



# Department of Computer Science

Designing Systems for Collaborative Intelligence in Pervasive Environments

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Hosted by Cristian Borcea

**Date:** Monday, February 6, 2023

**Coffee:** 2:15 PM – 2:30 PM

**Time:** 2:30 PM – 3:30 PM

**Location:** GITC 4402 (4<sup>th</sup> floor Seminar Lecture Hall)

**WebEx Link:** <https://njit.webex.com/njit/j.php?MTID=ma35022bfe370e50f16991574ce590dc8>

<http://cs.njit.edu/seminars>

**Abstract:** The proliferation of ubiquitous technologies (e.g., Internet of Things) and advances in deep learning, together, open opportunities for pervasive environments where humans and such machines can work side by side towards achieving common goals. However, there are two key challenges in realizing such systems in practice. First, constantly requiring humans to explicitly communicate with machines (e.g., verbally) can be cognitively loading. Secondly, resource constraints in terms of power, memory and computation onboard these machines can severely limit their capabilities. In this talk, I will highlight how enabling collaboration, between humans and machines, and among machines, can help overcome these challenges. In the first half of the talk, I will show examples of how passively sensing human behavior and intent through localization and wearable technologies can help build responsive built environments and autonomous systems. In the second half, I will present ComAI, a lightweight architecture that allows a network of cameras, each running lower-end neural networks, to collaboratively improve perception, a key capability for many downstream, vision-based applications. To conclude my talk, I will discuss my future vision for incorporating ubiquitous sensing in both the learning as well as inferencing phases of machines towards creating next generation, human-machine collaborative intelligence.

**Bio:** Kasthuri is a Research Assistant Professor at the Center for Real-time Distributed Sensing and Autonomy (CARDS) at UMBC where she explores solutions to real-world urban problems cutting across ubiquitous computing, applied machine learning, and behavioral insights. Drawing on experiences from both system and human-centric aspects of technology, she designs systems that support lightweight sensing, processing and communication across a broad range of resource-constrained platforms. Her research has featured in several top-tier CS venues including ACM IMWUT/UbiComp, ACM MobiSys, and IEEE INFOCOM. Kasthuri received her Masters in Computing at the National University of Singapore. She received her B. S. Eng. in Electronics and Telecommunication Engineering from University of Moratuwa. She was recognized as a EECS Rising Star (2020), Finalist of the UbiComp Gaetano Borriello Student Award (2019), and a recipient of the Google Women Techmaker Scholarship (APAC, 2017). More information about Kasthuri and her work can be found on her website: <https://kjayarajah.github.io/>.