



Report
Distinguished Lecture Series
On
“Computational Imaging with Few Photons, Electrons, or Ions”
IEEE Signal Processing Society Chapter of Gujarat Section
Electronics and Communication Engineering Department
Sarvajanik College of Engineering and Technology, Surat

Organizers:

IEEE Signal Processing Society, Chapter Gujarat Section

IEEE Gujarat Section

Electronics and Communication Engineering Department, SCET

Date: 30/11//2018

Venue: AV Room EC Dept. SCET

Speaker: Dr. Vivek Goyal (IEEE Fellow, IEEE Signal Processing Society Distinguished Lecturer, Associate Professor of Electrical & Computer Engineering Dept., Boston University)

Coordinators:

Dr. Maulin M. Joshi, Professor, SCET

Dr. Chirag N. Paunwala, Professor, SCET

IEEE Signal Processing Society Chapter of Gujarat Section organized a talk on “Computational Imaging with Few Photons, Electrons, or Ions” under Distinguished Lecture Series in Sarvajanic College of Engineering and Technology, Surat. The talk was delivered by Dr. Vivek Goyal (IEEE Fellow, IEEE Signal Processing Society Distinguished Lecturer, Associate Professor of Electrical & Computer Engineering Dept., Boston University).

Dr. Vivek Goyal holds Ph.D. in electrical engineering from the University of California, Berkeley, where he received the Eliahu Jury Award for outstanding achievement in systems, communications, control, or signal processing. He was a Member of Technical Staff at Bell Laboratories, a Senior Research Engineer for Digital Fountain, and the Esther and Harold E. Edgerton Associate Professor of Electrical Engineering at MIT. He was an adviser to 3dim Tech, winner of the 2013 MIT \$100K Entrepreneurship Competition Launch Contest Grand Prize, and consequently with Nest Labs 2014-2016. He is now an Associate Professor of Electrical and Computer Engineering at Boston University.

He currently serves on the Editorial Board of Foundations and Trends and Signal Processing, the IEEE SPS Computational Imaging SIG, and the IEEE SPS Industry DSP TC. He previously served on the Scientific Advisory Board of the Banff International Research Station for Mathematical Innovation and Discovery, as Technical Program Committee Co-chair of Sampling Theory and Applications 2015, and as Conference Co-chair of the SPIE Wavelets and Sparsity conference series 2006-2016. He is a co-author of Foundations of Signal Processing (Cambridge University Press, 2014).

The talk focused on LIDAR systems used for photon imaging. This system uses single-photon detectors to enable long-range reflectivity and depth imaging. By exploiting an inhomogeneous Poisson process observation model and the typical structure of natural scenes, first-photon imaging demonstrates the possibility of accurate LIDAR with only 1 detected photon per pixel, where half of the detections are due to (uninformative) ambient light. He also discussed about subsequent works that mitigate the limitations of detector arrays, withstand 25-times more ambient light, allow for unknown ambient light levels, and capture multiple depths per pixel. The philosophy of modelling at the level of individual particles is also at the root of current work in focused ion beam microscopy.

The main goal was to provide direction to the UG/PG researchers and the faculties in the domain photon Imaging and understand the cumbersome mathematical modelling for the system. Around 100 enthusiastic UG/PG scholars and faculties from EC, Electrical, IC, IT, MCA, CO department SCET and SVNIT participated in the talk.

It was truly an effective session with thorough teaching, learning and understanding qualities. Some snapshots have been appended below as a glimpse of workshop.



