



# FLEET

ARC CENTRE OF EXCELLENCE IN  
FUTURE LOW-ENERGY  
ELECTRONICS TECHNOLOGIES



MONASH  
University

## FLEET & MCATM RESEARCH SEMINAR

### Elemental 2D Materials Beyond Graphene

YI DU

ISEM & AIIM, University of Wollongong



**Abstract:** Two-dimensional (2D) materials, which possess atomic or molecular thickness and infinite planar lengths, are regarded as a novel family of materials that have a great potential to transform modern electronics. In this talk, I will review our recent work on silicene and germanene. The atomic honeycomb structures have been clearly demonstrated by scanning tunneling microscopy (STM). Their phonon properties and distinct electron-phonon coupling effects have been revealed by in-situ Raman spectroscopy. Dirac fermion characteristics of silicene and germanene were demonstrated by scanning tunneling spectroscopy (STS) and angle-resolved photoemission spectroscopy (ARPES). The electronic dispersion, band gap, Fermi velocity, and surface reactive sites at the nano scale and atomic scale on the surfaces of the silicene and germanene have been studied in details. We also successfully modulated their electronic properties by tuning interlayer interaction.

**About the Speaker:** Dr Yi Du obtained his B.Eng in Beihang University in 2004 and his PhD in University of Wollongong in 2011. He was awarded ARC Future Fellowship (FT2) in 2018. His research interests are in the research field of two-dimensional (2D) materials and surface physics and chemistry. His expertise covers molecular beam epitaxial (MBE) growth, scanning tunneling microscopy (STM), atomic force microscopy (AFM), angle-resolved photoemission spectroscopy (ARPES), ultra-high vacuum, electron beam lithography (EBL), and electronic structure design and engineering. His significant contributions to this field includes creation and revealing exotic properties of Xenes (silicene, germanene, and blue phosphorene). He has published more than 90 papers, including *Sci. Adv.*, *Nat. Commun.*, *Adv. Mater.*, *Phys. Rev. Lett.*, *ACS Nano*, and *Adv. Funct. Mater.*

**DATE:** Thursday 27 Sep 2018  
**TIME:** 11:00AM–12:00midday  
**VENUE:** G30, New Horizons Centre  
20 Research Way,  
Monash, Clayton  
**INFO:** [education@fleet.org.au](mailto:education@fleet.org.au)

