



ARC CENTRE OF EXCELLENCE IN
FUTURE LOW-ENERGY
ELECTRONICS TECHNOLOGIES

FLEET News: April 2024

The Centre's leadership group is busy planning the FLEET Landing event and other legacy-related programs, including the Centre website that will serve as an ongoing publicly-accessible repository of our work, and a final report describing FLEET's areas of greatest impact.

In the meantime, read on in this newsletter for news from around the Centre, including a new paper on switching a 'star-like' conductor into an insulator, a new COE pride network, and the beginning of the Women in Physics tour.



Regards,

Kirrily Rule

FLEET Communication Chair

In this edition of FLEET News:

- **Switching a kagome material** (Monash)
- **New COE Pride network**
- **Mitch's guide to doing a PhD**
- **Sue Coppersmith physics talk in Melbourne**
- **ECR authors this month**
- **Physics in the Pub, Sydney**
- **Catch up on talks online**

FLEET LANDING

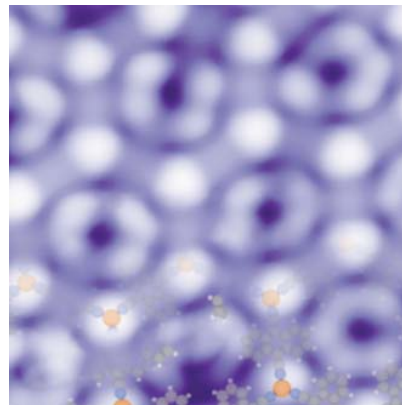
28 May 2024

Collaboration Lounge, New Horizons Centre, Monash Clayton

Below the text are six circular icons: 1. A green circle with a white atom symbol. 2. A yellow circle with a white globe and arrows. 3. An orange circle with a white hexagonal lattice structure. 4. A red circle with a white document and pencil icon. 5. A blue circle with a white lightbulb and gears. 6. A purple circle with a white telescope icon.

Switching a kagome material

A *Nature Comms* study this month led by Benjamin Lowe and Augustin Schiffrin (Monash) reveals a switchable, atomically-thin metal-organic material, with electron interactions in the 2D MOF material creating an unusual electrically-insulating phase in which electrons are frozen. By reducing the population of electrons, the authors are able to unfreeze the remaining electrons, allowing for controlled transitions between insulating and electrically-conductive phases: the key to the on-off binary operations of classical computing. [Read more online](#).



See coverage at [Phys.org](#) / [Nanowerk](#) / [Nanotechnology World Assoc](#) / [Electronics Online](#)

New COE Pride network

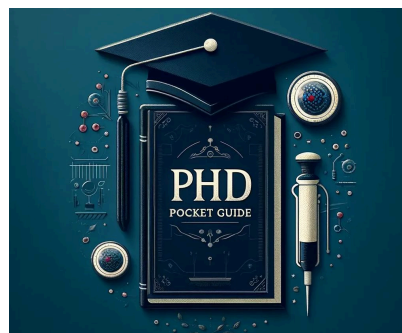
The new ARC Centres of Excellence Pride Network provides a discussion and networking forum for LGBTIQ+ folk, encouraging community-building and collaboration. This will be a space for discussing highlights and challenges, sharing advice and resources, and planning projects. [See more information online](#), including contact details to join the network.



Mitch's guide for PhD students

In a series of 'PhD Pocket Guide' chapters, FLEET alum Mitch Conway shares some of the skills and strategies, tricks and tactics he learned during the process of his own PhD journey: a helpful head-start for others just beginning that journey. First up:

- How to really get your head around plots in academic papers, and
- Presenting at a conference.



Women in Physics tour kicks off

Sue Coppersmith's Women in Physics tour kicks off in May, with talks at schools around Melbourne. If you're in town, please join us at Sue's public talk at RMIT, or at the FLEET/AIP seminar at Monash Clayton. .

- **Public talk** 7PM Wednesday 8 May RMIT
- **FLEET seminar** 10AM Friday 10 May Monash (and online)

Both events are co-sponsored by FLEET and the Australian Institute of Physics.



FLEET-AIP SEMINAR

Optimising silicon/silicon-germanium quantum dot qubits

Prof. Susan Coppersmith, UNSW

Friday 10 May 2024
10:00AM AEST
Online and New Horizons, G30, Monash University

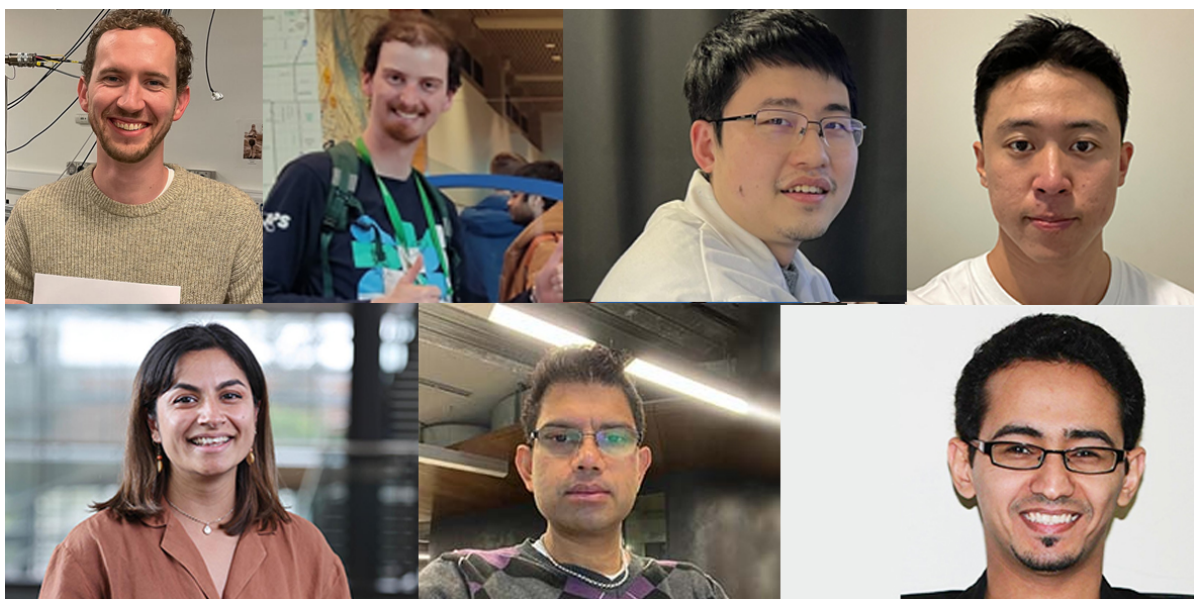
FLEET AND SOCIETY OF COLLEGIATES IN FUTURE LOW-CARBON SUSTAINABLE TECHNOLOGIES

aip AUSTRALIAN INSTITUTE OF PHYSICS

The poster features a portrait of Prof. Susan Coppersmith in the top right corner. The background is dark with a green diagonal stripe at the bottom right. Logos for FLEET and AIP are at the bottom.

Authors in April

Congratulations to our early-career researchers who were authors on papers published this month: Adam O'Neill, Benjamin Lowe, Bernard Field, Cheng Tan, Hongjae Shim, Karen Bayros, Minwoo Lee, Sultan Albarakati, and Sajid Panahandeh-Fard.

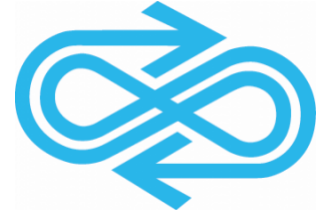


Physics in the Pub, Sydney

Nominations are open for performers at Physics in the Pub, 27 August in Sydney. [See details online.](#)

AIP/optoelectronics conference, December

2–6 December 2024: The Australian Institute of Physics Congress, co-located with the Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD), will be held at the Melbourne Convention Centre. **Abstracts close mid-June.** See [AIP-congress.org.au](#) for further details.



First Australian workshop on quantum light information, matter and electronics (QLIME), December

Melbourne 8–12 December 2024: **QLIME** will connect leading Australian and International researchers in the fields of quantum light, information, matter, and electronics to foster collaboration and identify new opportunities in these interrelated fields. The first in a new biannual series to be held in Australia.

Advanced Materials & Nanotechnology, February

Christchurch NZ 9–13 February 2025: The Conference on Advanced Materials and Nanotechnology (AMN11) will cover a broad variety of topics in nanotechnology and materials science, bringing together material scientists, chemists, physicists, biologists and engineers.

Registration is open now.



Jobs board

The FLEET “jobs board” at [FLEET.org.au/jobs-board](#) is a useful resource for people looking for future positions. If you know of any positions of interest, let us know and we’ll add them. Group leaders, we’re happy to list your new positions here too.

Catch up on past talks

All FLEET seminars and talks are available to catch up on YouTube:

- Oleg Yazyev (École Polytechnique Fédérale de Lausanne) **In-silico discovery of novel topological materials**
- Shu Ping Lau (Hong Kong Polytechnic) **Ferroelectricity in 2D heterobilayers**
- Michele Governale (MacDiarmid) **Corner states in 2D topological insulators**
- Wendy Rogers (Macquarie) **Understanding researcher values to build better scientific outcomes**
- Miguel Ugeda (Donostia) **Collective electronic states in 2D heavy fermion system**

Grants and opportunities

Main Sequence Ventures (CSIRO's investment arm) deep-tech newsletter features over 40 companies with 300+ jobs on offer. [Sign up for the newsletter](#) to stay informed.

\$25–50,000 to start-ups and SMEs to help commercialise highly innovative and new products or processes (TRL 3–9) to help them move along the technology readiness scale and attract investment. Applications close 30 April, with the following round opening 1 July.

For ongoing outreach/development opportunities see [In2science](#) mentoring, and [CSIRO STEM Professionals in Schools](#)

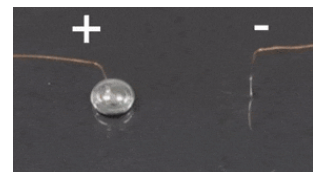
Live Centre stats

Ever wondered how many people have been in FLEET, how many ARC Laureates, Future or DECRA Fellows, collaborative publications or citations? All these stats and more are updated live at [FLEET.org.au/statistics](https://fleet.org.au/statistics)



Previous news

Liquid metal UOW A study led by Yahua He and Xiaolin Wang at UOW has demonstrated liquid-metal transfer from an anode to a cathode without short circuiting, utilising a screen effect caused by hydrogen bubbles at the ultra-thin surface oxide layer. Read the UOW article [here](#), and watch the video of the mechanism in motion [here](#).



Read the FLEET annual report! As well as a year of significant progress toward key research milestones, FLEET's 2023 annual report describes efforts to ensure FLEET's research capacity, far-reaching network and alums educated and trained will continue to make a positive impact "beyond FLEET." [Read the report online.](#)

Case study: FLEET alums and members value 'soft' skills and community: It's not just technical and scientific skills that set up FLEET graduates for future career success. FLEET alums perceive their most important skills gained at FLEET to be transferable or professional skills such as communication, networking, translation and collaboration, and a broad understanding of the research ecosystem. And these highly-valued transferable skills were enabled by a sense of community, a strong support network, and a sense of belonging or common purpose. [Read the case study for more survey comments.](#)

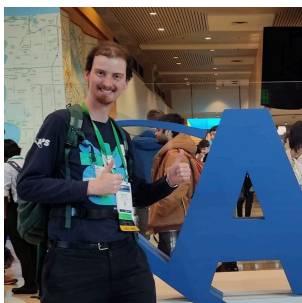
2D liquid-metal printing of future electronics Mohammad Bagher Ghasemian (now at the University of Sydney) led a collaboration of Australia's materials expertise, developing a new liquid-metal printing technique to reduce costs in manufacturing future semiconductors, memory chips and more. [Read more online.](#)

Better Futures Industry Challenge 35 intrepid researchers from five COEs gathered last month for the inaugural Better Futures Innovation Challenge to focus on a nominated critical industry challenges. Of the seven innovative proposals developed, three each receive \$5000 funding to take their proposal to the next step. [Read more about the event and what happens now.](#) Ten FLEET and associated participants were spread across four different teams:

- **Thermal transformers** Two-layer thermoelectric, thermally active building materials that can heat or cool buildings (Kyle Boschen)
- **LabSafe** Smarter inventory-tracking and risk-management systems for labs (Michael Harvey and Andrew Groszek).
- **Quantum Earthquake Detector (QED!)** An inexpensive, robust, sensitive seismometer utilising quantum tunnelling (Julian Ceddia, Kyle Portwin and Errol Hunt) - shortlisted
- **Quantum Tech Educational Unit** Quantum education kits for the masses (Jonathan Tollerud, Daniel McEwen, Sangeet Kumar, and Mitch Conway).



Tich-Lam describes FLEET equity in *The Age*/SMH "Having a workplace that is diverse and equitable is in the best interests of everybody" FLEET COO Tich-Lam Nguyen described the success of the Women in FLEET Fellowships initiative in a STEM equity feature article in *The Age / Sydney Morning Herald* last month. [Read the article here.](#)



Applying comms skills at Berkeley, FLEET

alum Bernard Field Find out how FLEET alumni Dr Bernard Field (ex Monash) applies communication skills honed in outreach and workshop presentations in his new role as a postdoc at the Berkeley Lab. [Read Bernard's interview online.](#)

Got an idea for a great science-outreach project? Funds are available to construct interactive demonstrations explaining relevant science to schools, students or public. FLEET's Mobius superconductor track has been enormously successful in engaging minds with science, but your idea need not be so grand. It could be an interactive gaming experience; something to help explain exciton-polaritons, use of optics/lasers to transform 2D materials, topology and zero-resistance, or even a simpler, smaller version of the levitating superconductor track. So pull a team together, brainstorm some ideas – think outside the box – and put a proposal together. (This counts towards outreach hours.)
