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 Chen Chufan

TOPIC	:	**Magnetic tunnel junction based Ising machine**
SPEAKER	:	**Mr Yang Shuhan** **Graduate student, ECE Dept, NUS**
DATE	:	**Wednesday, 23 April 2025**
TIME	:	**10:00AM-10:30AM**
VENUE	:	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/82804735334?pwd=FwVPNgxHEYglvEQntVFj1P3rZ9LsfH.1** **Meeting ID: 828 0473 5334** **Passcode: 880903**

ABSTRACT

In combinatorial optimization, probabilistic Ising machines (PIMs) have gained significant attention for their acceleration of Monte Carlo sampling with the potential to reduce time-to-solution in finding approximate ground states. However, to be viable in real applications, further improvements in scalability and energy efficiency are necessary. One of the promising paths toward achieving this objective is the development of the co-integration of different technologies and a co-design approach combining different layers including device, circuits and algorithm development.

We experimentally demonstrated a fully connected PIM architecture based on spin-transfer torque magnetic tunnel junctions (STT-MTJs) with CMOS (FPGA hardware). Our computing approach integrates STT-MTJ-based tunable true random number generators with advanced annealing techniques, enabling the solution of problems with any topology and size.

BIOGRAPHY

Shuhan Yang is currently pursuing his Ph.D. degree under the supervision of Professor Hyunsoo Yang in the Department of ECE, NUS. His current research interests are in spintronics based probabilistic computing.