



## Call for Papers for Symposium on Selected Areas in Communications *Molecular, Biological and Multi-Scale Communication Track*

### **TRACK CHAIR:**

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### **SCOPE AND MOTIVATION:**

Nano and bio technologies have not only increased our understanding of molecular and biological processes and their emergent role at different scales, but also enabled their engineering. The study of how information is represented and propagates in these processes, joined by advances in nanomaterial engineering, synthetic biology, and lab-on-a-chip, to name a few, is inspiring the design of new communication systems that operate in these domains. In particular, tools are being developed to engineer biochemical circuits, synthetic cells, swarms of devices, and many other systems at “small” length scales, *i.e.*, nanoscale to microscale, which interact and affect with systems at these and larger scales. Utilizing these tools to engineer or re-engineer communications for such systems could facilitate a wave of revolutionary and interdisciplinary applications in fields from manufacturing and sensing to precision and personalized medicine.

This track is devoted to the principles, design, analysis, implementation, and control of signaling and information systems that rely on substrates beyond conventional telecommunications, particularly based on (or crossing domains with) biological processes, chemical processes, and physics at the sub-micro scale, with consequent peculiar characteristics or features. These include: molecular communication (through/with natural or man-made systems), unconventional electromagnetic communications (e.g., terahertz), cross-domain communications (e.g., electrochemistry, electrogenetics, ionic currents, etc.); novel signaling techniques to revolutionize communication at these scales; and applications of communication and information theory to the analysis of biological/biochemical and nanoscale systems. In recognition of the interdisciplinary nature of this track, contributions from a diversity of disciplines are strongly encouraged.

### **TOPICS OF INTEREST:**

Original research articles are solicited in, but not limited to, the following topics of molecular, biological, or multi-scale communications:

- Active or passive transport molecular communication (e.g., diffusion, flow, microfluidic, motor-assisted)
- Molecular MIMO

- Mobile nanonetworking
- Biological data storage and computing (e.g., DNA)
- Biochemical or biophysical signalling and computing
- Communication between and within natural and/or synthetic organisms
- Neuronal signalling or interfacing with neurons
- Synthetic or systems biology
- Unconventional electromagnetism for small or multi-scale applications (*e.g.*, Terahertz-based wireless)

Submissions are expected (without limitation) to make contributions in at least one of the following areas:

- Channel modelling or characterization
- Computer simulation methods
- Information-theoretic analysis
- Interface and control between communication systems in different physical/chemical domains
- Laboratory experiments or testbeds
- Standards and datasets
- Synchronization, routing, and other higher layer communication techniques
- Transmitter and receiver design or analysis, including modulation, detection, estimation, and coding techniques

#### **IMPORTANT DATES:**

**Deadline for paper submission:** 11 October 2021

**Date for notification:** 18 January 2022

**Deadline for final paper submission:** 15 February 2022