



Karlsruher Institut für Technologie

Karlsruhe Institute of Technology
Personnel Services (PSE)

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Doctoral Research Position at KIT- IIP
in the field of Sustainable Urban Systems: Urban retrofitting and revitalising
- how to tackle surface conflicts between different uses?

Job description:

The Institute for Industrial Production (IIP) at the Karlsruhe Institute of Technology (KIT) invites applications for a doctoral research position within the international research training group **C4LaNd – Competition for land: Tackling the climate and biodiversity crises through the food, energy and materials nexus**. The position is located in Karlsruhe, Germany, at **KIT-IIP** and will be supervised by **Prof. Dr. Frank Schultmann** and **Prof. Dr. Rebekka Volk** (University of Freiburg, Chair of Sustainability Assessment of Technical Systems).

This doctoral project is embedded in **Cluster C2: Rethinking Urban Spaces** and addresses a key challenge of the **urban transformation**: the increasing competition for land/surface associated with the growing demand for living space, energy generation, urban green and (transport) infrastructure.

Urbanisation is an unbroken trend, not only in developed but also in less developed countries that leads to immense stress/competition for land and surfaces in metropolitan areas while landuse leads to surface sealing with deteriorated soil functions, CO₂ emissions from construction activity and materials, urban heat islands or disruption of the natural water balance.

The doctoral research will investigate these interactions in a spatially explicit manner and develop decision-support approaches for identifying more sustainable land- and surface utilisation pathways. The project will combine **geographic information systems (GIS)**, **techno-economic and life cycle assessment** methods, **scenario analysis** and **multi-criteria decision analysis (MCDA)** to assess where, and under which ecological, economic and policy conditions, urban transformation can support climate goals while minimising negative impacts on ecosystems and urban societies.

The work is expected to generate both methodological advances and practically relevant insights for planning, governance and value-chain design in the urban research. A particular strength of the position lies in its integration into the international and interdisciplinary C4LaNd environment. The project is closely connected to collaboration with the **University of Melbourne**, especially with research on participatory decision-making for multi-use urban land. Within the training group, doctoral researchers are expected to undertake a **12-month research stay** at the partner institution and to contribute actively to the broader interdisciplinary research and training programme.

The focus is on the structured analysis and resolution of urban land-use conflicts within the context of urban redevelopment, restoration and upgrading. The goal is to develop an optimising decision support

tool that identifies user-specific trade-offs and suggests potential solutions. This is based on techno-economic and (local) ecological analyses of possible urban retrofits, as well as data collection and analysis, and systemic analyses of new technologies, with a focus on de-sealing, soil restoration, climate change mitigation, food production, energy generation, and the creation and improvement of urban green spaces and biodiversity through blue-green infrastructure in cities. This includes, for example, the application and further development of tools and guidelines for life-cycle-based planning, new construction, upgrading, maintenance, and (climate-)resilient, multi-functional sustainable use of urban areas and urban infrastructure. In particular, innovative quantitative and optimisation approaches, as well as approaches for investigating acceptance, trade-offs, management, and decision support for the sustainable development of urban districts, are to be developed, and applied.

Personal qualifications:

Applicants should hold an excellent Master's degree in a relevant field such as urban planning, geoinformatics, civil engineering, industrial ecology, business and environmental sciences, geography, environmental engineering, sustainability assessment, or a related discipline. A strong interest in interdisciplinary research on land use, climate change, biodiversity and sustainable value chains is essential. Experience with GIS, spatial data analysis, quantitative modelling or sustainability-assessment methods is highly desirable. Familiarity with MCDA, scenario analysis, land-use systems or urban planning research would be advantageous, as well as particular experience in programming, especially SQL, PostgreSQL and QGIS (possibly also Python and Java), as well as the development and coupling of computer-aided models. Very good written and spoken English is required, as is the willingness to work in an international research environment, to complete a one-year research placement at the University of Melbourne, and to contribute actively to scientific publication and participation in international conferences and project-related dissemination activities.

Our offer:

- An attractive and modern workplace with access to KIT's excellent infrastructure
- A self-determined and varied job, flexible working time models and the possibility of mobile working
- The opportunity to network with national and international co-operation partners from science and industry
- A broad spectrum of further training opportunities
- A supplementary pension scheme (VBL)
- A subsidy for the JobTicket BW

Salary:

The position is funded for **3.5 years**. Salary and benefits are based on the **Collective Agreement for the Public Service of the German Federal states (TV-L, 75%)**.

Organisational unit: Karlsruhe Institute of Technology (KIT),
Institute for Industrial Production (IIP)

Contract term: 3.5 years

Start: 01.10.2026

Application deadline: 17.05.2026

Contact person: For further information on the position, applicants may contact **Prof. Dr. Frank Schultmann** at KIT-IIP: frank.schultmann@kit.edu or **Prof Dr. Rebekka Volk** at UFR: rebekka.volk@inatech.uni-freiburg.edu. Current programme information and additional information on the research training group are available at **c4land.earth**.

Application: Applications should be submitted as **one single PDF file** containing a letter of motivation, curriculum vitae, copies of academic transcripts and certificates, and the contact details of two academic references to:

Applications_Chair_of_Production@iip.kit.edu.

We are committed to achieving a balance in the number of employees (f/m/d). We therefore particularly encourage female applicants to apply for this position. Severely disabled persons with equal qualifications will be given preference.