School of Materials Science and Engineering

Seminar Topic:
Integration of 2D Materials on Silicon Photonics towards a Novel Platform of Information Processing

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Abstract

By using optical platforms instead of metallic interconnects, photonic devices can achieve both high speed and low power consumption suitable for next generation information processing. Although the state-of-the-art silicon (Si) photonic chips are outstanding optical platforms for light propagation, it requires external active optical components such as light sources and photodetectors. A potential solution comes in the form of atomically thin two-dimensional (2D) materials. Their remarkable optoelectronic properties are widely tunable by doping, strain, and external fields, owing to their atomic thickness and unique characteristics. In this presentation, I will discuss my current endeavors of novel photonics and optoelectronics functions using 2D materials integrated Si photonic, including ultra-low loss phase modulations, light emissions, and photodetections. Turning discussion towards a long-term goal, I will demonstrate new 2D-Si photonic applications for quantum information processing and neuromorphic computing that can outperform classical computers.

Biography

Dr Chae received his BS in 2010 and PhD in 2014, under Prof Young Hee Lee's group, from Sungkyunkwan University (SKKU). Then he worked in Columbia University from 2016 to 2021 under Prof James Hone's group, as a Postdoctoral Research Scientist. He joins Nanyang Technological University (NTU) as a Nanyang Assistant Professor, jointly appointed by the School of Electrical and Electronic Engineering (EEE) and the School of Materials Science and Engineering (MSE) in September 2021.

Dr Chae's research primarily focuses on understanding novel optoelectronic phenomena in atomically thin 2D materials systems, exploring their application as a new class of optoelectronic devices, and integrating their optical functions into Si photonics for information processing and beyond. His research initiatives have been published in top scientific journals such as Science, Nature Photonics, Nature Materials, Nature Communications, etc.

Wednesday, 27 October 2021 ‖ Time: 2:00 pm - 3:00 pm ‖
Live Streaming Link (Zoom Meeting): https://ntu-sg.zoom.us/j/94068760373
Meeting ID: 940 6876 0373 Passcode: 271021
Hosted by: Associate Professor Zhao Yang

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