Graduate Research Assistant opening for PhD aspirants in Nano Computing and Sensing Lab (NCSL) from Spring 2016 at Department of Electrical and Computer Engineering (ECE) at University of Illinois at Chicago (UIC)

About University of Illinois at Chicago (UIC): The University of Illinois at Chicago is a public research university located near downtown Chicago, Illinois, United States. UIC operates the largest medical school in the United States, and serves as the principal educator for Illinois’ physicians, dentists, pharmacists, physical therapists, nurses and other healthcare professionals. College of Engineering at UIC is relatively new, established in 1946. UIC offers unique opportunities to pursue interdisciplinary research works, especially in the areas of bio-medical applications. Location of UIC in downtown Chicago also offers distinct advantages for research collaboration with industries and other universities in the area. Department of Electrical and Computer Engineering has about 30 faculty, over 450 undergraduate and over 200 graduate students. In 2014, Times Higher Education 100 Under 50 University Rankings (a comparison of universities less than 50 years old) placed UIC in the 3rd position in the U.S. and 13th in the world.

Nano Computing and Sensing Lab (NCSL)

Nano Computing and Sensing Lab (NCSL) will be established in UIC by its program director Amit Ranjan Trivedi at Department of Electrical and Computer Engineering in Spring 2016. Research thrust of the lab is in utilizing nanoscaled conventional and emerging technologies for ultralow power (digital and analog) computing and sensing. The lab will pursue innovations by bridging novel aspects of physics of computing devices and mathematics of computing models and circuits. The lab will host state-of-the-art large scale analog and digital circuit design/measurement equipment. Active collaboration will be pursued with the other faculties at UIC and Argonne National Laboratory to pursue novel nanoscaled device fabrication/characterization while also focusing on large scale circuit and system design aspects.
Bio of the Lab Director:

Amit completed his undergraduate and graduate degree from Indian Institute of Technology (IIT), Kanpur in 2008. Amit was awarded academic excellence award from the institute for his standing in top 5% of his peers. Following this, he was a research staff member at IBM Semiconductor Research and Development Center, where he was involved in compact modeling and characterization of advanced nanometer node transistors/processes. Since, Fall 2010, Amit is pursuing Ph.D. at Department of Electrical and Computer Engineering in Georgia Institute of Technology, where he is expected to complete his studies by August, 2015. His research has been in low power energy-efficient neuromorphic computing with emerging technologies, and particularly, with Tunneling field-effect-transistors. He has published more than 15 journals and major conferences during his PhD studies. Amit was awarded IEEE Electron Device Society fellowship in 2014, where he was one of the three recipients worldwide. Amit was a research intern at IBM T J Watson research center in summer of 2012, and Intel’s Circuit research lab in summer of 2014. Amit will join UIC as tenured track assistant professor in Fall 2015.

Gallery of Major Past Research Projects:


Emerging variability sources in nanoscaled technologies

Future Research Vision:

The first task that we take at NCSL is towards enabling large scale and low power neuromorphic computing. Neuromorphic computing is a set of computing paradigms which are inspired by the functioning of biological brain. Neuromorphic computing follows a profoundly different approach in handling some of the critical (and increasingly prevalent) computing steps e.g. in (supervised/unsupervised) learning and in extracting information from vast amount of data. And, the computing attempts to bring in a brain like intelligence in electronics. Particularly, neuromorphic computing at lower power can unlock opportunities to make our mobile and embedded electronics smarter and more interactive with their user, and therefore significantly improve quality of our lives. Primary approach in our lab to explore higher energy-efficiency and reliability in neuromorphic computing is through a cohesive design of neuromorphic computing circuits/paradigm and computing devices. The lab will be interested to pursue an integrated system comprising conventional and neuromorphic computing. Such an integrated system operates a given computation step on the most suitable computing core, conventional or neuromorphic, for energy efficiency. We are also interested in following a fresh perspective in the development of neuromorphic computing. Following an alternate ‘computing with physics’ approach we seamlessly bridge physics of computing devices and mathematics of computing paradigm to develop highly energy-efficient systems. Exploiting current state of nanotechnology, we are also interested in exploring self-assembled array of nanostructures, such as quantum dots and nanowires, for an ultra large scale neuromorphic computing.

How to apply: I am looking for enthusiastic and creative minds for my ‘Nanoscale Computing and Sensing Lab’ starting at UIC from Spring 2016 onwards. If you have passion for state-of-the-art technologies, craving to make a dent in the research world, attention to details, and ability to work hard, please get in touch with me. I especially welcome students with background and experience in device physics and low power analog/digital circuits. Please send me your detailed resume at: amittr@gatech.edu. Please also submit your admission application at UIC, Department of Electrical and Computer Engineering, due on 15th July, 2015.