



Network & control: PhD job offer

Learning-based wireless resource management for distributed control in cyber-physical systems

Control applications become more and more distributed and comprise larger and larger number of entities – cyber-physical systems such as multi-agent robots, SmartGrid or cooperating autonomous vehicles bear witness to this trend. In such large-scale, distributed control, sensor/actuators on one hand and actual controllers on the other hand are not collocated and can often only communicate over wireless links. But doing control over notoriously error-prone, time-varying wireless links is still a challenge.

The project "Network-Informed Control, Control-Informed Networking" (NICCI, <https://cs.uni-paderborn.de/cn/research/research-projects/active-projects/nicci/>) addresses these challenges. It is part of the German Science Foundation's Priority Program "Cyber-Physical Networking" (SPP 1914, <http://www.cpn.itr.ei.tum.de/home/>). It is a collaborative effort between the control groups of Paderborn University (Prof. Daniel Quevedo) and Magdeburg University (Prof. Rolf Findeisen) and the Computer Networks group of Paderborn University (Prof. Holger Karl). The current position is hosted at the Computer Networks group, part of the Institute of Computer Science of Paderborn University.

NICCI's core idea is to improve the interaction between a distributed control system and the wireless resource management system. In particular, we are looking into learning techniques to find compact representation of a wireless channel's capabilities over short time horizons and derive best-possible decisions which transmissions should be undertaken between controllers, sensors, and actuators.

This **full-time position is currently fully funded** for at least two years (extension possible pending grant decisions) at the E13 pay scale of German universities; this corresponds to a starting salary of about 2100€ per month after taxes, insurances, and benefit. It is expected that work in this project leads to publications in internationally leading venues and completes with a PhD degree.

Paderborn University is a medium-sized German university; it's Institute of Computer Science is commonly considered to be among Germany's best ones. Paderborn is a small, safe city in the middle of Germany with very reasonable costs of living.

A successful application must hold a Master degree in Computer Science or a related area (e.g., Computer Engineering) and have very good knowledge about wireless systems and programming (e.g., Python or Matlab). Experience in control, learning, or algorithm design is a plus; willingness to work in an interdisciplinary context between networking and control is required. In addition, very good general communication skills in general and English skills in particular are necessary (knowledge of German is helpful in daily life, but not required).

For all questions or to send your application documents, please contact Prof. Holger Karl by email (holger.karl@upb.de), mentioning NICCI in the subject.