

Department of Computer Science and Engineering

Presents the Faculty Candidate

Nilanjan Banerjee
University of Arkansas Fayetteville

Self-sustainable Cyber-physical System Design

Renewable energy can enable diverse self-sustainable cyber-physical systems with applications ranging from healthcare to off-grid home energy management. However, there are several challenges that need to be addressed before such systems can be realized. For instance, how do we balance the small and often variable energy budgets imposed by renewables with system functionality? How can we design sensitive physical sensors and efficient harvesting circuits for mW energy sources such as sound and indoor light. For systems such as off-grid homes that interact with human, how do we balance demand and supply while being cognizant to usability needs? In this talk, I will present techniques that address these challenges. Specifically, I will propose a Hierarchical Power Management paradigm that combines platforms with varied energy needs to balance energy consumption and functionality, the design of an efficient harvester for sound scavenging, and the use of sensitive nanowire-based ECG sensors and PVDF film (for pulse wave) to determine pulse transit time (used to measure blood pressure). I will also present a measurement study that reveals the energy management challenges faced by off-grid home residents. Finally, I will conclude with the design of a solar replayer platform that allows immense flexibility in evaluating solar panel driven systems, and works for a wide range of panels.

Bio:

Nilanjan Banerjee is an Assistant Professor in the department of Computer Science and Computer Engineering at University of Arkansas Fayetteville. He graduated with a M.S. and a Ph.D. from the University of Massachusetts at Amherst in 2009 and a BTech. (Hons.) from IIT Kharagpur in 2004. He has won the Yahoo! Outstanding dissertation award at UMass, a best undergraduate thesis award at IIT Kharagpur, and an Outstanding Researcher award at University of Arkansas. He is a 2011 NSF Career awardee and has won three other NSF awards (including the NSF I-Corp grant). His research interests span renewable energy driven systems, healthcare systems, and mobile systems.

Tuesday, February 28, 2012 @ 3:30 PM

Davis 113 A – University at Buffalo - North Campus