



# FLEET

ARC CENTRE OF EXCELLENCE IN  
FUTURE LOW-ENERGY  
ELECTRONICS TECHNOLOGIES

## FLEET RESEARCH SEMINAR

# 3D graphene metamaterial platform for on-chip photonic device

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**Abstract:** Graphene-based metamaterials (GM), with alternating graphene and dielectric layers, are artificially structured materials designed to attain an extremely high optical response that can enhance optical modulation.

This seminar presents a low cost, solution-phase method to build multilayered metamaterials by using 2D materials as the building blocks. The prepared GM can firmly attach to the substrate with uniform distribution. The phototunable GM architectures are enabled by laser fabrication, which can lead to reconfigurable applications. Dynamic tuning of the optical properties and the bandgap of the GM has been realized through laser-induced reduction. The amplitude and phase modulation devices, which are a quick response (QR) code and an ultrathin flat lens, have been fabricated on this platform.

**About the Speaker:** Yunyi Yang is a postdoctoral researcher at Centre for Micro-Photonics, Swinburne University of Technology, where he completed his PhD in applied physics in 2019.

Dr. Yunyi Yang's research focuses on frontier technologies between advanced 2D materials and nanophotonic devices, including 2D metamaterial synthesis, functional structure design, laser/nano fabrication, laser-material interaction and integrated photonics.

From 2019, he is focusing on the study of the nonlinear behaviour in 2D material incorporated integrated photonic devices, including waveguide, micro-ring resonator based on Si, SiN and doped silica platform.

**DATE:** Monday 19 August 2019  
**TIME:** 10:00AM–11:00AM  
**VENUE:** 107 Physics Seminar room  
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