



SEMINAR

Advanced Passive Thermal Management in Extreme Heat: from Infrastructure to Personal Cooling

Date: 18 August, 2026 (Tuesday)

Time: 2:00 p.m.

Venue: Room 7-34 & 7-35
Haking Wong Building
HKU

Speaker: Professor Qiaoqiang Gan
Material Science Engineering and Applied Physics, Physical Science and
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Abstract:

Extreme heat is no longer an episodic environmental stress; it is becoming a structural challenge for national development, urban resilience, energy security, water sustainability, and public health. This challenge is especially urgent for Saudi Arabia, where high ambient temperatures, intense solar irradiation, rapid urban and industrial growth, and rising cooling demand converge to place exceptional pressure on buildings, power grids, water systems, transportation networks, agricultural production, and outdoor work environments. Addressing these conditions requires more than incremental improvements in conventional air conditioning. It calls for a new generation of passive thermal-management technologies that can reduce heat loads, recover or redirect waste heat, enhance infrastructure reliability, and protect people in extreme climates.

This talk will present an integrated passive thermal-management framework tailored to Saudi Arabia's unique environmental and national needs. I will first discuss advanced materials and system designs for managing heat across critical infrastructure, including data centers, photovoltaic systems, power cables, lighting, buildings, and urban surfaces. These approaches aim to improve energy efficiency, extend asset lifetime, and strengthen the resilience of infrastructure operating under extreme heat. I will then discuss thermal strategies for water security, including solar-driven desalination, brine management, zero-liquid-discharge treatment, and atmospheric water harvesting. Finally, I will highlight emerging directions in personal and localized cooling for outdoor workers, pilgrims, soldiers, students, and communities exposed to prolonged heat stress.

Together, these examples show how advanced thermal management can support Saudi Arabia's transition toward climate-resilient infrastructure, lower cooling-related energy demand, sustainable water production, and improved quality of life in an increasingly hot world.

Biography:

Dr. Qiaoqiang Gan is a Professor in the Materials Science Engineering and Applied Physics Program and Thrust Lead for Advanced Cooling Technologies at the Center for Renewable Energy and Storage Technologies (CREST), King Abdullah University of Science and Technology. He is a Fellow of Optica and SPIE. He has authored over 130 peer-reviewed publications and holds tens of patents. He currently serves as Editor-in-Chief of IEEE Journal of Selected Topics in Quantum Electronics and as Associate Editor for Journal of Photonics for Energy (SPIE) and PhotoniX (Springer). He previously served as CLEO Subcommittee Chair (2019–2020), Program Chair (2021), and General Chair (2023).

ALL INTERESTED ARE WELCOME

For further information, please contact Professor X.B. Yin at 3910 2659.