Four PhD students in fiber-optical communication theory

Research project

The rapid increase in data traffic will lead to capacity exhaust in the optical fiber communications infrastructure, which carries over 95% of all data services. The optical fiber channel is nonlinear, that is, its properties depend on the transmitted signal intensity, which limits the achievable data rates over long distances. This research project aims to develop nonlinear modulation, coding, and detection methods, tailored to the nonlinear channel, to dramatically improve the data throughput of future communication networks.

The project, called Coding for Optical communications In the Nonlinear regime (COIN), is organized as a European Marie Skłodowska-Curie Innovative Training Network (ITN). It is a collaboration project between University College London (UCL) in the U.K., Chalmers University of Technology in Sweden, Alcatel-Lucent Bell Labs in Germany, and University of Toronto in Canada. Four PhD students will be recruited, two at UCL and two at Chalmers. All four will spend approximately half their time at Bell Labs in Germany. More information about the project can be found in http://www.coinproject.eu

Research environments

Founded in 1994, the Optical Networks Group (ONG) at UCL is a world-leading research group in optical communication systems and networks. The current research themes include the design of optical network architectures, wavelength routing algorithms, nonlinear optics, advanced digital signal processing and techniques for achieving high-capacity optical transmission. ONG, now over 25 strong, has excellent experimental research facilities, including a terabit/s recirculating fibre loop transmission & network test-bed as well numerous academic and industrial collaborations world-wide, including the current EPSRC Programme Grant UNLOC (http://www.unloc.net).

The Communication Systems Group at Chalmers applies tools from signal processing, information theory, and coding theory to develop methods for wireless and optical communications. It is the largest group in Sweden in its field and well recognized internationally. As PhD students in the COIN project, you also belong to a strong team of researchers in the FORCE research center (http://chalmers.se/force). This center brings together researchers in communications and photonics to solve hard problems in optical communications through a cross-disciplinary approach. The collaboration bridges traditional discipline boundaries and includes the whole chain from components to system, from analysis to experiments.

At Alcatel-Lucent Bell Labs, you will be part of the High Speed Systems & Processing group within the IP Transport research program. You will collaborate with Bell Labs researchers that offer a unique mixture of fundamental research skills and practical insight into real-world problems. You will have access to a powerful computation cluster and an optical lab with extensive measurement hardware and several optical fiber transmission link test-beds.

Position summary

Four positions as PhD students are open at UCL and Chalmers. Full-time temporary employment is offered, with a competitive monthly salary, limited to a maximum of four years. The starting date is in the beginning of 2016, somewhat flexible.

Your major responsibility as PhD student is to pursue your own doctoral studies. You are expected to develop your own scientific concepts and communicate the results of your research in major journals and conferences. Most of the research will be conducted in cross-disciplinary teams. After completing PhD studies in a European ITN, you will be in great demand from industry, and you will have an excellent basis for further academic research as well.

Candidates with any nationality are welcome to apply. However, due to the ITN regulations, which promote mobility, candidates with a U.K. Master's degree are not eligible to the positions in the U.K, and candidates with a Swedish Master's degree are not eligible for the positions in Sweden.

Qualifications

A suitable background for this position is a Master of Science degree in Applied Mathematics, Engineering Physics, Electrical Engineering, or equivalent. High grades in the core courses are required. Skills in mathematical analysis are essential, particularly transforms, probability, and differential equations. Experience in optical communications is not required, but you should have an interest in applying your skills to optical systems.

Candidates must be creative and have the ability to work in an interdisciplinary, international team, present their ideas and results to researchers with different backgrounds, and be open for the application of results. Good communication skills and fluency in English are essential, as are good programming skills. Previous experiences in research, publications, and teaching are also advantageous.

Application procedure

To apply, visit http://www.coinproject.eu and follow the links. There are different online application portals for the positions at UCL and Chalmers. You may apply to both if you are interested. Send all the required documents and information, in the prescribed format.

Applications sent by email will not be considered.

Links

- COIN project
- Optical Networks Group at UCL
- Communication Systems Group at Chalmers
- Alcatel-Lucent Bell Labs, Germany
- Communications Group at the University of Toronto, Canada

Keywords: Applied mathematics, channel coding, communication networks, communication systems, detection and estimation, digital communications, eigenvalue communications, error-correcting coding, fiber-optical communications, Horizon 2020, information theory, modulation, nonlinear Fourier transform, nonlinear interference, nonlinear transmission, open position, optical fiber, optimization, Ph.D. student, signal processing, solitons, telecommunications.