

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: <https://cde.nus.edu.sg/ece>

Area: Control, Intelligent Systems and Robotics

Host: Associate Professor Xiang Cheng

Co-sponsored by IEEE Singapore Control Systems Chapter

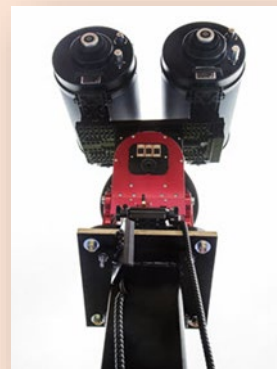
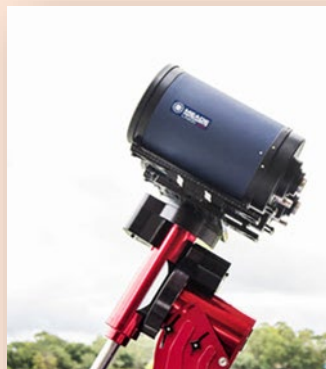
TOPIC	:	Neuromorphic Engineering – Paving the Way for Next-Generation AI
SPEAKER	:	Dr Bharath Ramesh Senior Lecturer International Centre for Neuromorphic Systems Western Sydney University
DATE	:	Thursday, 22 December 2022
TIME	:	4.00PM to 5.00PM
VENUE	:	E1-06-04 College of Design and Engineering, NUS Alternatively, Join Zoom Meeting https://nus-sg.zoom.us/j/85412597257 Meeting ID: 854 1259 7257 Passcode: 012972

ABSTRACT

Neuromorphic Engineering is a sub-field of Electrical Engineering that aims to apply knowledge of how signals are processed in the brain to build electronic signal processing systems that vastly outperform current digital signal processing systems. Current 'smart' sensors are generally sensors with a built-in computer. We aim to develop smart sensors with a built-in brain by combining bio-inspired sensors with bio-inspired signal processing.

Reverse Engineering the Brain - The brain creates a coherent interpretation of the external world based on input from its senses. Yet data from the senses are unreliable and confused. How does the brain determine what is out there in the world around it? Neuromorphic Engineering conducts neurophysiological and psychophysical investigations combined with theoretical, computational, and electronic modelling studies to discover how the brain achieves this. The outcomes of this research will then be applied to create intelligent electronics sensors.

This talk reviews the fundamentals and properties of neuromorphic sensors and provides a unified view of the main approach taken. Examples are presented to demonstrate the application using a novel setup known as Astrosite. Only about 40% of those satellites are active, so the potential for disruptions caused by dead satellites and debris in orbit that don't perform as expected has increased the need to track and monitor objects in space. Western Sydney University has been tackling this problem with bio inspired (neuromorphic) engineering principles. Using unique event-based sensors on mobile telescopes, they have demonstrated the ability to capture and track real time orbital objects day and night.



BIOGRAPHY

Dr. Bharath's main research interests include pattern recognition and computer vision. At present, his research is centred on event-based cameras for computationally efficient machine learning, for problems such as object recognition and related areas such as scene understanding, face recognition, and object detection. He has published and reviewed papers at well-known AI/ML conferences. He also serves as a reviewer for top conferences such as the CVPR and journals like Transactions on Image Processing (TIP). He received the B.E. degree in electrical & electronics engineering from Anna University of India in 2009; M.Sc. and Ph.D. degrees in electrical engineering from National University of Singapore in 2011 and 2015 respectively, working at the Control and Simulation Laboratory on Image Classification using Invariant Features.