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PRESENTS

Distinguished Speaker: Dr. Karthik Ramani
Title: *A New Genre of Human Computer-Interaction Driven Geometric Representations for 3D Creative Design & Fabrication*
Date: Friday, October 6, 2017
Time: 11:00 am
Location: LE 105 (Lecture Hall)

Karthik Ramani
Donald W. Feddersen Professor of Mechanical Engineering
Professor of Electrical and Computer Engineering (by courtesy)
Professor of Education Studies, College of Education (by courtesy)

Karthik Ramani is the Donald W. Feddersen Professor with the School of Mechanical Engineering at Purdue University, with courtesy appointments in Electrical and Computer Engineering and College of Education. He earned his B. Tech from the Indian Institute of Technology, Madras, in 1985, an MS from Ohio State University, in 1987, and a Ph.D. from Stanford University in 1991, all in Mechanical Engineering. He has received many awards from the National Science Foundation (NSF) and other organizations. He has served on the editorial board of Elsevier Journal of Computer-Aided Design (CAD) and the ASME Journal of Mechanical Design (JMD). In 2008, he was a visiting Professor at Stanford University (computer sciences), research fellow at PARC (formerly Xerox PARC), and in Oxford University Institute of Mathematical Sciences in summer, 2016. He also serves on the Engineering Advisory sub-committee for the NSF IIP (Industrial Innovation and Partnerships). In 2006 and 2007, he won the Most Cited Journal Paper Award from CAD and the Research Excellence Award in the College of Engineering at Purdue University. In 2009, he won the Outstanding Commercialization Award from Purdue University. He was the co-founder of the world's first commercial shape-based search engine (VizSeek) and more recently co-founded ZeroUI whose product (Ziro) won the Best of Consumer Electronics Show Finalist (CES 2016). He has won several best paper awards and in 2014 the Outstanding Research Excellence Award from ASME Computers and Information Sciences in Engineering Division.   NSF recently invited him as a distinguished speaker in cyber-learning and engineering maker spaces. In 2015, he won the most cited researcher for 2005-16 in the Elsevier CAD journal. His recent papers have been published in venues such as ACM (SIGCHI, UIST); IEEE (CVPR, ECCV, ICCV, TVCG, VAST), TEL, CAD and ASME JMD.

The convergence of many factors such as low cost sensors, electronics, computing, machines, and more recently machine learning have created the potential for changing the way users engage with the physical world. This talk will explore and demonstrate how we can create new geometric interfaces and interactions that leverage our knowledge of the physical world for 3D design and fabrication. These new methods and tools enable users to personalize designs using new machines. In the first part of the talk, we will explore how any consumer with little knowledge of computers can repurpose everyday objects and or shapes and quickly customize them to foldable constructions.   Such constructions are then used to create robots in the physical world. In the second part, we will see how new interactive workflows using a smart phone and tablets with pen-and-touch interfaces can be used for collaborative 3D design ideation. Because of low thresholds and simple user interactions with lower cognitive loads, users are shown to explore multiple creative pathways. In the last part of the talk, we will examine how a new deep learning technique, "SurfNET", transforms a single image into 3D shapes and even hallucinate shapes that it has not seen.   We envision a future with personalized manufacturing interfaces that lower the barrier for many to participate in the design and fabrication processes.