



**Seminar Topic:
Neuromorphic In-Memory Computing: Across Times and Scales**

Visiting Professor Arindam Basu
Professor, Department of Electrical Engineering
City University of Hong Kong

Abstract

In this talk, I will describe how the concept of neuromorphic In-memory computing (IMC) has evolved over time. I will share some of our work on IMC spanning different flavours: volatile and non-volatile memory based, chip scale to large area covering flexible designs etc. Concrete applications of IMC employed in a system to process event streams from neuromorphic vision sensors in traffic monitoring will be shown as a means to enable the Internet of Video Things. Opportunities for Material Scientists in contributing to this emerging area will be highlighted. I will also talk about some of the lessons learnt in working in cross-disciplinary teams spanning circuits, algorithms, devices, material scientists and physicists.

Reference / Selected Publications:

- [1] R. J. Abraham, *J. Acharya, ... **A. Basu** and **N. Mathews**, "Optogenetics-Inspired Light-Driven 2D TMDC Computational Circuits Enable In-Memory Computing for Deep Recurrent Neural Networks," *Nature Communications*, vol. 11, 3211, 2020.
- [2] R. A. John, N. Tiwari,.. C. Bartolozzi, **A. Basu** and **N. Mathews**, "Self-Healable Neuromorphic Memtransistor Elements for Decentralized Sensory Signal Processing in Robotics," *Nature Communications*, vol. 11, 4030, 2020.
- [3] X. Zhang and **A. Basu**, "A 915-1220 TOPS/W, 976-1301 GOPS Hybrid In-Memory Computing Based Always-On Image Processing for Neuromorphic Vision Sensors," *IEEE Journal of Solid-State Circuits (JSSC)*, vol. 58, no. 3, Mar 2023.
- [4] S. K. Bose and **A. Basu**, "A 389 TOPS/W, Always ON Region Proposal Integrated Circuit Using In-Memory Computing in 65 nm CMOS" *IEEE Journal of Solid-State Circuits (JSSC)*, vol. 58, no. 2, Feb 2023.

Biography

Arindam Basu received the B.Tech. and M.Tech. degrees in ECE from the I.I.T, Kharagpur, India, and the M.S. degree in Mathematics and the Ph.D. degree in ECE from the Georgia Institute of Technology, Atlanta, GA, USA. He is currently a Professor with the Department of EE, City University of Hong Kong and was a tenured faculty at NTU, Singapore earlier.

Dr. Basu was included in Georgia Tech Alumni Association's 40 under 40 list in 2021 and was awarded the MIT Technology Review's TR35 Asia Pacific Award in 2012. He also received the Prime Minister of India Gold Medal from I.I.T Kharagpur in 2005. He and his students have received several best paper awards and nominations in IEEE conferences.

He has served as IEEE CAS Distinguished Lecturer from 2016 to 2017 and currently serves IEEE in various roles such as TC Chair, Associate editor of journals etc.

**Wednesday, 12 April 2023 || Time: 2:00pm – 3:00pm ||
Venue: MSE Meeting Room (N4.1-01-28)
Please register [here](#)
Hosted by: Associate Professor Nripan Mathews**