

## 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: Prof Ang Kah Wee**

|                |   |                                                                                                                              |
|----------------|---|------------------------------------------------------------------------------------------------------------------------------|
| <b>TOPIC</b>   | : | <b>Research on GaN monolithic integrated devices and In-sensor reservoir computing system</b>                                |
| <b>SPEAKER</b> | : | <b>Prof Wang Qing<br/>Professor, School of Microelectronics,<br/>Southern University of Science and Technology (SUSTech)</b> |
| <b>DATE</b>    | : | <b>Thursday, 19 March 2026</b>                                                                                               |
| <b>TIME</b>    | : | <b>11:00AM-12:30PM</b>                                                                                                       |
| <b>VENUE</b>   | : | <b>E1-06-02</b>                                                                                                              |

### ABSTRACT

Owing to their exceptional material properties, GaN and SiC, as leading third-generation semiconductors, are widely recognized as the cornerstone of next-generation power electronics, energy-efficient systems, and smart manufacturing. However, in traditional circuit systems, discrete GaN devices often introduce parasitic inductance when integrated with peripheral components such as drivers, sensors, and protection circuits, resulting in voltage instability. To overcome this challenge, on-chip integration technology has been developed, enabling more efficient power management with reduced size and cost. This seminar presents recent advances from our group in the development of a new class of GaN-based monolithic integrated devices. First, I will introduce charge trapping layer (CTL) technology, which enables a wide and stable threshold-voltage modulation window of up to 17.8 V. This approach has been applied, for the first time, to fabricate high-performance GaN DCFL inverters, featuring large output swings, excellent noise margins, and high-frequency operation. Next, I will discuss key challenges in developing GaN p-FETs for CMOS integration, including the formation of p-type ohmic contact, low-damage gate etching and high-quality dielectric layer. In particular, a novel Mg-based ultra-low-resistance p-type contact technology was proposed, along with an associated p-type doping mechanism. Finally, I will present our progress in the integration and application of GaN-based sensors and algorithms, introducing a GaN in-sensor reservoir computing system and exploring its potential applications in intelligent systems.

### BIOGRAPHY

Prof. Qing Wang is a Research Professor at the School of Microelectronics, Southern University of Science and Technology (SUSTech), where she also serves as Deputy Director of the Guangdong Provincial Engineering Technology Research Center for GaN Devices and Shenzhen Key Laboratory of Third-Generation Semiconductor Materials and Devices. Her research focuses on advancing wide-bandgap semiconductor technology, with particular emphasis on GaN power devices and monolithic integrated circuits, GaN radio frequency devices and power amplifier modules, GaN smart sensor devices and GaO power devices.

Prof. Wang is recognized as a Shenzhen High-Level Talent and received the Guangdong Natural Science Foundation for Outstanding Young Scientists. She has authored over 100 papers in journals and conference proceedings, including Science Advances, IJEM, Device, IEEE EDL, ISPSD, APL. She holds more than 50 Chinese invention patents (granted or pending) and five PCT patents, and has contributed to standardization efforts through one national standard, one industry standard, and two group standards. As an IEEE Senior Member, Prof. Wang is actively engaged in the power electronics community. She serves on the IEEE Electron Devices Society (EDS) Power Devices and ICs Committee and contributes as a Guest Editor in IEEE TED.

<https://cde.nus.edu.sg/ece/highlights/events/>