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Friday, April 6
2:00PM
230A Davis Hall

“Bio-Nano-Machines Communication Systems Inside Cellular Tissues and Their Role in Precision Medicine”

Abstract: Since the early days of life on earth, bio-nano-machines have been organizing themselves with communications mechanisms that allowed the evolution from unicellular systems to multicellular systems. It is now well known that multiple multicellular systems are co-dependently organized to become entire living organisms, and they constitute the main pillar for human life to exist as we know. However, it is not only till recently that we started to understand how this type of communications in the same way we understand communications engineering, named Molecular Communications. This field is composed of a plurality of systems that use molecules as information carriers such as the communication inside cellular tissues. Now, bio-nano-machines communication can be not only further understood but engineered to performed increased sensor and actuation tasks. At the same time, the many diseases that alarm world society nowadays are often linked to failures in those communicating biological machines. With this vision, we can use the existing various communication engineering theories and methods to control these communication systems towards developing novel diagnosis and treatment of diseases in the cellular scale, which is the main vision of Precision Medicine. In this talk, I will introduce how these multicellular mechanisms are organized through communications, how diseases can start as molecular communications failures (e.g. Alzheimer's, Parkinson's, and so on), how communication engineers are increasingly contributing to this new research topic, and how molecular communications can create a tremendous impact on Precision Medicine. It is expected that both the advancements in nanotechnology and in molecular communications can one day be finally merged towards the Internet of Bio-Nano-Things, and revolutionize the society we living in.

Bio: Dr. Michael Taynnan Barros is currently an Irish Research Council Government of Ireland Postdoctoral research fellow associated with the TSSG, WIT. He received his Ph.D. in Telecommunication Software at the Waterford Institute of Technology in 2016, M.Sc. degree in Computer Science at the Federal University of Campina Grande in 2012 and B.Tech. degree in Telematics at the Federal Institute of Education, Science and Technology of Paraiba in 2011. He has published over 40 research papers in diverse journals such as IEEE Transactions on Communications, IEEE Transactions on Nanotechnology, and conferences in the area of wireless communications, optical communications, ad-hoc networks, as well as molecular and nanoscale communications. He is also a reviewer for many journals and participated as technical program committee and reviewer for various international conferences. In 2017, he served as the Technical Program Co-chair for the 3rd International Workshop on Nanoscale Computing and Communications (NsCC) held in conjunction with NEW2AN conference, the chair of the 5GPPP Network Management, QoS and Security Working Group and the Chair of the 2nd Network Management, QoS and Security for 5G Networks held in conjunction with the EuCNC. Interests in Molecular Communications, Nanonetworks and 5G Technology for Connected Health. More at: <http://drbarros.com>