



**IEEE Global Communications
Conference**
9-13 December 2018
Abu Dhabi, UAE
Gateway to a Connected World



Call for Papers

Selected Areas in Communications Symposium

Track on Molecular, Biological and Multi-Scale Communications

Symposium Track Chair

Tadashi Nakano, Osaka University, Japan

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 communications, 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 are solicited in, but not limited to, the following areas concerning molecular, biological and multi-scale communications:

- Modulation, detection and estimation techniques
- Channel modeling and capacity analysis
- Modelling and performance evaluation of passive and/or active diffusion-based communication systems
- Synchronization, routing and other higher layer techniques
- Design and architecture of molecular, biological and multi-scale communication systems



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- Mobility control and management of molecular, biological and multi-scale communication systems
- Interfaces for molecular, biological and multi-scale communication systems
- Collective behavior of molecular, biological and multi-scale communication systems
- Novel applications of molecular, biological and multi-scale communication systems
- Computer simulations, mathematical modelling and analysis
- Implementation, laboratory experiments and testbeds
- Lab-on-a-chip, microfluidics and MEMS/NEMS
- DNA, molecular, chemical and nanoscale computing
- DNA storage and molecular memory
- Unconventional electromagnetism for small or multi-scale applications
- Information and communication theoretical approaches to biological systems
- Synthetic biology and systems biology