TUD Dresden University of Technology, as a University of Excellence, is one of the leading and most dynamic universities in Germany. The Leibniz Institute of Ecological Urban and Regional Development (IOER) is a non-university research institute in the field of the spatial sciences and a member of the Leibniz-Association, focusing on the sustainable development and transformation of cities and regions in the context of the global human-ecological crises. Together TUD and IOER maintain a close partnership in research and education through six joint professorships and diverse collaboration activities. This includes the Chair of Spatial Information and Modelling, which is at the same time leading the IOER Research Area under the same title.

Both TUD and IOER are globally oriented, regionally anchored top institutions tackling the grand challenges of the 21st century and developing innovative solutions for the world's most pressing issues. Their highly inter- and transdisciplinary research activities support effective transfer of science to society. As employers they offer attractive working conditions to all employees aiming to promote and develop their individual abilities while empowering everyone to reach their full potential. For TUD and IOER diversity is an essential feature and a quality criterion. Accordingly, we welcome all applicants who would like to commit themselves, their achievements and productivity to the success of the whole institution.

The **Chair of Spatial Information and Modelling** at the **Faculty of Environmental Sciences** in close collaboration with the **IOER** offers a position as

Research Associate / PhD student (m/f/x)

Integrating Material Flow Analysis and Digital Twin Approaches to Enable Material Autarky in the Construction Industry

(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

The position is starting at the **next possible date** and comprises 80% of the fulltime weekly hours. The position is limited to December 31, 2027. The period of employment is governed by the Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG). The position aims at obtaining further academic qualification (usually PhD). In case of positive evaluation, a scholarship will be provided by IOER for up two years to support the finalization of the thesis.

Tasks: scientific research and teaching tasks:

The position explores the development of digital twin concepts and their application to promote regional material self-sufficiency in the construction industry in line with net zero targets. It is embedded in a Joint Research Lab between IOER and the National Taiwan University (NTU) in Taipei, focusing on urban resilience and innovation. The successful candidate will be involved in ongoing research work at IOER (Research Areas “Spatial Information and Modelling” and “Built Environment – Resources and Environmental Risks” and NTU (“Research Center for Building & Infrastructure Information Modeling and Management”) on the development of material flow analysis (MFA) methods and digital methods for spatial analysis.

Specific tasks comprise:

- Design and apply digital models for analyzing and simulating circular futures for the materiality of the built environment in defined regions, based on MFA and supported by BIM, GIS, IoT and AI technologies.
- Map existing anthropogenic material stocks and their dynamics and simulate circularity scenarios, taking into account established 'R' strategies and the availability of anthropogenic and natural resources.
- Use system dynamics and other forms of modelling to simulate policy impacts, resource flows, and stakeholder behavior.

Requirements:

- Completed university degree (master's/diploma) in civil engineering, architecture, geoinformation technologies, or a degree related to the subject matter.
- Knowledge of geoinformation technologies, 3D building modelling (BIM), and AI applications
- Knowledge of R and Python—especially spatial data science techniques
- Analytical and process-oriented thinking as well as a structured and solution-oriented approach to work.
- Strong interest in interdisciplinary approaches and strong teamwork skills.
- English language proficiency (CEFR Level C1 or higher), German language skills would be an asset.
- Basic knowledge of circular construction concepts and material flow analysis methods and their application in construction would be desirable.
- Interest in German/Taiwanese collaboration and willingness and ability to participate in at least two annual exchanges and research stays at NTU in Taipei.

We offer:

- Integration into a vibrant inter-/national and interdisciplinary research community.
- Insights in and advancements of cutting-edge research pushing the frontiers of the field.
- Active support through tailored qualification, training and career development measures.
- A working culture characterized by cosmopolitanism, mutual appreciation, thriving innovation and active participation.

TUD strives to employ more women in academia and research. We therefore expressly encourage women to apply. The University is a certified family-friendly university. We welcome applications from candidates with disabilities. If multiple candidates prove to be equally qualified, those with disabilities or with equivalent status pursuant to the German Social Code IX (SGB IX) will receive priority for employment.

Please submit your detailed application with the usual documents by **March 31, 2026** (stamped arrival date of the university central mail service or the time stamp on the email server applies), preferably by sending it as a single pdf file to **m.wolfram@ioer.de** (Please note: We are currently not able to receive electronically signed and encrypted data.) or to:

TU Dresden, Chair of Spatial Information and Modelling, Prof. Marc Wolfram, Helmholtzstr. 10, 01069 Dresden, Germany.

Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.

TUD is a founding partner in the DRESDEN-concept alliance.

DRESDEN concept

Reference to data protection: Your data protection rights, the purpose for which your data will be processed, as well as further information about data protection is available to you on the website: https://tu-dresden.de/karriere/datenschutzhinweis.