TUD Dresden University of Technology, as a University of Excellence, is one of the leading and most dynamic research institutions in the country. Founded in 1828, today it is a globally oriented, regionally anchored top university as it focuses on the grand challenges of the 21st century. It develops innovative solutions for the world’s most pressing issues. In research and academic programs, the university unites the natural and engineering sciences with the humanities, social sciences and medicine. This wide range of disciplines is a special feature, facilitating interdisciplinarity and transfer of science to society. As a modern employer, it offers attractive working conditions to all employees in teaching, research, technology and administration. The goal is to promote and develop their individual abilities while empowering everyone to reach their full potential. TUD embodies a university culture that is characterized by cosmopolitanism, mutual appreciation, thriving innovation and active participation. For TUD diversity is an essential feature and a quality criterion of an excellent university. Accordingly, we welcome all applicants who would like to commit themselves, their achievements and productivity to the success of the whole institution.

At the Faculty of Electrical and Computer Engineering, Institute of Communication Technology, the Deutsche Telekom Chair of Communication Networks offers a project position under the BMWK project DymoBat as

**Research Associate (m/f/x)**
(Subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

Starting **January 1, 2024**. The position is limited until September 30, 2026. The period of employment is governed by § 2 (2) Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

The purpose of this project is to increase the use of renewable energies to reduce CO₂ emissions. This goal faces multiple challenges, both on the user and utility side (e.g., demand-supply balancing, use of energy storage, etc.). By extending 5G-based ultra-reliable and low-latency communications, with new technologies such as IoT remote monitoring infrastructures, wireless mesh networking and AI models, and bidirectional EV charging (V2G), the energy system as a whole can be optimized. This will enable a significant increase in the share of renewable energy in future energy systems. In this context, ComNets leads the efforts in network-level optimization. The project will be carried out in cooperation with industrial partners and the City of Dresden. TUD is project leader.

**Tasks:** The successful candidate will join a team working on developing and implementing a combined network communication and load management solution for V2x applications. The goal is to use the storage capacity of BEVs to stabilize the power network and optimize internal power consumption after the meter for large industry plants to small households (V2H). Machine learning approaches will be used in the project DymoBat, funded by the German Federal Ministry of Economic Affairs and Climate Action.

Under the assumption of two-way charging operations between electric cars and the power grid, a decentralized combined approach for communication network cells and electric micro/small cells, will enable mobility of the future, including mobility of people, energy and communication. The envisioned dynamic control of the two-way charging networks and the communication networks can, for example, be tackled using multi-agent reinforcement learning. To ensure seamless compliance with the requested quality of service of all users, a predictive engine may also be part of the overall system. All parts of the charging and communication networks will be covered, especially the communication interfaces between electric cars, charging points and the decentralized charging point and communication management instances. The project leaves much space for creativity and the implementation of the candidates’ interests.
A successful candidate will be required to perform the following tasks:

- design, build up, attach and optimization a testbed at TU Dresden for proof-of-concept studies for intelligent load management using current and future real-time communication technologies
- carry out research in combining and converging energy and communication networks, including 5G campus networks, mesh networks, artificial intelligence for charge point and communication network optimization
- design of a combined power and communication network simulator, that will be integrated into real systems and testbeds
- collaborate with colleagues at TUD and with industry partners
- disseminate results through scientific publications in the top-tier venues
- present results in top-tier international conferences and workshops.
- The position may also include minor teaching duties and/or contributions in the development of new research proposals.

Requirements:

- The candidate should possess a university degree (e.g. master’s degree) in electrical engineering, telecommunication engineering, computer science, or equivalent.
- The ideal candidate should have knowledge and experience in several of the following topics:
  - Wireless communications, in particular in the context of 5G and mesh networks.
  - Usage of embedded Systems in application scenarios
  - An understanding of load management for electric cars is beneficial towards understanding the larger picture of the project, but not required.
- Good programming skills are required. Highly relevant programming languages are Python, JAVA, and C++.
- Fluent written and verbal communication skills in English are required.
- Basic written and verbal communication skills in German are helpful.

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 and offers a Dual Career Service. 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 **October 11, 2023** (stamped arrival date of the university central mail service or the time stamp on the email server of TUD applies), preferably via the TUD SecureMail Portal [https://securemail.tu-dresden.de](https://securemail.tu-dresden.de) by sending it as a single pdf file to karin.domel@tu-dresden.de or to: TU Dresden, Fakultät Elektrotechnik und Informationstechnik, Institut für Nachrichtentechnik, Deutsche Telekom Professur für Kommunikationsnetze, z. H. Frau Karin Domel, 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.

**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](https://tu-dresden.de/karriere/datenschutzhinweis).