



Department Seminar

Dear Colleagues & Students,
You are cordially invited to a special seminar on

Date: 13 July 2026, Monday

Time: 10 - 11 am

Venue: E7-03-08 (Seminar Room 3), 15 Kent Ridge Cres, Singapore 119276 ([Map](#))

A study in contrasts: epitaxial integration of III-Vs with dielectrics for novel lasers



By Prof. Minjoo Larry Lee

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Hosted by Asst. Prof. Di ZHU

Abstract:

This talk will highlight our recent progress in molecular beam epitaxy (MBE) regrowth of laser structures that harness the contrasting properties of III–V semiconductors and dielectric materials to realize new device architectures. In the first part of the talk, I will describe efforts to integrate red AlInGaP-based laser diodes on a SiN/Si photonics platform for trapped ion qubit technology. Through a combination of selective and non-selective III-V growth, we show that dislocation-tolerant InP quantum dots grown in “pockets” are a promising active region material for butt-coupled visible gain [1]. In the second part, I will describe our group’s work on 1.5 μm photonic crystal surface-emitting lasers (PCSELs). For this work, we developed a selective MBE growth method to encapsulate nanoscale SiO₂ features with single-crystal InP. Optically pumped laser results [2] will be presented along with ongoing work to realize electrically injected devices.

[1] Y. Wang, C. Heidelberg, J. Plant, D. Kharas, P. Dhingra, R. B. Kaufman, X. Fang, B. D. Li, R. D. Hool, J. Dallesasse, P. W. Juodawlkis, C. Sorace-Agaskar, and M. L. Lee, “Embedded growth of visible InP quantum dot lasers in silicon nitride photonic integrated circuits,” *Optica* **12**, 1697 (2025).

[2] E. M. Raftery, D. Lee, B. J. Thompson, K. Chow, W. K. North, M. L. Lee, and K. D. Choquette, “Photopumped Buried Dielectric Photonic-Crystal Surface-Emitting Lasers,” *IEEE Photonics Journal* **17**, 1–5 (2025).

Biography:

Minjoo Larry Lee is Professor of Electrical and Computer Engineering at the University of Illinois Urbana-Champaign and Director of the Holonyak Micro and Nanotechnology Lab. He received his Sc.B. from Brown University and Ph.D. from MIT, both in materials science. After serving on the faculty at Yale University, he joined UIUC in 2016. Professor Lee’s research focuses on molecular beam epitaxy of electronic and photonic devices with an emphasis on lattice-mismatched and patterned growth. He has authored more than 200 journal and conference publications and is an Optica Fellow. His honors include the DARPA Young Faculty Award and the NSF CAREER Award.

Looking forward to seeing all of you!

