

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

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

Area: Microelectronics Technologies & Devices (MTD)

Host: Prof Ang Kah Wee

TOPIC	:	Integrated Silicon Photonics with Quantum Dot On-Chip Lasers: Enabling Scalable and Energy-Efficient Photonic Systems
SPEAKER	:	Dr Wan Yating Principal Investigator of Integrated Photonics Lab, KAUST
DATE	:	Thursday, 13 November 2025
TIME	:	11:00AM to 12:00PM
VENUE	:	E5-03-20 Seminar Room

ABSTRACT

The rapid growth of artificial intelligence, high-performance computing, and secure communication has created an urgent demand for faster and more energy-efficient hardware platforms. Silicon photonics has emerged as a powerful solution by combining the scalability of CMOS electronics with the speed of light. However, its full potential relies on one essential element — an efficient and reliable on-chip light source. In this talk, I will present our recent breakthroughs in integrating quantum dot (QD) lasers onto silicon and other photonic platforms through heterogeneous integration. These QD-based light sources exhibit record-low threshold currents, ultranarrow linewidths, and remarkable temperature and feedback stability, paving the way for scalable, CMOS-compatible optical systems. Building on this foundation, I will discuss how such integrated light sources enable a wide range of emerging applications — from photonic computing units (PCUs) for AI acceleration, to silicon photonics-integrated LiDAR for autonomous systems, and chaos-based photonic hardware for next-generation cybersecurity. By connecting materials innovation, device engineering, and system-level integration, our work aims to transform silicon photonics into a universal hardware platform — one that unites communication, computation, and sensing through light, paving the way toward an intelligent and energy-sustainable future.

BIOGRAPHY

Dr. Yating Wan is the Principal Investigator of Integrated Photonics Lab at KAUST, specializing in silicon photonics with a focus on integrating on-chip QD light sources. Before joining KAUST, she worked in Prof. John Bowers' group at UCSB (2017–2022), where she led Intel's project on heterogeneously integrated QD lasers on silicon. At KAUST, her team has 17 members, including 5 postdoctoral researchers, 11 Ph.D. students, and 2 master's students. She has published over 100 peer-reviewed papers, including 38 first-author publications (29 journals, 9 proceedings, 10 journal covers), 26 corresponding-author publications (11 journals, 15 conferences). She actively contributes to the scientific community as an Associate Editor for *IEEE JQE*, and *Applied Optics*, Associate guest editor for *IEEE JSTQE* and *APL Photonics*, Sub-committee chair of 2026 CLEO, committee member of the IEEE Photonics Society Conference Council and several conferences like CLEO, IPC, and as a referee for peer-reviewed journals across IEEE, OSA, and the Nature Publishing Group for over 100 times. For her pioneering work in on-chip laser integration on silicon, Dr. Wan has received numerous prestigious awards, including 2021 CLEO Tingye Li Innovation Prize (1 awardee worldwide), 2022 Rising Stars of Light by Light: Science & Applications (3 awardees worldwide), 2023 "35 Innovators Under 35 for China" by MIT Technology Review, 2025 Sony Women in Technology Award with Nature (\$250,000 prize, 3 awardees worldwide), and 2025 IEEE Photonics Society Young Investigator Award (1 awardee worldwide).



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