

HiCOMB 2017 Keynote Talk

From Molecular Communication and Nano-Networking to Precision Medicine:

A Cyber-Physical Systems Perspective

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Keynote Talk Abstract: Medicine and healthcare will undergo a profound revolution in the 21st century. This talk focuses on the emerging area of molecular communication and nano-networking which targets cell-based therapeutics. Cell-based therapeutics is a key component of precision medicine, i.e. the new paradigm for disease prevention and treatment aimed at providing customized healthcare solutions on a patient-to-patient basis. In recent years, there has been significant progress towards understanding the cellular behavior and controlling individual cells. However, a new perspective able to capture various interactions and emerging behaviors that manifest at population-level is critical to engineer cells behavior, reprogram the cell-cell communication, and develop new strategies that can control the dynamics of population of cells. To this end, we discuss a cyber-physical systems approach that combines the strengths of computational systems biology and emerging single-chip heterogeneous architectures in order to address two of the most important life science challenges of this century, namely microbiome and biofilm dynamics characterization.

Keynote Speaker Biography: Radu Marculescu is a Professor in the Department of Electrical and Computer Engineering at Carnegie Mellon University. He received his Ph.D. in Electrical Engineering from the University of Southern California (1998). He has received multiple best paper awards, NSF Career Award (2000), Outstanding Research Award from the College of Engineering (2013). He has organized several international symposia, conferences, workshops, and tutorials, as well as served as guest editor of special issues in archival journals and magazines. His research focuses on design methodologies for embedded and cyber-physical systems, biological systems, and social networks. Professor Marculescu is an IEEE Fellow.