Joint Talk with
OSU Artificial Intelligence of Things (AIoT) Seminar Series

Decoding Hidden Worlds: Wireless & Sensor Technologies for Oceans, Health, and Robotics

Fadel Adib
Department of Electrical Engineering and Computer Science
MIT

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Meeting ID: 982 4773 6070
Password: 692193

Abstract: As humans, we crave to explore hidden worlds. Yet, today’s technologies remain far from allowing us to perceive most of the world we live in. Despite centuries of seaborne voyaging, more than 95% of our ocean has never been observed or explored. And, at any moment in time, each of us has very little insight into the biological world inside our own bodies. The challenge in perceiving hidden worlds extends beyond ourselves: even the robots we build are limited in their visual perception of the world. In this talk, I will describe new technologies that allow us to decode areas of the physical world that have so far been too remote or difficult to perceive. First, I will describe a new generation of underwater sensor networks that can sense, compute, and communicate without requiring any batteries; our devices enable real-time and ultra-long-term monitoring of ocean conditions (temperature, pressure, coral reefs) with important applications to scientific exploration, climate monitoring, and aquaculture (seafood production). Next, I will talk about new wireless technologies for sensing the human body, both from inside the body (via batteryless micro-implants) as well as from a distance (for contactless cardiovascular and stress monitoring), paving the way for novel diagnostic and treatment methods. Finally, I will highlight our work on extending robotic perception beyond line-of-sight, and how we designed new RF-visual primitives for robotics - including sensing, servoing, navigation, and grasping - to enable new manipulation tasks that were not possible before. The talk will cover how we have designed and built these technologies, and how we work with medical doctors, climatologists, oceanographers, and industry practitioners to deploy them in the real world. I will also highlight the open problems and opportunities for these technologies, and how researchers and engineers can build on our open-source tools to help drive them to their full potential in addressing global challenges in climate, health, and automation.
Biography: Fadel Adib is an Associate Professor in the MIT Media Lab and the Department of Electrical Engineering and Computer Science. He is the founding director of the Signal Kinetics group which invents wireless and sensor technologies for networking, health monitoring, robotics, and ocean IoT. He is also the founder & CEO of Cartesian Systems, a spinoff from his lab that focuses on mapping indoor environments using wireless signals. Adib was named by Technology Review as one of the world’s top 35 innovators under 35 and by Forbes as 30 under 30. His research on wireless sensing (X-Ray Vision) was recognized as one of the 50 ways MIT has transformed Computer Science, and his work on robotic perception (Finder of Lost Things) was named as one of the 103 Ways MIT is Making a Better World. Adib’s commercialized technologies have been used to monitor thousands of patients with Alzheimer’s, Parkinson’s, and COVID19, and he has had the honor to demo his work to President Obama at the White House. Adib is also the recipient of various awards including the NSF CAREER Award (2019), the ONR Young Investigator Award (2019), the ONR Early Career Grant (2020), the Google Faculty Research Award (2017), the Sloan Research Fellowship (2021), and the ACM SIGMOBILE Rockstar Award (2022), and his research has received Best Paper/Demo Awards at SIGCOMM, MobiCom, and CHI. Adib received his Bachelors from the American University of Beirut (2011) and his PhD from MIT (2016), where his thesis won the Sprowls award for Best Doctoral Dissertation at MIT and the ACM SIGMOBILE Doctoral Dissertation Award.