Chair of Theoretical Information Technology
Department of Electrical and Computer Engineering
Technical University of Munich

The Chair of Theoretical Information Technology has an immediate opening for a

Bachelor/Master Thesis, Research Internship, IDP: Practical Transmission Schemes for 6G Sensing-Assisted Secure and Robust Communication

Within the 6G-life project, transmission systems that go beyond Shannon's communication approach are to be developed, in order to achieve a more secure, efficient, and resilient communication in novel 6G systems. It has been shown that transceiver architectures employing an additional sensing unit along with traditional communication aid in achieving these objectives. Our goal is thus to propose and implement practical schemes, which we subsequently demonstrate using our setup of mobile robots and unmanned aerial vehicles (UAVs). For this, key technologies such as multi-user-MIMO (MU-MIMO), machine learning, software-defined radio (SDRs), and distributed control are indispensable.

Content of the project and areas of responsibility

- Improvement of an MU-MIMO system model with integrated sensing functionality.
- Translation of information-theoretical concepts of security and robustness into operational ones.
- Identification of design variables and metrics, as well as solving the arising optimization problems.
- Empirical validation of resulting theory and methods by simulations.
- Practical implementation of proposed methods in National Instruments (NI) software-defined radios and integration into our mobile robots.

Your qualifications

- Currently enrolled in electrical engineering, communications engineering, computer science, physics, or similar.
- Good knowledge in at least one of the following subjects: MU-MIMO communications, radar system design, statistical signal processing, information theory, convex optimization, and machine learning.
- Hands-on programming skills in one of the following languages: MATLAB, Python, and C/C++.
- Familiarity with Linux systems, software-defined radios, and communication standards (LTE, 5G-NR) is a plus.
- Goal-oriented, independent, and structured work style

To apply just send an e-mail to vlad.andrei@tum.de with the subject “6g-edge”. Make sure to add your latest transcript of records and a short description of yourself!

General Information

TUM is aiming to increase the number of women employees, and applications from women are expressly welcomed. People with disabilities, with essentially the same suitability and qualification, will be preferred. As you apply for a position at the Technical University of Munich (TUM), you provide personal data. Please note our data protection information according to Art. 13 Data Protection Basic Regulation (DSGVO) on the collection and processing of personal data in connection with your application http://go.tum.de/554159. By submitting your application, you confirm that you have taken note of the data protection information of the TUM.

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Chair of Theoretical Information Technology
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Theresienstrasse 90, 80333 Munich
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