Technische Universität Braunschweig

Institut für Verkehr und Stadtbauwesen
Prof. Dr.-Ing. Bernhard Friedrich

The Institute of Transportation and Urban Engineering (IVS) offers a position as
Research Associate (PhD) (m/f/d)
at the Research Group "ReSpace! – Connected Response-able Spaces and Infrastructures for Sustainable Living"

(EG 13 TV-L, full-time, fixed-term for 2 years, with possible extension)

The newly established interdisciplinary research group "ReSpace! – Connected Response-able Spaces and Infrastructures for Sustainable Living" is a cutting-edge initiative at Technische Universität Braunschweig, bringing together a vibrant and interdisciplinary team dedicated to investigating and shaping sustainable spatial responses to the challenges of climate change. With ReSpace! we will focus on the design and planning of sustainable communal and public infrastructures for future living amid the realities of climate change. ReSpace! is funded by zukunft.niedersachsen, a funding program of the Ministry of Science and Culture of Lower Saxony (MWK) and VolkswagenStiftung, as part of TU Braunschweig's project "Ecoversity – Collaborative space for change".

The aim of ReSpace! is to advance an integrated knowledge and understanding of how spatial infrastructures and typologies can be conceived of or transformed in the context of climate adaptation, while also addressing resource constraints and societal demands in the complex interplay of global and local (economic) entanglements. Building on cross-disciplinary collaboration between architecture and urban design, the humanities, social and natural sciences, and engineering, the group will co-design, narrate, simulate, and evaluate innovative solutions for future sustainable living in the context of climate change and resource scarcity. Partnering with actors – cities, municipalities, NGOs, non-university research institutions and industry – ReSpace! focuses not only on developing spatial role models, but also on transferring knowledge to regional and institutional stakeholders.

The advertised position contributes to the development of an integrated urban mobility system that includes both passenger and freight transportation. The focus is on modelling and simulating future-oriented scenarios using agent-based methods. This involves investigating how flexible, demand-responsive, and multifunctional transport solutions can be enabled through strategically positioned hubs, modular vehicle concepts, and shared infrastructure. Particular attention is paid to the integration of automated and data-driven systems that enable the dynamic coordination of passenger and freight flows in a uniform, responsive network. These simulations aim to evaluate spatio-temporal decoupling strategies, multimodal integration and system-wide optimizations that support sustainable, resilient, and inclusive mobility systems. The emphasis is on real-world applicability by using open data, scenario evaluation and performance-based evaluation of transformation paths. The research thus aims to identify the structural, operational and social impacts of future mobility and freight configurations under conditions of spatial scarcity and climate change.

Your Tasks

- Contribute to research on the integration and co-simulation of passenger and freight transport
- Design, implement, and evaluate open-source agent-based transport demand models (MATSim)
- Develop and test multi-modal and multifunctional hub concepts and explore freight and passenger flow coordination
- Investigate operational and behavioral strategies for the spatiotemporal decoupling and coordination of passenger and transport flows
- Quantify and analyze key performance indicators to assess the effectiveness of integrated passenger-freight mobility scenarios
- Inter- and transdisciplinary exchange as well as collaboration with partners outside academia
- Support teaching and supervision of student projects

Experience in one or more of these research areas is an advantage.

Your Qualifications

- Completed university degree (Master's or Diploma) in traffic engineering, urban planning, computer science, data science or related disciplines
- Programming skills in Java and/or Python
- Very good knowledge of English is required; knowledge of German is desirable
- Experience in traffic and freight simulation and preferably with agent-based modeling (e.g. MATSim), optimization and dynamic routing algorithms
- Knowledge of mobility and freight systems, transport infrastructure, and sustainable urban planning principles
- Ability to work independently and as part of a collaborative team
- Experience in research, methodological knowledge and passion for scientific writing
- Interest in pursuing a PhD in the fields of agent-based modelling, traffic simulation, or sustainable mobility systems

We Offer

- Position in an interdisciplinary and forward-thinking research environment
- Flexible work hours and remote work options
- Excellent academic supervision and support for your PhD
- Collaboration with international research and practice partners within and outside ReSpace!
- Access to advanced modelling tools and real-world mobility datasets
- Opportunities for professional development and training programs
- Support for active participation in national and international scientific conferences

About Technische Universität Braunschweig, Ecoversity, and the Institute of Transportation and Urban Engineering

TU Braunschweig is the academic center in the middle of one of the most active research regions in Europe and has a renowned Faculty of Architecture, Engineering and Environmental Sciences. We work successfully with over 20 research institutions in our neighborhood as well as with our international partner universities. Our university's core research areas are Mobility, Engineering for Health, Future city and Metrology. TU Braunschweig is part of TU9 – the association of Germany's leading Institutes of Technology. The cooperating institutes stand for relevant research, strategic and results-driven thinking and action, committed teaching and the successful transfer of knowledge and technologies to society and industry.

With Ecoversity – Collaborative space for change, TU Braunschweig is focusing on pooling the strengths of our high-performing research region and strengthening the support structures necessary for collaboration. It creates new spaces in research, teaching, administration, and knowledge transfer to enable even more intensive cross-disciplinary and cross-institutional collaboration, as well as to harness synergies between the university and research institutions, society, business, politics, and culture.

The IVS is a small, research-oriented institute with a strong focus on integrated transport planning, traffic engineering, and sustainable mobility. Our size fosters a collaborative and supportive environment with close interaction between students, researchers, and faculty. IVS offers a practice-based curriculum in areas such as traffic simulation, public transport planning, mobility data analysis, and street space design. In research, the institute develops data-driven methods for traffic analysis, travel demand forecasting, and the simulation of innovative mobility solutions, with a particular emphasis on agent-based models and the use of floating car data. Close cooperation with cities, public authorities, and industry ensures both practical relevance and real-world impact.

Further Notes

We welcome applicants of all nationalities. At the same time, we welcome the interest of severely disabled people and give preference to their applications if they are equally qualified. Please indicate this in your application and enclose proof. Furthermore, we are working to fulfill the equality mandate based on the Lower Saxony Equal Opportunities Act (NGG) and are striving to reduce underrepresentation as defined by the NGG in all areas and positions. We are therefore particularly pleased to receive applications from women.

As part of the application, we expect a proposal of one to max. three pages (plus references) outlining an idea for a PhD project related to the research aims of ReSpace! The application deadline for the doctoral positions will be mid-August 2025. Interviews are scheduled for September 2025. Acceptances are expected to be sent out by mid-September 2025. The position will start on October 15th, 2025.

The personal data will be stored for the purpose of processing the application. By submitting your application, you agree that your data may be stored and processed electronically for application purposes in compliance with data protection regulations. Further information on data protection can be found in our privacy policy at www.tu-braunschweig.de/datenschutzerklaerung-bewerbungen. Application expenses cannot be refunded.

Please send your complete application as a single PDF file to:

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https://www.tu-braunschweig.de/en/ivs

We look forward to your application!