



June 8 - 12, 2025// Montreal, Quebec, Canada

Communications Technologies 4Good

Call for Papers and Proposals

SAC Symposium: Molecular, Biological, and Multi-Scale Communications

Co-Chairs

- Maximilian Schäfer, Germany. max.schaefer@fau.de
- Dimitrios Makrakis, Canada. dmakraki@uottawa.ca

Scope and Motivation

New communication systems are approaching the possibility of interacting with biological processes using molecules, paving the way to the interface with digital systems, and establishing an exciting area in telecommunications. Since information representation using molecules, as well as their propagation and control, are ongoing studies, novel solutions for molecular communication (MC) systems are required while integrating nanobio technologies, natural/synthetic biology and nanomaterial engineering. This new communication technology is expected to facilitate diverse interdisciplinary applications in various sectors including industry, agriculture, environmental monitoring and medicine. One of the most exciting applications of MC in the medical sector is the Internet of BioNanoThings (IoBNT), which extends beyond conventional health monitoring by establishing in-body MC networks that connect organs and cells to the Internet, enabling real-time observation of their status and the targeted delivery of drugs for personalized therapy. Other significant and fast evolving areas are those of brain-machine interface and neuro-prosthetics. Additionally, the need for less detrimental environmental effects may allow further exploration of biological communications in the pharma industry investigating the optimization of drug delivery, discovery and development.

The IEEE ICC MBMC track is focused on showcasing the most recent exciting contributions in the molecular, biological and multi-scale communications. We are seeking contributions in molecular communication systems applicable to biological, chemical, and sub-micro physical domains. Applications of biological communications are also welcomed including, but not limited to the areas of biomedical sciences, biotechnology, bioengineering, synthetic biology, medical diagnostics and treatment. Both theoretical and experimental areas are welcomed. In recognition of the interdisciplinary nature of this track, contributions from a diversity of disciplines are strongly encouraged.

Selected papers will be fast tracked to IEEE Transactions on Molecular, Biological, and Multi-scale Communications.

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)
- Mobile molecular communications and molecular MIMO
- Biological data storage and computing (e.g., DNA, ions)
- Biochemical or biophysical signaling and computing
- Communication between and within natural and/or synthetic organisms
- Neuronal signaling and interfacing with neurons
- Intra-body communication systems using neurons, cardiac cells, and other body cell types
- Information theoretical analysis and semantic molecular communication
- Synthetic or systems biology
- Internet of BioNanoThings and bio-cyber interfaces
- Bio-optical communications and bio-sensing

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

- Channel modelling, characterization and simulation methods
- Laboratory experiments and testbeds: ranging from inorganic to organic compounds
- Interfacing and control between communication systems in different physical/chemical domains
- Synchronization, routing, and other higher layer communication techniques
- Transmitter and receiver design or analysis, including modulation, detection, estimation, and coding techniques
- Performance analysis methodologies

Important Dates

Paper Submission Deadline:	11 October 2024
Acceptance Notification:	17 January 2025
Camera-Ready:	14 February 2025

Biographies of the Co-Chairs

Maximilian Schäfer is a Postdoctoral Researcher at the Institute for Digital Communications at FAU Erlangen-Nürnberg, Germany. His research is focused on multidimensional systems theory with applications in the modeling and design of molecular communication systems. He has given several invited talks and tutorials on the modeling of molecular communication systems. He has received a fellowship for his research on the Internet of BioNanoThings from the Bavarian Research Institute for Digital Transformation (bidt) and the Bavarian State Ministry for Science and Art, and received the Best Paper Awards at the 9th ACM International Conference on Nanoscale Computing and Communication (2022). Maximilian also serves as a Steering Committee Member of the Workshop on Molecular Communications and as the Educational Services Coordinator of the Technical Committee “Molecular, Biological and Multi-Scale Communications” of the IEEE Communications Society.

Prof. Dimitrios Makrakis is currently with the School of Electrical Engineering and Computer Science (EECS) of the University of Ottawa and is the founding Director of the Broadband and Wireless Research Laboratory (BroadWIRLab) and the Bio-Communication and Nano-Networks Research Laboratory (Bio-Comm-NetLab). He is member of the Montreal Blockchain Laboratory. During his tenure at faculty member at the University of Western Ontario, he founded and directed the Advanced Communications Engineering Center (ACEC); an advanced telecommunications research facility, established by the joint support of Western University, Bell Canada and Bay Networks. He has published over 300 research articles in reputable journals and conferences, holds patents, co-authored book chapters, and has contributed to ITU’s standardization initiatives. His current research evolves around the subjects of Nano-Communications and Nano-Networks, Blockchain theory and applications, Cyber-Security and Wireless Networks.

How to Submit a Paper

All papers for technical symposia should be submitted via EDAS. Full instructions on how to submit papers and important deadlines are posted at <https://icc2025.ieee-icc.org/>