FLEET

ARC CENTRE OF EXCELLENCE IN FUTURE LOW-ENERGY ELECTRONICS TECHNOLOGIES

FLEET News: November 2023

As I write, FLEET members are gathered in Surfers Paradise Queensland at the FLEET Legacy Meeting quantifying and celebrating seven years of great scientific advances and development of future science leaders, and the Centre's positive impact on the Australian research ecosystem. It's an inspiring experience, even if bitter-sweet. We'll be sharing some talks from the meeting soon.

In the meantime, read on for news from across the Centre.

Michael Fuhrer
Director, FLEET

In this edition of FLEET News:

Legacy meeting in Surfers

Clarivate most cited

Congratulations to Stefan Maier (Monash) and Kourosh Kalantar-zadeh (Sydney), named in the top 1% by citations in their fields, recognised by Clarivate Analytics as influential researchers who have consistently won recognition in the form of high citation counts over a decade.

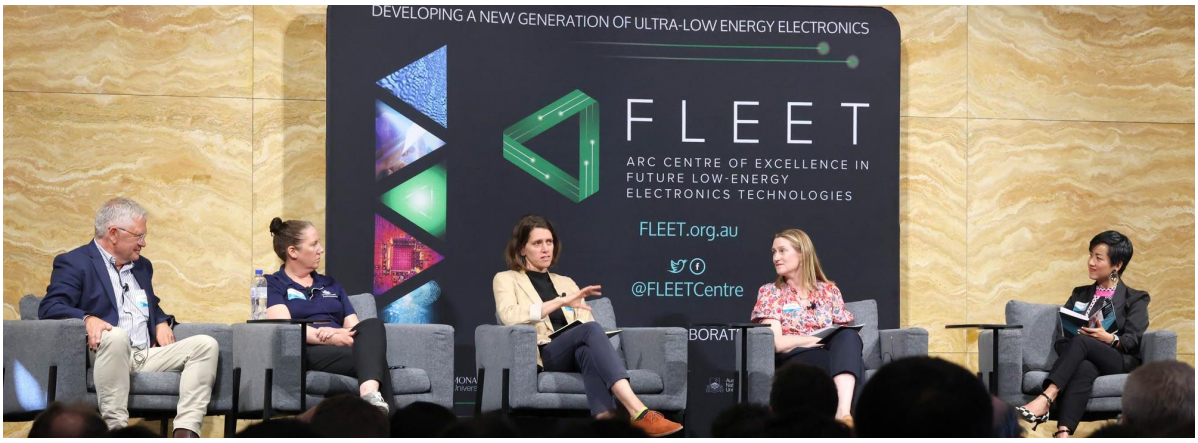
Meet FLEET report & resources

Last month's 'Meet FLEET' innovation-and-industry event at UNSW gathered 90 researchers, industry representatives and others in the translation sphere.

FLEET capabilities in quantum and electronic materials and systems were showcased in a poster session allowing industry reps to engage directly with the researchers, including quantum optics, semiconductor and superconducting devices, sensing, AI, software and hardware.

All 20 posters are now online covering STM automation, THz switching, low-noise quantum devices, thermoelectrics, high-bandwidth comms, LED encapsulants, biosensing, wearable EEG sensing and more.

Thanks once again to all our panellists, attendees and poster presenters.



Infrastructure funding

This month’s ARC infrastructure funding round saw FLEET researchers across five universities on teams awarded additional funding towards research facilities, including significant new imaging resources in South Australia and NSW. **See the report online**.

New defence funding for quantum technologies

The first round of Emerging Disruptive Technologies (EDT) funding has opened, to fund research aligned with Australian defence priorities at approximately $3M per project of 3-5 year duration. Applications (4pp) are due 9 February 2024, with shortlisted applications participating in co-design workshops in February/March.

Read more about the EDT program and identified quantum technology opportunities, including quantum sensing, quantum computing, navigation, ML and software.

Advancing AUS-EU links

The FLEET-EU 2023 Conference Transport in exciton condensates and exciton insulators was run in San Benedetto del Tronto, the art-deco resort town known as the Riviera of the Palms situated on the Italian Adriatic coast. A joint effort between FLEET and partner organisations the University of Camerino (Italy), University of Antwerp (Belgium), and FLEET, the conference covered a range of exciton physics, strengthening Australian-European links in this area of physics. **See the report online**

Gordon Godfrey

The 2023 Gordon Godfrey workshop 20-24 November at UNSW saw presentations across spin, topology and strong electron correlations.

inSTEM report

Kristen Harley (EQUS) wrote a report on the inSTEM networking and careers conference run by seven ARC Centres of Excellence recently. **See the report and images from the conference online**.

Quantum atoms in regional outreach

FLEET took a road trip to Horsham in regional Victoria recently to introduce 100 Year 8 and 9 students to quantum physics and the colourful world of light. “The exercises helped students wrap their heads around the new idea that that electrons are (Mexican) wavy, and that electrical resistance causes the heat they have all felt coming out of their laptop and mobile phone,” says FLEET Research Fellow Yik Kheng Lee (RMIT). **See the report online**.

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.

FLEET ECRs publishing in November

Congratulations to our early-career researchers who were authors on papers published this month: Abhay Gupta, Cheng Tan, Dawei Zhang, Feixiang Xiang, Guolin Zheng, Maedehsadat Mousavi, Majid Panahendeh Fard, Matthew Rendell, Meri Algarni, Mohammad Ghasemian, Sultan Albarakati, and Zeb Krix.

Jeff Davis' Nobel Prize lecture

FLEET CI Jeff Davis (Swinburne) delivered the Australian Institute of Physics' annual lecture on the Nobel Prize (this year covering the field of ultrafast laser physics) to around 100 people at Swinburne this month. FLEET PI Ferenc Krausz, with Pierre Agostini, and Anne L'Huillier received the 2023 Physics Nobel Prize for experimental methods generating atto-second pulses of light for the study of electron dynamics in matter.

Other events & opportunities

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 or 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 in Wagga Wagga NSW 6-9 Feb 2024. Contributed papers are encouraged in all areas of condensed matter and materials research.

Grants and opportunities

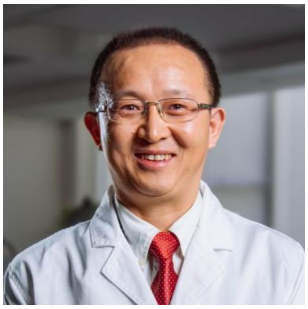
The Australian Institute of Physics is sponsoring two delegates to Science Meets Parliament in March 2024. Deadline 31 January.

The Pint of Science festival puts scientists in front of a friendly and relaxed crowd, to practice explaining their science in the most speaker-friendly atmosphere possible. Deadline 22 December.

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.

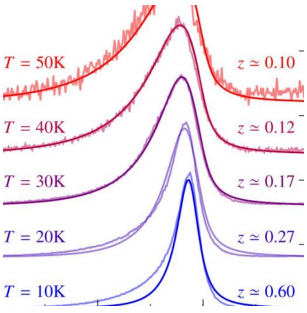
For ongoing outreach/development opportunities see **In2science** mentoring, and **CSIRO STEM Professionals in Schools**.

Previous news

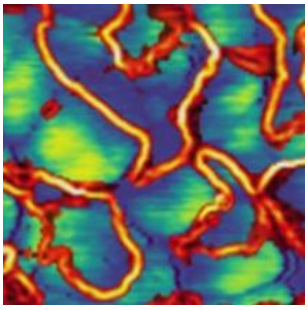


Yuerui Lu Physical Scientist of the Year Congratulations to Prof Yuerui Larry Lu (ANU) receiving the Malcolm McIntosh Prize for Physical Scientist of the Year—recognising his work in interlayer exciton pairs, paving the way for faster, more energy-efficient future electronics. **Read more and watch the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

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

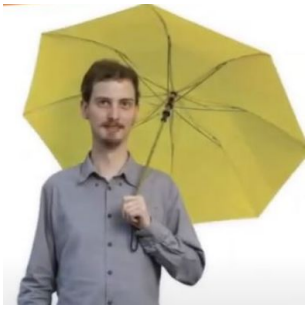


Jan Seidel joins ARC College of Experts Jan Seidel has been announced a 2024 member of the **Australian Research Council College of Experts**, where he will lend his expertise to identifying research excellence, moderating peer assessments and having an input into funding decisions. The ARC College of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



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**.

Stefan Maier Leloir Prize Congratulations to 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**.

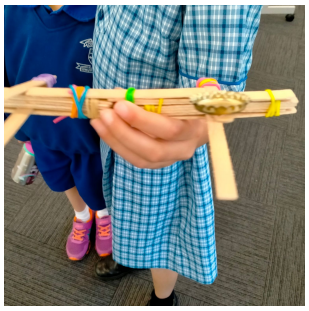


The search for more elegant electrons: Bernard Field FLEET alumni Bernard Field (now at the UC's Lawrence Berkeley National Lab) was talking about the ravenous and unsustainable energy usage of ICT at the recent Berkeley Lab Research SLAM, winning second place for his explanation of the search for more-efficient transistors. **Watch on YouTube**

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 Allioux, 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.

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).

Report on ECR workshop FLEET's final early-career researcher workshop convened last 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**.



Energy outreach Moein Seyfouri, Tiziana Musso (both UNSW) and Jason Major (FLEET Ops) got creative with catapults and quantum circuits last month at Corpus Christi Catholic School, taking

year 3-6 students through potential and kineitc energy, electrons as waves and the probability (superposition) of the school principal eating breakfast in the staffroom.

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.