

Call for Papers for Selected Areas in Communications Symposium

Molecular, Biological, and Multi-Scale Communications Track

Symposium Track Chair

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Scope and Motivation

As a result of recent advances in MEMS/NEMS and systems biology, as well as the emergence of synthetic bacteria and lab/process-on-a-chip techniques, it is now possible to design chemical “circuits”, custom organisms, micro/nanoscale swarms of devices, and a host of other new systems at small length scales, and across multiple scales (e.g., micro to macro). This success opens up a new frontier for interdisciplinary signaling techniques using chemistry, biology, novel electron transfer, and other principles not previously examined. This track is devoted to the principles, design, analysis, and implementation of signaling and information systems that use physics beyond conventional electromagnetism, particularly for small-scale and multi-scale applications. This includes: molecular, quantum, and other physical, chemical, and biological (and biologically-inspired) techniques; as well as new signaling techniques at these scales. As the boundaries between communication, sensing and control are blurred in these novel signaling systems, research contributions in a diversity of disciplines are invited.

Main Topics of Interest

Original research articles on **biological, molecular, and multi-scale communication** are solicited in, but not limited to, the following areas:

- Modulation, detection, and estimation
- Mathematical modeling of biological, molecular, and multi-scale communication
- Channel modelling, including diffusion, flow, active transport, biological, and microfluidic channels
- Biological, molecular, and multi-scale networking
- Nanosensor networks
- Components of biological, molecular, and multi-scale communication systems
- Implementation, laboratory experiments, and testbeds

- Molecular, DNA, and nano computing
- Systems biology and biological circuits
- Analysis and control of biological systems
- Information/communication theoretical tools for biological systems
- Unconventional electromagnetism for small or multi-scale applications
- Experiment-based studies on information processes and networks in biology
- Industrial applications

Submissions to IEEE Transactions on Molecular, Biological and Multiscale Communications

The authors of selected accepted papers of this symposium will be invited to submit an extended version of the paper to the **IEEE Transactions on Molecular, Biological and Multiscale Communications**. For these extended papers a fast-track review process will be ensured.

Biography of Robert Schober

Robert Schober (S'98, M'01, SM'08, F'10) received the Diplom (Univ.) and the Ph.D. degrees in electrical engineering from Friedrich-Alexander University of Erlangen-Nürnberg in 1997 and 2000, respectively. Since May 2002 he has been with the University of British Columbia (UBC), Vancouver, Canada, where he is now a Full Professor. Since January 2012 he is an Alexander von Humboldt Professor and the Chair for Digital Communication at the Friedrich Alexander University (FAU), Erlangen, Germany. His research interests fall into the broad areas of Communication Theory, Wireless Communications, and Statistical Signal Processing.

Dr. Schober received several awards for his work including the 2002 Heinz Maier-Leibnitz Award of the German Science Foundation (DFG), the 2004 Innovations Award of the Vodafone Foundation for Research in Mobile Communications, the 2006 UBC Killam Research Prize, the 2007 Wilhelm Friedrich Bessel Research Award of the Alexander von Humboldt Foundation, the 2008 Charles McDowell Award for Excellence in Research from UBC, a 2011 Alexander von Humboldt Professorship, and a 2012 NSERC E.W.R. Steacie Fellowship. In addition, he has received several best paper awards for his research. Dr. Schober is a Fellow of the Canadian Academy of Engineering and a Fellow of the Engineering Institute of Canada. From 2012 to 2015, he served as Editor-in-Chief of the IEEE Transactions on Communications and since 2014, he is the Chair of the Steering Committee of the IEEE Transactions on Molecular, Biological and Multi-scale Communication. Furthermore, he is a Member-at-Large of the Board of Governors of the IEEE Communications Society.