

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microelectronic Technologies & Devices

Host: Associate Professor Aaron Danner

TOPIC	:	On-Chip Light Source Technologies for Integrated Photonic Quantum Computing
SPEAKER	:	Assistant Professor Donguk Nam School of Electrical and Electronic Engineering (EEE), Nanyang Technological University (NTU), Singapore
DATE	:	Tuesday, 9 May 2023
TIME	:	4.00PM to 6.00PM
VENUE	:	Block E5, E5-03-20 College of Design and Engineering, NUS

ABSTRACT

Integrated photonics technology is currently gaining significant attention as the leading candidate for developing a practical and fault-tolerant quantum computer. By assembling millions of quantum photonic devices on a single chip, researchers aim to create a fully integrated photonic quantum processor. However, despite promising recent demonstrations of integrated photonic quantum technologies, achieving this goal remains challenging, mainly due to the lack of viable on-chip quantum light sources.

In this talk, I will discuss our recent efforts in developing on-chip quantum light sources. In the first part of this talk, I will introduce our results on Ge and GeSn lasers integrated on Si. I will also discuss our recent progress on using these Si-compatible lasers for generating quantum states of light such as photon pairs and squeezed states of light, which are resources for discrete-variable and continuous-variable quantum computing, respectively. In the second part of this talk, I will present our strain engineering technologies that can be applied to 2D materials for developing on-chip light sources, including 2D single-photon emitters and graphene-based nonlinear light sources. I will also discuss recent results on creating giant pseudo-magnetic fields and pseudo-Landau levels in strained graphene, which holds the key to inventing graphene lasers.

BIOGRAPHY



Dr. Donguk Nam is an Assistant Professor and Assistant Chair (Student Development) at the School of Electrical and Electronic Engineering (EEE) at Nanyang Technological University (NTU) in Singapore. Dr. Nam earned his PhD and MS from Stanford University and his BSc from Korea University. Dr. Nam's research focuses on silicon- and 2D material-based photonics for quantum computing and integrated photonics applications. Dr. Nam has an outstanding publication record, with approximately 50 articles in high-impact journals, including Nature Communications. He has also been invited to speak at various premier conferences such as CLEO and SPIE Photonics West. Since joining NTU in 2017, Dr. Nam has secured more than 6 million SGD in grant funding. Dr. Nam is an active member of the scientific community, serving as a sub-committee chair for CLEO and previously as a symposium co-organizer for IEEE Summer Topical Meetings. Dr. Nam's efforts in teaching has been recognized with an Early Career Teaching Excellence Award at the School of EEE in NTU.

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