

**FLEET News: October 2023**

Congratulations to Yuerui Larry Lu, recently announced as the 2023 Malcolm McIntosh Physical Scientist of the Year, and to Stefan Maier receiving Argentina's Leloir Prize.

We are running our first briefing tomorrow (11AM AEST) on 'Better Futures', the science-meets-industry 'hackathon' we are running with four other COEs. [Details below.](#)

On the 15th of this month, you might join us again on zoom for a discussion covering how personal values work towards (and sometimes against) better scientific outcomes. [Details below.](#)

Read on for more about these awards and events, recent research, funding success, and other news from around the Centre.

Michael Fuhrer  
Director, FLEET



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**In this edition of FLEET News:**

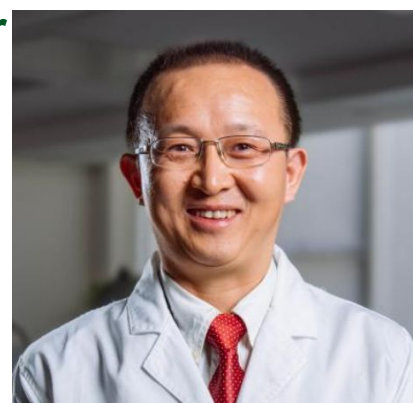
- [Yuerui Lu Physical Scientist of the Year](#) (ANU)
- [Solving quantum mysteries in 2D semiconductors](#) (Monash)
- [Join us tomorrow for the COE hackathon!](#)
- [Jan Seidel on ARC College of Experts](#) (UNSW)
- [Ferroelectric data storage](#) (UNSW, Flinders)
- [Stefan Maier Leloir Prize](#) (Monash)
- [Industry-meets-research event](#)
- [Michael Fuhrer on future energy](#) (Monash)
- [ECR workshop at UNSW](#)
- [Energy outreach](#)
- [FLEET ECR authors this month](#)
- [Jeff Davis to give Nobel Prize lecture](#) (Swinburne)
- [More talks online](#)

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**Yuerui Lu Physical Scientist of the Year**

Congratulations to Prof Yuerui Larry Lu (ANU) receiving the Malcolm McIntosh Prize for Physical Scientist of the Year—recognising his work in interlayer exciton pairs, paving the way for faster, faster, more energy-efficient future electronics.

[Read more and watch the video](#)



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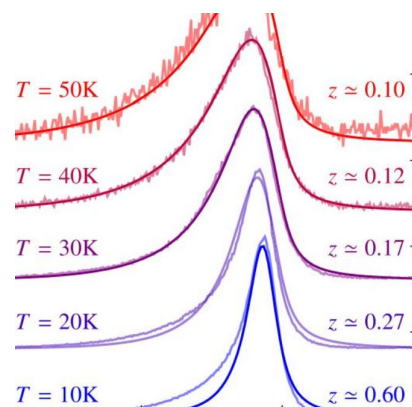
## Solving quantum mysteries: New insights into 2D semiconductor physics

Brendan Mulkerin (Monash) led a study unlocking new insights into the behaviour of quantum impurities within materials. The new, international theoretical study introduces a novel approach known as the ‘quantum virial expansion,’ offering a powerful tool to uncover the complex quantum interactions in 2D semiconductors. This breakthrough holds potential to reshape our understanding of complex quantum systems and unlock exciting future applications utilising novel 2D materials.

[Read more online](#)



See coverage at [Phys.org](#) / [Nanotechnology Now](#) / [AZO Nano](#) / [Nanowerk](#) / [AZO Quantum](#) / [AZO Materials](#)



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## Industry / science hackathon

The **2024 Better Futures hackathon** will assign multidisciplinary teams of researchers to solve industry challenges, with \$30,000 research funding plus \$15,000 prize money for the best solution.

Find out more at the first information session 1 November, tomorrow on zoom: [sign up online](#).



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## Jan Seidel joins ARC College of Experts

FLEET CI Jan Seidel (UNSW) has been announced a 2024 member of the **Australian Research Council College of Experts**, where he will lend his expertise to identifying research excellence, moderating peer assessments and having an input into funding decisions. The ARC College of Experts comprises a range of experienced people of international standing, drawn from academia, industry, and public sector research organisations.

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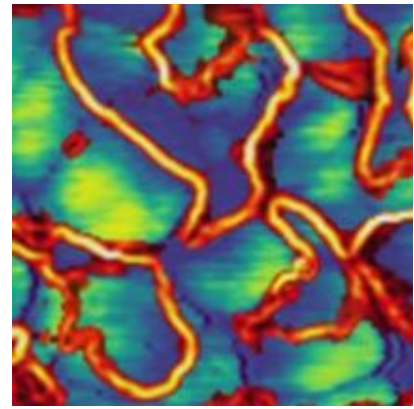
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## Ferroelectric data storage

Pankaj Sharma (now at Flinders) and Jan Seidel (UNSW) explore switchable polarisation in a new class of silicon-compatible metal oxides paving the way for the development of advanced devices including high-density data storage, ultra low energy electronics, and flexible energy harvesting and wearable devices. [Read more online](#).



See coverage at [Flinders University](#) / [Phys.org](#) / [AZO Nano](#) / [Nanowerk](#)



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## Stefan Maier Leloir Prize

Congratulations to FLEET AI Stefan Maier (Monash) on being awarded the prestigious Leloir Prize 2023 from Argentina's Ministry of Science, Technology and Innovation, recognising valuable, continuing nanophotonics collaborations with Argentinean researchers. [Read more online](#).



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## The search for more elegant electrons: Bernard Field

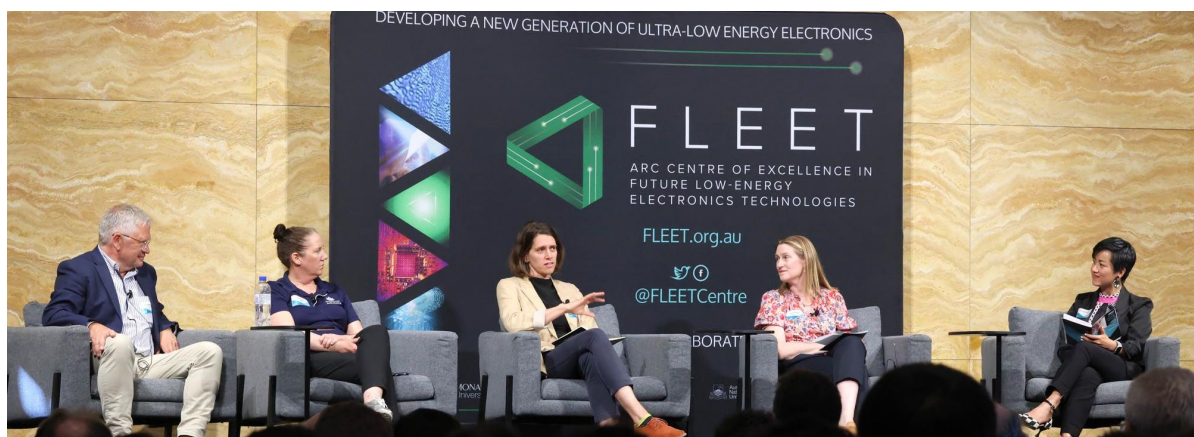
FLEET alumni Bernard Field (ex Monash, now at UCLA Berkeley) was talking about the ravenous and unsustainable energy usage of ICT at the recent Berkeley Lab Research SLAM, winning second place for his explanation of the search for more-efficient transistors. [Watch on YouTube](#)



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## Meet FLEET showcase

FLEET's industry-meets-researchers event at UNSW this month was a great success, introducing end-users to potential collaboration avenues, as well as FLEET research ranging from quantum optics, semiconductor and superconducting devices, sensing, AI, high-tech/deep-tech materials and computing software/hardware. The approximately 90 attendees included academic researchers, energy, semiconductor, quantum and mining representatives, and those working in translation. [See Tich-Lam's report on LinkedIn](#).



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## Discover funding success

Congratulations to FLEET members (current and past) and partners successful in **the latest ARC funding round**. In particular, Kourosh Kalantar-Zadeh, Francois-Marie Allieux, Agustin Schiffrin, Semonti Bhattacharyya, Dimitrie Culcer, Allan MacDonald, Yuerui Lu, Jesper Levinsen, Dmitry Efimkin, Emma Laird, Torben Daeneke, Michelle Spencer, Jan Seidel and Pankaj Sharma.

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## Michael Fuhrer on future energy

FLEET Director Michael Fuhrer and other energy experts spoke on sustainable energy and computing before 90 Monash Science alumni, staff and current students at a panel discussion and networking event, 'The Future of Energy – How are we tackling it?' Michael was joined by Douglas MacFarlane (Monash School of Chemistry) and Karolina Matuszek (Jupiter Ionics).

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## Report on ECR workshop

FLEET's final early-career researcher workshop convened this month at UNSW, with two days of development covering everything from article writing to career and profile building. The workshop was planned and organised by FLEET's ECR Working Group. Big thanks to Abhay Gupta, Bianca Fabricante, Maedehsadat Mousavi, Mitko Oldfield and Yasufumi Nakano. [See the program online](#).



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## Upcoming FLEET Events...

**Better Futures first information session, tomorrow! ([see above](#))**

**Understanding researcher values to build better scientific outcomes** Learn to consider the values that shape your research, factors that support and undermine these values and your ability to conduct research, effects on partnerships, and how to manage conflicts of values. Wed 15 November at 10AM.

### FLEET SEMINAR

#### Understanding researcher values to build better scientific outcomes

Distinguished Prof. Wendy Rogers, Macquarie University,  
Centre of Excellence for Synthetic Biology (CoESB)

Wednesday 15 November 2023  
10:00AM AEDT



**The 2023 Gordon Godfrey workshop** 20-24 November at UNSW will see presentations across spins, topology and strong electron correlations, and features an informal poster session for students and ECRs. [Sign up online](#).



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## Energy outreach

Moein Seyfour, Tiziana Musso (both UNSW) and Jason Major (FLEET Ops) got creative with catapults and quantum circuits this month at Corpus Christi Catholic School, taking year 3-6 students through potential and kinetic energy, electrons as waves and the probability (superposition) of the school principal eating breakfast in the staffroom.



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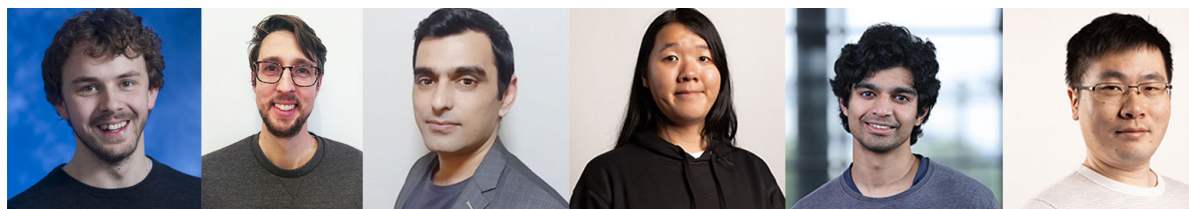
## Jobs board

The FLEET “jobs board” at [FLEET.org.au/jobs-board](https://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.

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## FLEET ECRs publishing in October

Congratulations to our early-career researchers who were authors on papers published this month: Andrew Groszek, Brendan Mulkerin, Muhammad Nadeem, Robin Yow-Ming Hu, Sangeet Kumar and Yahua He.



## Jeff Davis delivering Nobel Prize talk

FLEET CI Jeff Davis (Swinburne) will deliver the Australian Institute of Physics' annual lecture on the Nobel Prize, this year covering the field of ultrafast laser physics. FLEET PI Ferenc Krausz, with Pierre Agostini, and Anne L'Huillier received the 2023 Physics Nobel Prize for experimental methods generating attosecond pulses of light for the study of electron dynamics in matter. The public lecture at Swinburne in Melbourne (3:30PM AEST November 10) will also be streamed online with access link emailed to those who register. [Details and registration online](#).

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## Other events & opportunities

**The Australian Army Quantum Next Generation Minesweeper Challenge** is running until 24 November, aiming to develop the next generation of quantum thinkers (open for ECRs within 6 years of HDR award).

**The 2023 AIP Physics in Industry Day: The Future of Semiconductors** will be held in Sydney Thursday, 2 November 2023.

**The Asian Photochemistry Conference (APC2023)** will be held in Melbourne 27 November to 1 December, hosted by our friends at the ARC Centre of Excellence in Exciton Science

**The Australian Institute of Physics/Optics and Photonics (ANZCOP-AIP) Summer Meeting** will run 3–8 December at ANU. The AIP's lower-cost summer meetings are a great opportunity for Australian/Kiwi post-doctoral researchers and PhD students.

**The 1st International Conference in Quantum Energy** in Melbourne 4-6 December 2023 will examine the role of quantum technologies in future energy challenges and opportunities. [Program out now](#).

**The Condensed Matter and Materials Meeting** will be back in Wagga Wagga NSW 6-9 Feb 2024. Contributed papers are encouraged in all areas of condensed matter and materials research.

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## Catch up on past talks

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

- Peter Abbamonte (Illinois) **Observing Pines' Demon with momentum-resolved EELS**
  - Hui Deng (Michigan) **Different phases of polariton lasers**
  - Ying Liu (Sydney) **Domains, interfaces, nanoscale phenomena in ferro/antiferroelectric materials**
  - Flore Kunst (Max Planck) **Exceptional non-Hermitian topology**
  - Patjaree Aukarasereenont (RMIT) **Liquid metal platforms for 2D materials synthesis**
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## Grants and opportunities

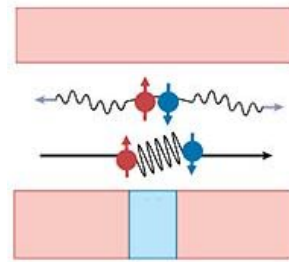
Main Sequence Ventures (CSIRO's investment arm) deep-tech newsletter features over 40 companies with 300+ jobs on offer. [Sign up for the newsletter](#) to stay informed.

**Nano Letters and ACS's new Seed Grants competition** will provide US\$2500 for high-risk, high-reward nano' research proposal ideas from later-stage graduate students (third year+). Closes 1 Sept.

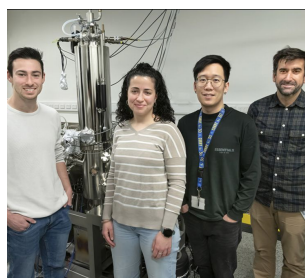
For ongoing outreach/development opportunities see [In2science](#) mentoring, and [CSIRO STEM Professionals in Schools](#).

## Previous news

**Superconducting diode effect review** A UOW/Monash collaboration led by Muhammad Nadeem has reviewed the superconducting diode effect, one of the most fascinating phenomena recently discovered in quantum condensed-matter physics. A superconducting diode enables dissipationless supercurrent to flow in only one direction, providing new functionalities for superconducting circuits. [Read more online](#).



**FLEET alumni Wafa Afzal** FLEET PhD graduate (ex UOW) Wafa Afzal is still pursuing novel materials' functions, now at Archer Materials, designing and integrating innovative materials for operating qubits in quantum technologies. She reports that FLEET's training towards innovative collaborative work, and working towards a shared goal, still helps focus her research efforts. [Read more online](#).



### Research uplift for quantum control

Congratulations to FLEET and other awardees of the Monash Faculty of Science Research Uplift Scheme, including Daniel Moreno Cerrada, Amelia Dominguez Celorrio, Agustin Schiffrin and Nikhil Medhekar, awarded \$3000 to progress electric-field control of quantum phases in 2D metal-organic nanomaterials.

**Farewell Tenille, welcome Nandhini !** We bid a sad farewell to FLEET EO Tenille Ibbotson recently, as she moved on to a great new gig managing the Art, Design and Architecture Department at Monash.



We're also very pleased to welcome **Dr Nandhini Nehru** who is FLEET's new Executive Officer. Dr Nehru has 5+ years experience in physics and materials engineering research and was previously Coordinator of the Monash Energy Institute.



**Mitko wins 3MT silver** Congratulations to Mitko Oldfield for winning second prize at the Monash all-university round of the 3MT competition. Mitko represented the Faculty of Science and competed against 11 other presenters across the range of Monash faculties.

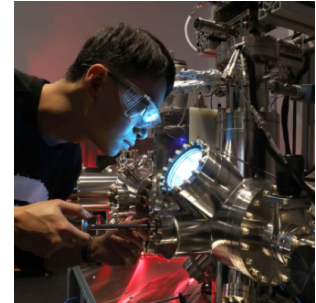


**Nanomagnets on radio** Karen Livesey (University of Newcastle) hit the airwaves last month to describe applications of nanomagnets in medicine and data storage, pathways to physics, and the ongoing AIP Women in Physics lecture tour. [Listen here](#) (Karen's interview starts at 1hr 22min).



**Meanwhile Australian Chief Scientist** (and previous FLEET Advisor) Cathy Foley was interviewed for a recent article in Physics World, speaking about accessing networks of experts, 4AM starts, the value of practising talks and extracurricular efforts such as schools outreach. [Read the article.](#)

**Listening to atoms moving at the nanoscale: UNSW story** A nice news story covered Cam Phu Nguyen and Jan Seidel's recent *Nature Communications* paper on discontinuities studies via nanoscale acoustics (reported in a previous edition of FLEET News). [Read the UNSW article here.](#)



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## Participating organisations

FLEET is The Australian Research Council Centre of Excellence in Future Low-Energy Electronics Technologies. Read more about our [participating nodes](#) and [partners](#) online.

