SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
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Area: Control, Intelligent Systems & Robotics (CISR), Signal Analysis & Machine Intelligence (SAMI) and Communications & Networks (CN)

Host: Asst Prof Shi Fan

TOPIC	:	**Beyond the Screen: When Physical AI Comes Alive**
SPEAKER	:	**Prof Karthik Ramani** **Donald W. Feddersen Distinguished Professor of Mechanical Engineering** **Professor of Electrical and Computer Engineering, Purdue University, USA**
DATE	:	**Wednesday, 17 June 2026**
TIME	:	**2:30PM-3:30PM**
VENUE	:	**E7-03-09**

ABSTRACT

For centuries, humans have learned and created through their hands and bodies, but our computational tools have often separated us from that embodied intelligence. Now, the convergence of sensors, spatial interfaces, and large visual-language AI models is reconnecting the digital and the physical. My research designs systems where the body becomes the interface for interaction. In this talk, I present three themes from our work on Physical AI: where human experience, spatial computing, and intelligent systems come together to augment physical understanding (perception), authoring (creation), and interaction (action).

First, I will discuss our work on authoring environments that empower non-programmers to easily create immersive extended-reality applications. I will provide examples from hands-on training, production, and education to show how this works. Our system, agentAR and ARify, enables subject-matter experts to author spatial learning experiences using both voice and gesture to create augmented reality (AR) applications with ease. Second, I will highlight our advances in AI design generation that take in human input and generate designs in real time. Our platform, designfromX, SketchConcept, and JustShape, integrates vision and language models to convert verbal prompts and sketches into 3D designs, allowing humans and AI to co-create 3D design models. Third, I will present applications of embodied Physical AI in task performance and skill augmentation. AvaTTar system is an extended reality table tennis-playing coach that fuses coaching with immersive feedback and AgentCoach provides adaptive feedback for motor skill learning from tutorial videos. Building on avaTTar I will present PACE: physics augmented table-tennis-playing humanoid, offering a glimpse into the future of embodied AI. I will end by discussing visuo-haptic interfaces and smart physical tools to train workers in hands-on manufacturing settings.

Together, these systems point to a future where Physical AI enhances how we design, train, and learn, expanding human potential across engineering, production, sports, and beyond. By bridging immersive interfaces and embodied intelligence, we aim to shape a new class of accessible, real-time, and spatially aware engineering systems.

BIOGRAPHY

Karthik Ramani is the Donald W. Feddersen Distinguished Professor of Mechanical Engineering at Purdue University, with additional roles in Electrical and Computer Engineering and the College of Education. He directs the Convergence Design Lab, where his research blends human-centered AI with spatial computing to develop immersive, real-time systems for design, manufacturing, sports, and learning—advancing the vision of *Physical AI*. His work spans augmented interactions, AI-powered skill augmentation, and embodied intelligence for co-creative and production-centric applications. A serial academic entrepreneur, he co-founded VizSeek (the first commercial shape-based search engine) and ZeroUI (CES finalist for robotics). He has published widely across premier venues in AI (NIPS, ICLR), HCI (CHI, UIST), and vision (CVPR, ECCV), and pioneered educational innovations like Purdue's Toy Design course. Ramani earned degrees from IIT Madras, Ohio State, and Stanford, and has held visiting appointments at Oxford, Stanford, PARC, and MIT. He also coaches Purdue's Table Tennis team—where his research and passion intersect in the emerging domain of *Athletic AI*.