



## FLEET News: July 2020

Congratulations to FLEET PhD students Qile Li and Matt Gerbet, recognised this month in awards from ANSTO and Monash respectively.

Centre researchers continue to find new ways of remote-connection, with two mini-workshops kicking off this month focussing on individual Centre research themes. ANU postdocs Maciej Pieczarka and Eliezer Estrecho organised a two-day Theme 2 workshop last week, while today Monash's Marina Castelli discussed her PhD research in the first of a series of monthly updates for Theme 1/Technologies AB.

Read on for more about these achievements, the two workshops, as well as a bumper crop of research news, awards, and other news from around the Centre.

Regards,  
**Prof Michael Fuhrer**  
FLEET Director

*Catch up on previous editions of FLEET News*

### In this edition:

Synthesising piezoelectrics with liquid metal (RMIT/UNSW)  
Studying nanoscale properties of glass (UOW/ANSTO)  
Congratulations Qile Li (Monash/ANSTO)  
Reviewing spin-gapless semiconductors (UOW)  
New Women in FLEET funding option  
Unlocking vdW heterostructures (Monash)

Semonti Bhattacharyya (Monash) on radio  
Matt Gebert (Monash) outreach champion  
Virtual theme 1/theme 2AB workshops  
Unlocking post-pandemic career skills  
(FLEET/MacDiarmid)  
Staying connected: live-streamed talks  
Previous news

## Applying liquid-metal synthesis to piezoelectric materials

New RMIT-UNSW collaboration led by FLEET PhD Hareem Khan advances future flexible, wearable electronics, and biosensors drawing their power from the body's movements - published in Nature Communications.

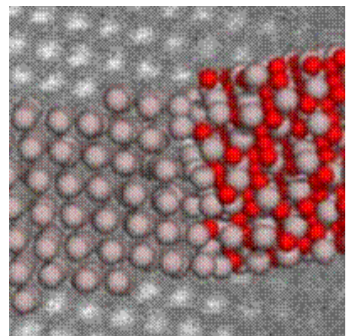
[Read more online.](#)



## Through the nanoscale looking glass

A FLEET collaboration of experimentalists (UOW/ANSTO) and theorists (RMIT) confirm boson peak frequency in ultra-thin alumina. The 'mysterious' vibrational properties of nanoscale glasses are studied by subjecting novel (and slightly explosive) particles of aluminium wrapped in a thin alumina skin to neutron spectroscopy measurement at ANSTO.

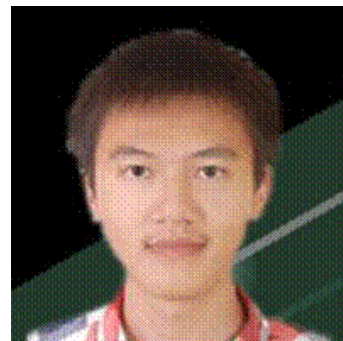
[Read more online.](#)



## Congratulations Qile Li

Congratulations to FLEET PhD student Qile Li (Monash), whose excellent work in probing electronic structures of novel materials has been recognised by an award and scholarship from the Australian Institute of Nuclear Science and Engineering (AINSE).

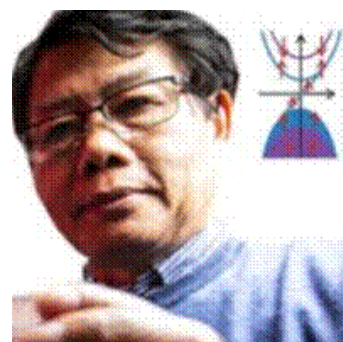
[Read more online.](#)



## Spin-gapless semiconductors reviewed at UOW

New candidates for next-generation low-energy, high efficiency spintronics have been identified in a comprehensive study from Xiaolin Wang's team at UOW published in *Small*.

[Read more online.](#)



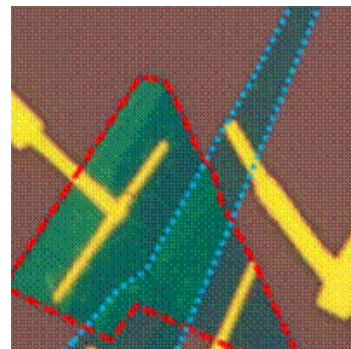
## New funding to support women in STEM

Research indicates COVID is disproportionately hurting women in science, who are already under-represented in STEM, particularly in physics. In response, FLEET has introduced a new, third scholarship option for outstanding candidates who identify as women: [See more online about FLEET's new PhD partial-stipend scholarship.](#)

## Unlocking vdW heterostructures at Monash

An India-Australian theoretical and experimental study from FLEET CI Nikhil Medhekar's group for high-performance optoelectronics has been published in *Nano Letters*. The Monash-IITB collaboration designed and fabricated a heterostructure comprising two layered transition metal dichalcogenides.

[Read more online.](#)



## Catch Semonti's radio interview

FLEET postdoc Semonti Bhattacharyya was interviewed this month on science radio show Einstein-a-gogo, describing her work as akin to stacking "atomically-thin Lego blocks" in quest of low energy topological transistors.

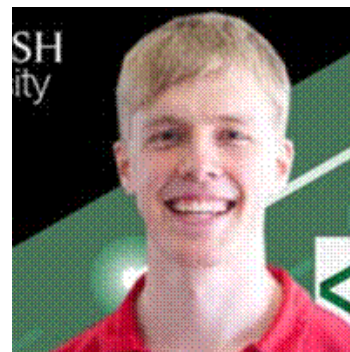
[Listen to the interview online](#) (starts at 48min 45sec)



## Matt Gebert outreach champion

Congratulations to FLEET PhD Matt Gebert, recognised for his dedication to science-outreach by the Monash Faculty of Science. Matt has been announced co-winner of the Faculty's Award for Outstanding Contributions by a Graduate Research Student to the Life of the Faculty or School Community.

[Read more online.](#)



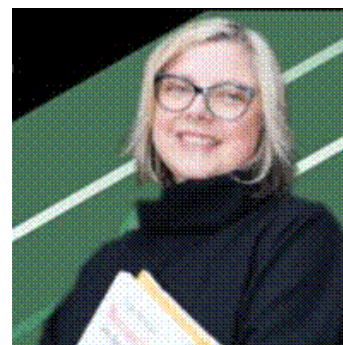
## Virtual Theme I and II workshops

A two-day live-streamed workshop brought 30 **Theme 2** researchers from across FLEET together last week, organised by ANU Research Fellows Maciej Pieczarka and Eliezer Estrecho. FLEET's second research theme uses a quantum state known as a superfluid to achieve electrical current flow with minimal wasted dissipation of energy. [Read more about the online workshop online.](#)

An ongoing **Theme 1/Enabling technologies A/B workshop** starts this week, building on the Thursday Monash Condensed Matter Physics journal club, which has successfully attracted a wider FLEET audience post-COVID. Each month a FLEET Theme 1/AB member will give an informal talk about a paper related to FLEET research, or about new results/ideas of their FLEET research, covering one topic in depth to stimulate discussion.

## Trans-Tasman workshop unlocks post-pandemic career skills

Around 35 PhDs and other Early Career Researchers from FLEET and partner organisation the MacDiarmid Institute took a chance last week to learn how to take control of their future in these uncertain times, and to gain a better understanding of the job market (both in academia and industry) with a targeted, one-hour workshop from ANU's "thesis whisperer". [Read more online.](#)



## Maintaining connections: Centre-wide, live-streamed seminars

The next live-streamed talk will be a discussion of leadership skills gained by Centre participants in Women & Leadership Australia's Leading Edge program. [Details online.](#)

Future live-streamed talks include Julie Karel (Monash) in September (a public event co-hosted with Materials Australia), Priyank Kumar (UNSW) in October and Iolanda Di Bernardo (Monash) in November.

Previous Centre-wide talks in 2020 have included:

- **Sumeet Walia** (RMIT) explained how his team's research into 2D and other low-dimensional materials meshes with FLEET's research goals
- **Peggy Zhang** (UNSW) SPM study of material properties
- **FLEET PI Kirrily Rule** neutron scattering analysis at ANSTO
- **Director Michael Fuhrer's** topological materials, COVID Q&A.



## Australian quantum tech forum

Hot on the heels of CSIRO's Growing Australia's Quantum Technology Industry report, outlining the opportunities for Australia of a thriving quantum technology sector, our friends at EQUUS have had a hand in starting the **Australian Quantum Technology Forum**. Subscribe to keep an eye on developments.

## Previous news

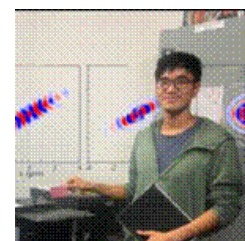
**FLEET CI Professor Kourosh Kalantar-zadeh (UNSW)** was awarded the prestigious 2020 Robert Boyle Prize for Analytical Science last month by the Royal Society of Chemistry: recognised for his significant influence across multiple fields of engineering. [Read more online.](#)



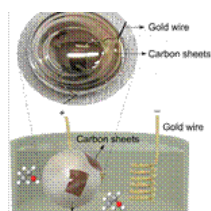
**CSIRO Chief Scientist Dr Cathy Foley** was recognised in Australia's Queen's Birthday Honours for her distinguished service to research science, to the advancement of women in physics and to professional scientific organisations.

FLEET is very fortunate to have the benefit of Dr Foley's advice on the Centre's Advisory Committee. [Read more online.](#)

**Applying 'magic angle' twistrionics** FLEET/Monash researchers are part of an international collaboration applying 'twistrionics' concepts (the science of layering and twisting 2D materials to control their electrical properties) to manipulate the flow of light in extreme ways. Published this month in Nature. [Read more online.](#)



We made use of this publication to create a **Moire explainer**, linking with a recent FLEET homescience experiment on Moire patterns.



**Graphitic materials synthesis at UNSW** FLEET's Mohammad Mayyas and team of UNSW/RMIT researchers achieved the first synthesis of ultra-thin graphitic materials at room temperature using organic fuels (eg, basic alcohols). Promising materials for future battery storage, solar cells, touch panels. [Read more about the study online.](#)

## Internships, grants and other opportunities

Current research internship opportunities listed at **Australian Postgraduate Research Intern** include deep learning, signal processing and composite materials. APR Intern provides short-term university research collaborations.

Applications are open for the **2020 Sydney Quantum Academy Postdoctoral Fellowships**, closing 11 August.

### Other opportunities:

- **MacDiarmid Collaborative Grants** will fund travel in 2021 to collaborate with MacDiarmid in complementary research plus equity, outreach or public-engagement initiatives
- **Two beamline scientist positions** at the Australian Synchrotron
- **Two postdoc positions available** with FLEET AI Bent Weber at NTU, Singapore
- **Women in FLEET Scholarships** are open to students who identify as female and are accepted into an Honours or PhD program to work with any one of FLEET's investigators. Considered twice a year in June and November. Submit applications anytime.

## Participating organisations

FLEET is the Australian Research Council Centre of Excellence in Future Low-Energy Electronics Technologies.

Participating nodes are:

The Australian National University, Monash University, RMIT University, Swinburne University of Technology, the University of New South Wales, the University of Queensland and the University of Wollongong.

