



University at Buffalo

Research and Education in eEnergy,
Environment and Water (RENEW)

RENEW Innovation Lecture: Sensors and cyberphysical sensing networks for water and agriculture

Wednesday, March 22nd 10:00am

Davis 101

Dr. Supratik Guha

Director, Nanoscience and Technology Division and the Center for Nanoscale Materials

Argonne National Laboratory

Professor, Institute of Molecular Engineering

The University of Chicago

Abstract: The affordability of computing today, progress in nanomaterials and sensing devices, the increasing availability of data, and the emergence of low power wireless networks have made this an opportune time for the emergence of cyberphysical sensor networks for agriculture, water, and the environment. I will discuss three projects at different stages of development: (i) a two year pilot experiment with Gallo wineries and IBM that used satellite imagery data to calculate and then deliver water to vineyards in a pixelized manner via drip irrigation--resulting in improvements in yield and water efficiency; (ii), the development of Thoreau (Thoreau.uchicago.edu)-the first university based fully sub-terranean sensing network for soil that we have built at the University of Chicago, and (iii) a planned pilot for temporal and geospatial mapping of water quality in the Godavari River in Southern India. Through the descriptions of these projects I will try to argue that a key bottleneck for ubiquitous use of these technologies lies in the development of cheap, reliable, and scalable sensing packages. I will also describe a few of the key sensing challenges for water and agriculture.

Biography: Supratik Guha is the Director of the Nanoscience and Technology Division and the Center for Nanoscale Materials at the Argonne National Laboratory, and a Professor at the Institute for Molecular Engineering The University of Chicago.

Dr. Guha came to Argonne in 2015 after spending twenty years at IBM Research where he last served as the Director of Physical Sciences. At IBM, Dr. Guha pioneered the materials research that led to IBM's high dielectric constant metal gate transistor, one of the most significant developments in silicon microelectronics technology. He was also responsible for initiating or significantly expanding IBM's R&D programs in silicon photonics, quantum computing, sensor based cyberphysical systems and photovoltaics.



Dr. Guha is a member of the National Academy of Engineering and a Fellow of the Materials Research Society, American Physical Society and the recipient of the 2015 Prize for Industrial Applications of Physics. He received his Ph.D. in materials science in 1991 from the University of Southern California, and a B.Tech in 1985 from the Indian Institute of Technology, Kharagpur. At Argonne, his interests are focused on discovery science in the area of nano-scale materials for energy, sensing and future information processing; and their translation to applications.