



## FLEET News: May 2020

Another month has passed. We have more reasons to feel hopeful: It appears that Australia has done relatively well in avoiding the direct impact of the pandemic. We're starting to see some restrictions eased; some of you may be returning to labs, or re-engaging in other activities for the first time in months. But now that the immediacy and urgency of action to mitigate the pandemic is waning, the hard work begins. We are just starting to survey the damage. It appears that the impact on the Australian university sector will be unprecedented, and there is still great uncertainty in what the future holds.



I am concerned for the young STEM researchers in our cohort who are now facing an uncertain future. And as pointed out below, this crisis also threatens to roll back gains that we have made in paving the way for women to advance their careers in STEM. We are as determined as ever to make sure all of our researchers are supported in their careers, and we will be working to find how best we can help all of our people contend with the stress, and help them plan for their future.

And some brighter news: Please join in me in welcoming Julie Karel of Monash University as our newest Chief Investigator in FLEET! See more details below, along with ongoing initiatives to maintain connections within the Centre and with the semiconductor/engineering/physics community.

Regards,  
Michael Fuhrer  
**FLEET Director**

*Catch up on previous editions of FLEET News*

### In this edition:

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## New FLEET CI: Julie Karel

It is a great pleasure to announce that Dr Julie Karel (Monash) is now a FLEET Chief Investigator.

Julie conducts research at the intersection of materials science and condensed-matter physics, to develop new materials for emerging low-energy nanoelectronic and magneto-electronic devices. [Read more about her work online.](#)



## Quantum COVID-19 will disproportionately hinder women in STEM

A new report on the impact of the COVID-19 pandemic on careers in STEM finds that women will be disproportionately affected, based on disparities in domestic work and reduced career opportunities.

The effects, which include disruptions to working hours, job security and paid work capacity, are expected to be most acute for those with children under 12, those employed in short-term contract or in casual jobs. Women from diverse ethnic backgrounds are expected to face additional barriers to entry, retention and career progression.

[Read the report online.](#)

## What comes after CMOS: a live-streamed seminar with the IEEE

Please join us 5 June for a discussion of experts:

- Paolo Gargini**, who worked with Gordon Moore at Intel, and has led the semiconductor roadmap
- Michelle Simmons** UNSW on quantum computing
- our own Michael Fuhrer** on the search for low-energy electronics.

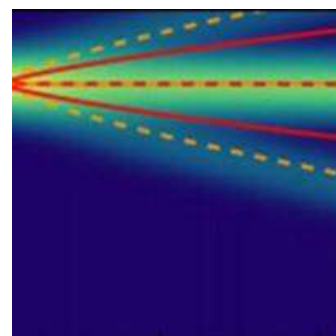
This discussion will be shared with IEEE members and hosted by FLEET's Francesca Iacopi and David Cortie.

Registrations are via [eventbrite](#).

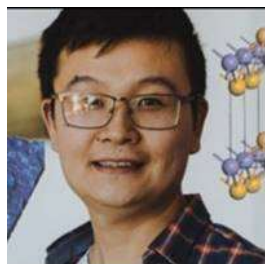


## What's the fate of a quantum impurity in a BEC?

Bernard Field and Meera Parish's (Monash) study of interplay between quantum and thermal fluctuations (excitations) in quantum matter impurity in a BEC finds an intriguing energy spectrum as its temperature is raised above 0K: the number of quasiparticle branches set by the number of hole excitations of thermal cloud. [Read more online.](#)



## A Superconductivity review



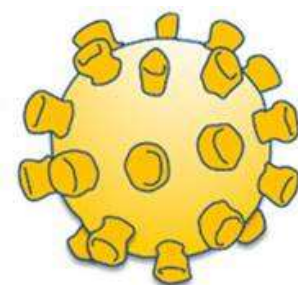
A major FLEET collaboration (UOW, Monash, Tsinghua University) reviewing atomically-thin high-temperature superconductors finds that each has a common driving mechanism: interfaces between materials. The enhancement of superconductivity at interfaces in atomically-thin superconductors is a unique tool for discovering new high-temperature superconductors.

[Read more online.](#)

## The COVID-gut link

A really interesting new paper in ACS Nano from Kouros Kalantar-Zadeh (FLEET-UNSW) and colleagues looks at links between COVID-19 and gut microbes, presenting "an urgent need to investigate the possible impact and therapeutic options for COVID-19 based on dietary and microbiome modifications".

[Read the paper.](#)



## Digitally connected: live-streamed seminars

FLEET's series of monthly live-streamed seminars continues.

On June 11 **Peggy Zhang (UNSW)** will host the next Centre-wide talk, covering the use of scanning probe microscopy in the study of material properties.



In May, **FLEET Partner Investigator Kirrily Rule** explained how neutron scattering analysis at ANSTO aids the search for low-dimensional magnets and spintronic devices—co-hosted by the Australian Institute of Physics, this FLEET talk had over 100 people dial in.



## More digital connections

Coming up:

**FLEET's Iolanda Di Bernardo** will run internal training this week, teaching the use of Blender to create animations illustrating scientific concepts.

**A weekly European series** of [colloquia](#) investigates atomic-scale quantum material issues. The talks are 10AM CEST (6PM Monday nights, Australian time).

**FLEET PI Jairo Sinova** and colleagues at the Spin Phenomena Interdisciplinary Center SPICE are running weekly condensed matter seminars (midnight, Wednesday nights Aus Eastern Time) with an emphasis on spin and topological physics, streamed via the SPICE YouTube Channel. [Sign up online](#).

Earlier this month:

- **FLEET PhD Jesse Vaitkus** gave a popular and valuable talk on the use of colour in data presentations.
- **CSIRO Chief Scientist (and FLEET Advisor) Cathy Foley** presented a talk on the 'softer' skills of a science career ([watch](#)), as well as hosting CSIRO's launch of the Australian quantum roadmap (with over 800 attendees dialling in!) [watch online](#)
- **Dianne Ruka** led a discussion of homescience outreach experiments
- **A few FLEET folk/friends** shared their science in the Pint of Science [#Thisismyscience](#) event. Check out [Semonti](#), [Iolanda](#), and [Antonija's](#) contributions.

## Equity/diversity resources

Upcoming Diversity Council of Australia (DCA) talks include:

- [diversity fatigue](#) 2 June
- [domestic violence](#) 16 June

Other recent DCA sessions have discussed methods to maintain mental health in our current challenging times, and working alongside diverse faiths in the workplace.

How do you think organisations should measure the cultural diversity of their workforce?

A brief survey invites views on the most inclusive and informative way for Australian organisations to 'count culture' – that is, to measure and report on cultural diversity in their workforce and leadership teams.

[A recent McKinsey report](#) investigates the business case for inclusion and diversity.



## Congratulations Maciej

Congratulations to FLEET's Maciej Pieczarka (ANU) who has been awarded the START award for young Polish scientists by the Foundation for Polish Science.

[Read more online.](#)



## Congratulations Cathy



FLEET Advisor and CSIRO Chief Scientist Prof Cathy Foley has been named as a new Fellow of the Australian Academy of Science, recognising her significant contributions to physics (high-temperature superconductors, and to the development of field-deployable superconducting devices that locate valuable mineral deposits) and to science more generally through promoting and supporting science across the wider community.

## Previous news

**Seeking sounds of superfluids at Swinburne** Sound waves used to reveal unique properties of an ultracold quantum gas, a model system for describing superconductors and nuclear matter. This new study, led by Chris Vale's team at Swinburne was featured by editors at *Physics Review Letters*. [Read their writeup online.](#)

**New Monash system applies machine learning in the lab** A new AI-driven system developed by Agustin Schiffrin's team at Monash can operate and acquire optimal SPM data autonomously, for multiple straight days, and without any human supervision. [Read about the new "remote lab" system online.](#)

**Applying impurity theory to quantum lights** Jesper Levinsen and Meera Parish's (Monash) study developed a new approach to directly observe correlated, many-body states in an exciton-polariton system that go beyond classical theories. [Read more online.](#)

**UOW research highlighted Xiaolin Wang** and the UOW team's paper on Dirac (linear) spin gapless semiconductors was named one of *Applied Physics Review* most-cited papers. [Read the paper here.](#) The team's November-2019 paper on 'superfluid like' penetration was featured in the February edition of the *National Science Review*. [Read the article here.](#)

**Meera Parish (Monash) and Errol Hunt** answered questions for an audience from the Royal Society of Victoria, after a physically-isolated digital re-broadcast of last year's talk at the RSV. [Read about the original talk online.](#)

**RMIT support: Thanks Charles, welcome back Nicci & introducing Rebecca** Welcome back Nicci Coad, who returned as FLEET's RMIT Administrator last month after maternity leave, and thank you to Charles Welcome for his invaluable support for the last year. Nicci is joined at RMIT by new FLEET support Rebecca Kessler who will job-share with Nicci.

## 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.

