

CALL FOR PAPERS
IEEE COMMUNICATIONS MAGAZINE

FEATURE TOPIC: NANO-NETWORKING FOR NANO-, MICRO-, AND MACRO-SCALE APPLICATIONS

BACKGROUND

Recent advances in the fields of bioengineering and nanotechnology have resulted in various applications via the emergence of tiny devices that can perform sensing and actuation. Yet, the driving applications (e.g., efficient lab-on-a-chip applications, artificial immune system, targeted and coordinated drug delivery, and continuous health monitoring) require coordination and communication of nodes at small scales. There is a growing interest towards fulfilling these requirements. However, establishing a reliable communication link between tiny objects is still an open problem. Two main approaches are adopted in the literature for nano-scale communication solutions: molecular (a.k.a. wet) and terahertz (a.k.a. dry) communication.

During the last decade, many studies on the theoretical analysis of such wet and dry communication systems at small scales (i.e., nanonetworks) have been conducted. However, there are still many open issues regarding channel modeling, capacity estimation, modulation design, and transmitter/receiver design. Moreover, molecular communication research has potential to shed light on studies of pandemics, e.g. the one caused by the SARS-CoV-2 virus, through the lens of communication and information theory domain. This could be through studies on virus propagation, algorithms for testing strategies, etc. contributing to the epidemiology and virology fields.

For macro-scale applications, there are areas where traditional electromagnetic (EM) waves are hindered, e.g., since these traditional systems would experience heavy path loss. The reliability of molecular signals can be higher than that of EM waves in such challenging environments, e.g., under-water communications or networks of tunnels/pipelines. In addition, wet communication systems can be used for multi-scale applications and/or problems at different scales. Examples of wet communications systems that are observed in multi-scales include: chemical signals that are used for inter/intra-cellular communications at micro-scales, pheromone-based communication systems that are used for long range communication between members of the same species, and virus transmission via aerosol propagation that can be modeled from a communication perspective.

Motivated by the potential of wet and dry communication systems to shape the applications of nanotechnology and multi-scale applications, this Feature Topic (FT) aims to identify critical technology gaps regarding transmitter/receiver design and the transfer of nanonetworking to the application domain.

This FT aims to provide a platform for academia, industry, and government to present their latest research results and ongoing projects. We invite submissions in areas including (but not limited to) the following topics:

- Modulation and coding techniques for wet and dry communications at multi-scales
- Transmitter and receiver design
- Testbeds and future application studies, particularly for pandemic scenarios
- Simulation tools and capabilities of simulators for wet and dry communications at multi-scales
- Energy models and energy efficiency of nanonetworking systems
- Machine learning techniques for such communication systems
- Standardization efforts for wet and dry communications at multi-scales
- Infectious disease transmission via aerosol propagation: a look from the communication and information theory perspective
- Communication studies on virus diffusion, algorithms for testing strategies, etc. contributing to the epidemiology and virology fields

SUBMISSION GUIDELINES

Manuscripts should conform to the standard format as indicated in the Information for Authors section of the Manuscript Submission Guidelines. Please, check these guidelines carefully before submitting since submissions not complying with them will be administratively rejected without review.

All manuscripts to be considered for publication must be submitted by the deadline through Manuscript Central. Select the "May2021/NanoNetworking" topic from the drop-down menu of Topic/Series titles. Please observe the dates specified here below noting that there will be no extension of submission deadline.

IMPORTANT DATES

Manuscript Submission Deadline: 1 November 2020, 16:00 pm NYC time (EDT)

Acceptance Notification: 1 February 2021

Final Manuscript Due: 15 March 2021

Publication Date: May 2021

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