SEMINAR ANNOUNCEMENT

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

Area*: *Microelectronic Technologies & Devices (MTD)

Host: Dr Huo Jiali

TOPIC	:	**Observation of Anisotropic Oxidation-related Memristive Behavior in $NbOCl_2$**
SPEAKER	:	**Mr Wang Caokun** **Graduate Student, ECE Dept, NUS**
DATE	:	**Tuesday, 23 December 2025**
TIME	:	**10:00AM-11:00AM**
VENUE	:	**Join Zoom Meeting** **https://us05web.zoom.us/j/82652934906?pwd=ZZ9FDsOdElzCRgUSwVEhtuaAJpZTNk.1** **Meeting ID: 826 5293 4906** **Passcode: 6ly4eM**

ABSTRACT

Two-dimensional (2D) anisotropic materials have been actively explored for their orientation-dependent electrical and optical properties. This intrinsic heterogeneity also makes them a promising platform for neuromorphic computing, enabling brain-like complexity. In this talk, I will present our recent work on lateral memristors based on niobium oxide dichloride ($NbOCl_2$), in which we observed orientation-dependent volatile switching. To investigate the underlying mechanism, we performed comprehensive characterizations and first-principles calculations, confirming that the anisotropic behavior is associated with oxidation of the material. Leveraging this volatile switching, we implemented 4-bit reservoir computing (RC) using an $NbOCl_2$ memristor and achieved 94.3% accuracy on a subset of the MNIST dataset, demonstrating the potential of $NbOCl_2$-based memristors for efficient neuromorphic computing.

BIOGRAPHY

Mr. Wang Caokun is currently pursuing a Ph.D. degree in Prof. Ang Kah Wee's group in the Department of Electrical and Computer Engineering at National University of Singapore (NUS). His research interests include 2D materials-based memristors and memtrasistors.