Faculty of Electrical and Computer Engineering

At the Institute of Communication Technology, the Deutsche Telekom Chair of Communication Networks, the 6G-life Research-Hub „Digital transformation and sovereignty of future communication networks“ offers, subject to the availability of resources, three positions as

Research Associate

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

starting as soon as possible. The positions are initially limited for three years with the option of extension subject to the availability of resources. The period of employment is governed by the Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG). The position offers the chance to obtain further academic qualification (e.g. PhD).

Position 1:
Task: We seek applications for a PhD position in Quantum Technologies for low latency 6G communications. Low latency will be a critical key performance indicator (KPI) in future 6G communication networks. In particular, these networks will employ massive distributed storage and computing resources for network management and operations. In this context, Network coding was demonstrated to improve latency, security, and sustainability through recoding techniques. Recoding can also be implemented through softwareization. However, virtualized environments will generate additional latencies. Quantum resources and technologies have been identified as an optimal means to distribute and handle shared randomness.

The successful candidate will have to investigate the possibility of latency optimization by quantum entanglement creation and distribution for random linear network coded communication environment. For example, the shared randomness obtained via entanglement distribution could target the reduction of the communication overhead generated by sending the coding coefficients. The investigation will deal with metrics like entanglement fidelity and entanglement source quality. Moreover, the study of the trade-offs of different entanglement sources will help in providing an effective integration between network coding and the quantum physical-link layer.

Requirements: university degree (Diploma/Master) in electrical or electronic engineering, telecommunications engineering, computer science, physics or equivalent; knowledge of quantum mechanics and/or network coding. Candidates should be proficient in English and have good oral and written communication skills. Former experience with Matlab, C programming language is recommended.

Position 2:
Task: We seek applications for a PhD position in Quantum Technologies for network synchronization. Network synchronization is fundamental for secure and efficient network operations. Currently, the principal method for network synchronization in classical communication networks is described by the IEEE 1588 standard called Precision Time Protocol (PTP). This network synchronization protocol synchronize network nodes by exchanging frames. Due to the inherent and variable delays in routing and the losses of frames in communications, the synchronization between sender and receiver can achieve limited accuracy. Moreover, network softwareization adds an additional layer of imprecision in the synchronization.

Requirements: university degree (Diploma/Master) in electrical or electronic engineering, telecommunications engineering, computer science, physics or equivalent; knowledge of quantum mechanics and/or network coding. Candidates should be proficient in English and have good oral and written communication skills. Former experience with Matlab, C programming language is recommended.
The successful candidate will have to focus on the design of advanced network synchronization protocols based on quantum technologies to go beyond the precision of classical protocols. This will be fundamental for the management and operations of future 6G communication networks. In fact, precise and reliable network synchronization is necessary for all the layers of the protocol stack and especially in the context of ultra-reliable low-latency communications.

Requirements: university degree (Diploma/Master) in electrical or electronic engineering, telecommunications engineering, or physics. Candidates should be proficient in English and have good oral and written communication skills. Good knowledge of experimental physics, quantum mechanics, and programming, is recommended.

Position 3:
Task: The successful applicant will be involved in research activities in the area of Post-Shannon communication. You will cooperate with our team researching and implementing on real testbeds and emulators the results of your research. You will work on novel theory and codes for Post-Shannon communication. This involves but is not limited to message identification, semantic communication, goal oriented communication, common randomness generation, and physical layer service integration. The philosophy of our team is “Research that matters.” Therefore, you are expected not only to work on pure theory, but also program and deploy in our Software Defined Radio (SDR) testbeds your own research as well as the result of cooperative research with other members of our team.

Requirements: university degree (Diploma/Master) in electrical or computer engineering; knowledge of the basic principles of communication networks, network coding and their mathematical foundations; english in spoken and written; ability and willingness to work independently, conceptually and scientifically; interest in practice-oriented, interdisciplinary cooperation with partners from research and industry; programming knowledge (Matlab, Python, C, C ++). Knowledge of german is desirable. Knowledge in the area of energy-efficient communication or storage of information is also helpful.

More details about the 6G-life Research-Hub are given under www.6g-life.de
Applications from women are particularly welcome. The same applies to people with disabilities. Please send your application documents until September 10, 2021 (stamped arrival date of the university central mail service applies) preferably via the TU Dresden SecureMail Portal https://securemail.tu-dresden.de by sending it as a single pdf document to recruitment.6glife@tu-dresden.de with the reference „6G_Fitzek_Position…” (as given above) in the subject header or to: TU Dresden, Fakultät Elektrotechnik und Informationstechnik, Institut für Nachrichtentechnik, Deutsche Telekom Professur für Kommunikationsnetze, Prof. Dr.-Ing. Dr. h.c. Frank H. P. Fitzek, Helmholtzstr. 10, 01069 Dresden. 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://tudresden.de/karriere/datenschutzhinweis