requires high quality software able to integrate with the hardware that is to be controlled.

The underlying research areas forming the foundation for this increased quality demand are mechatronics, software quality, virtual prototyping/simulation, and systems integration.

Due to a close cooperation between Mechanical Engineering, Electrical Engineering, and Computer Science, we can research novel development methods, in particular in the areas of modeling, simulation, and formal verification. These methods take into account the increasing move from hardware to software, as well as the highly networked system components.

 **Contact:**
Prof. Dr.-Ing. habil.
Ansgar Trächtler

 **Research areas involved:**
Electrical Engineering,
Mathematics, Computer
Science, Economics

2. Key Research Area 'Optoelectronics and Photonics'

Research within the key research area 'Optoelectronics and Photonics' is focused on the physics and application of optical technologies. It is driven by innovative concepts from quantum optics, coherent optics, ultrafast nanooptics, and optoelectronics. The coordinated research aims at establishing novel information technologies based on nonlinear light-matter interactions and quantum effects.

Within experimental research, new materials are developed and functional nanostructures as well as photonic quantum devices are produced and evaluated. The theoretical work covers the full range from atomistic material description and quantum optics to protocols for quantum information processing. This research is dominantly applied in the field of automotive lighting: We develop prototypes and technology de-

monstrators in close cooperation with industry and the Research Institute for Automotive Lighting Technology and Mechatronics.

 **Contact:**
Prof. Dr. Thomas Zentgraf

 **Research areas involved:**
Physics, Electrical
Engineering, Chemistry,
Mathematics, Computer
Science

The Institute for Photonic Quantum Systems (PhoQS)

The Institute for Photonic Quantum Systems (PhoQS) is an interdisciplinary central research facility.

Based on the recognition that second-generation quantum technologies combine concepts from

physics, mathematics, electrical engineering, and computer science, the Institute for Photonic Quantum Systems establishes a strategic collaborative model for interdisciplinary research and for the development of new quantum technologies.

PhoQS bundles Paderborn University's expertise within the profile areas 'Intelligent Technical Systems' and 'Optoelectronics and Photonics.'

 **Contact:**
Prof. Dr. Christine Silberhorn

3. Key Research Area ‘Sustainable Materials, Processes and Products’

Climate protection and resource conservation are central tasks of today’s society. Research in the natural sciences and in engineering can contribute to solving these by working on solutions for sustainable materials (metals, polymers, and combined hybrids), on material-specific construction, joining and manufacturing processes, specific production and simulation processes, or in the field of sustainable energy supply.

To cover this vast spectrum, Paderborn University brings together the interdisciplinary research in the faculties of Mechanical Engineering, Natural Sciences, and Electrical Engineering in its key research area ‘Sustainable Materials, Processes and Products.’

Three key technologies are central to this key research area.

Key Technology Lightweight Design

Lightweight design holds tremendous resource-saving potential, in particular through combining state-of-the-art (production) techniques with high functionality. Interfaculty project teams at the Institute for Lightweight Design with Hybrid Systems (ILH) and the Paderborn Institute for Additive Manufacturing (PIAF) research this complex topic.



Contact:
Prof. Dr. Thomas Tröster

Key Technology Additive Manufacturing

Additive manufacturing can directly translate evolution through Industry 4.0 into reality. Through design freedom, it enables the creation of customised, resource-efficient and function-optimised lightweight structures. At the Paderborn Institute for Additive Fabrication (PIAF) and Direct Manufacturing Research Centre (DMRC), interfaculty project teams collaborate with industry on research aimed at establishing additive manufacturing processes as robust industrial manufacturing processes.



Contact:
Prof. Dr. Hans-Joachim Schmid

Key Technology Sustainable Energy Technology

The transformation from existing energy systems based on fossil and nuclear energy sources to sustainable, reliable, and affordable electricity, heat, and mobility generated by renewable energies is one of the central global challenges of the twenty-first century. The Competence Centre for Sustainable Energy Technology (KET) contributes toward this goal through its research in sustainable mobility concepts, smart grids, energy efficiency as well as air pollution control and resource conservation.



Contact:
Prof. Dr.-Ing. Eugeny Kenig

4. Key Research Area ‘Digital Humanities’

In the key research area Digital Humanities, Paderborn’s Computer Science and Humanities are breaking new ground together.

Research in the humanities raises new challenges for computer science, e.g. when it comes to the analysis of non-standard data. Conversely, the digital processing of research data requires cultural studies to reflect on and expand their methodological toolbox. A particular focus of cooperation therefore is on the interdisciplinary development of technology and methods, as well as on the development of data and coding standards for the cultural sciences – the latter in exchange with the relevant international standardisation initiatives and the corresponding committees, institutions, and alliances.



Contact:
Prof. Dr. Andreas Münzmay
& Prof. Dr. Axel-Cyrille Ngonga Ngomo



Research areas involved:
Humanities, Computer Science

5. Key Research Area ‘Transformation in Education’

Current megatrends such as globalisation, internationalisation, or digitalisation pose challenges that have a direct or indirect impact on the design of educational processes.

The key research area ‘Transformation in Education’ addresses these challenges through evidence-based research and transfer approaches within the framework of (vocational) educational research. The members of the key research area focus on the design of teaching and learning processes in different educational contexts. The profile is

characterised by a research and development strategy that is linked to the requirements and innovation needs of practice. The aim is to generate action-relevant knowledge in order to strengthen the transfer of evidence-based findings into practice.



Contact:

Prof. Dr. Sabine Fechner



Research areas involved:

Educational Research,
Teacher Education



Funding Options in Germany

There are different programmes to fund your own independent research project at a German university. If you can prove preliminary work, for example through previous publications and international research experience, the success rates are excellent.

The most common types of funding programmes are:

- **Fellowships** (duration 3 months up to 24 months)
- **Project grants** (duration 2-3 years)
- **Grants to establish your own research group** (duration 3-5 years)
- **Grants to prepare for a professorship** (duration up to 5 years)



Not all programmes accept applications all of the time, and programme regulations may be subject to change. Therefore, please check each programme individually.

Fellowships

The following fellowship programmes enable you to carry out a research project at a research institution of your choice in Germany. You can choose the duration of your fellowship, from a minimum of 3 months to a maximum of 2 years.

- **Research Stays for University Academics & Scientists**
German Exchange Service (DAAD)
- **Research Fellowship**
Gerda Henkel Foundation
(area: History & Archaeology)

- **Marie Skłodowska-Curie Actions – Postdoctoral Fellowships**
Horizon Europe: EU Framework Programme for Research and Innovation
- **Humboldt Research Fellowship**
Alexander von Humboldt Foundation (all nationalities except Germany and Brazil)
- **Georg Forster Research Fellowship**
Alexander von Humboldt Foundation (for applicants from developing or transition countries in accordance with OECD (excluding PR China and India))

Project Grants

The following grant programmes enable Early Career Researchers to carry out a research project on a topic of their choice at a German research institution of their choice. The project duration can be up to three years. The grant usually funds your position, research equipment and materials, as well as travelling and publication costs.

- **DFG Research Grant ('Eigene Stelle')**
German Research Foundation (DFG)
- **Fritz-Thyssen Foundation**
Grant Fritz Thyssen Foundation
- **Walter Benjamin Programme**
German Research Foundation (DFG)
- **Grants at the German Federal ministries**
Thematic calls of the federal ministries

Grants to Establish your own Research Group

Leading your own research group enables you to conduct research and teach independently. In leading an independent junior research group and assuming relevant teaching duties, you gain qualifications for executive academic positions, in particular for an appointment as a professor.

Junior research group leaderships play an important role at Paderborn University. A junior research group leadership is awarded at Paderborn University with a formal, official, and standardised status within the university. This status affords the junior research group scientific and financial independence. The junior group leader carries both personnel and financial responsibility.

Junior research group chairs are regularly advertised by Paderborn University, but externally funded junior research group chairs are also welcome. The programmes listed here offer postdocs the opportunity to lead a junior research group and gain the necessary qualifications for a professorship. The grants usually provide funding for your position, your research group (2-5 people), research equipment and materials, as well as travelling and publication costs.

- **Junior research group at Paderborn University**
German Research Foundation (DFG)
- **NRW Rückkehrprogramm**
NRW Ministry for Culture and Research
- **ERC Starting Grant**
Horizon Europe: EU Framework Programme for Research and Innovation
- **Sofja Kovalevskaja Award**
Alexander von Humboldt Foundation
- **Freigeist-Fellowship**
VW Foundation

Grants to Prepare for a Professorship

When you prepare for a professorship, the DFG provides funding to enable you to carry on with high-quality research at the institution of your choice and continue building your academic reputation. Applications are open to appropriately qualified foreign researchers looking to pursue careers in Germany, as well as German researchers returning from abroad.

Four types of funding are available within the DFG Heisenberg Programme:

- Heisenberg professorship
- Heisenberg position
- Heisenberg temporary substitute position for clinicians
- Heisenberg fellowship



Jenny Aloni Center for Early Career Researchers at Paderborn University

In case of any questions, don't hesitate to contact us!

Jenny Aloni Center for Early Career Researchers

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**Have a look at our website where you can find lots of general information for
Early Career Researchers!**

upb.de/jennyalonicenter

