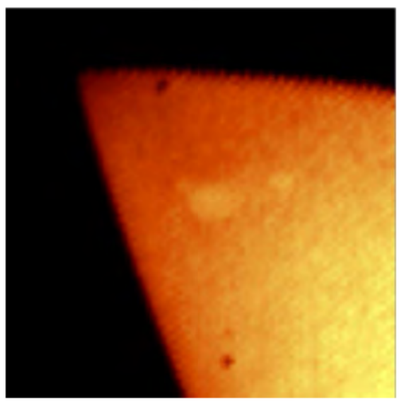
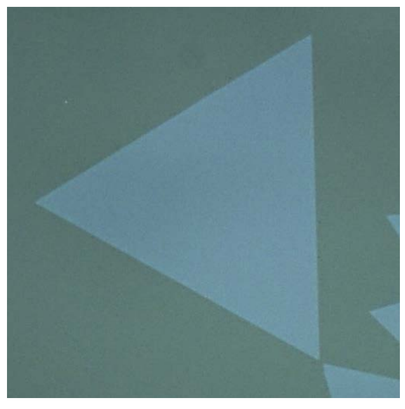
# Emerging 2D Heterostructures

$MoS_2$ PL

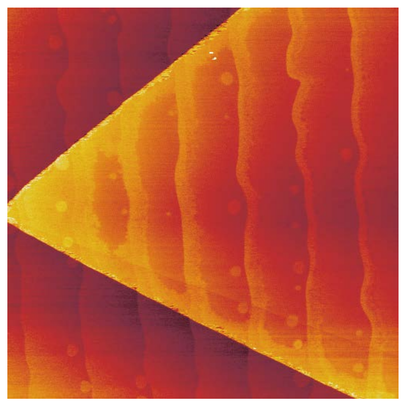


Graphene on sapphire

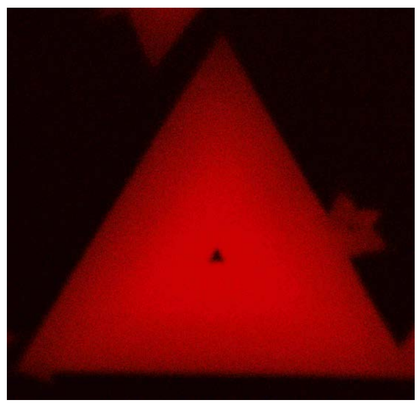
CVD $MoS_2$



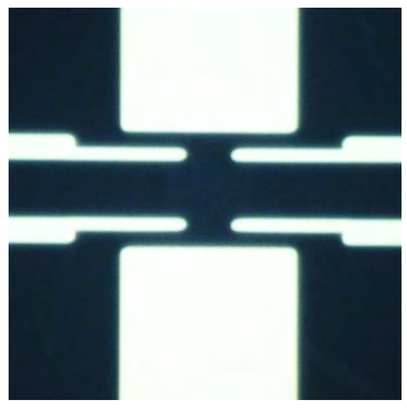
$MoS_2$ AFM



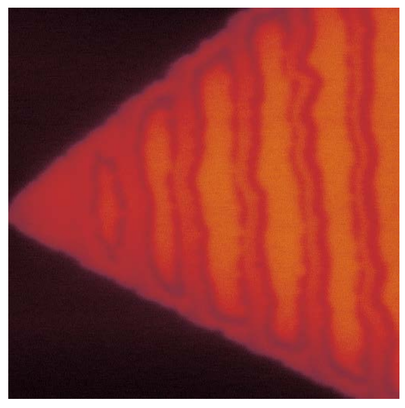
$MoS_2$ Fluorescence



Graphene Hall Bar



MoS2 KPFM



## Lead Scientist

Dr Changxi Zheng
ARC DECRA Fellow

## Research Expertise

Dr Zheng's research focuses on atomically thin transition metal dichalcogenides (TMDs). His research expertise are in:

1. Preparation of large-area TMD crystals and their heterostructures using chemical vapor deposition.
2. Electrical and optical characterization of TMDs using spectroscopy and lithography techniques.

## Key Contact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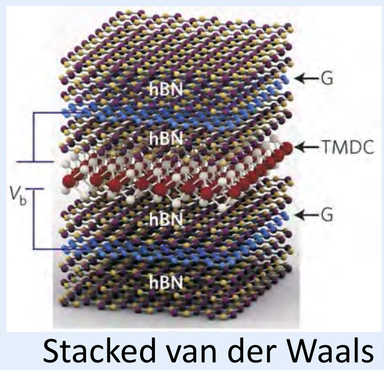
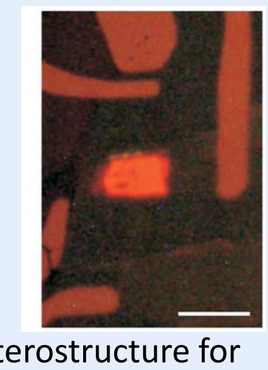
## Applications

Monolayer TMDs are a class of emerging semiconductors exhibiting a sizable direct bandgap, strong photoluminescence and electroluminescence, large spin-orbital coupling, and an unusual two-fold valley degeneracy. The materials are attractive for optoelectronics, valleytronics and spintronics. Our research is to synthesis large-scale TMDs and their heterostructures for various practical device applications.



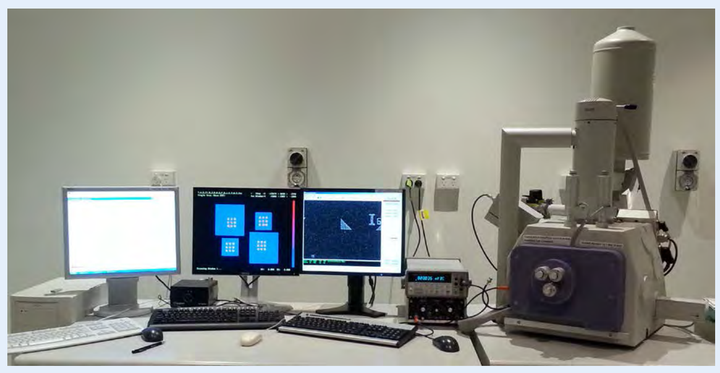



Stacked van der Waals heterostructure for LED device. (*Nat. Mater.* 14, 301 (2015))

## Research Facilities

CVD furnace


Electron beam lithography



Dimension Icon AFM (accessible at MCN)