

FLEET News: April 2023

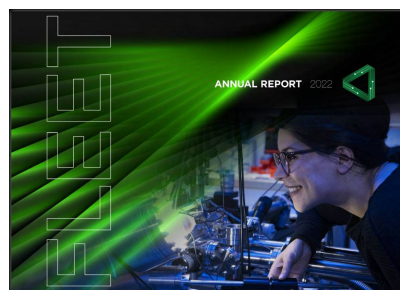
FLEET's 2022 annual report is out. [See the link below](#) for a wrapup of last year's excellence in scientific discovery, outreach, training and equity initiatives. Also in this newsletter you'll find stories on nanopatterning at ANSTO/UOW, and quantum supersolids at UNSW/Europe.

Michael Fuhrer
Director, FLEET



Read the FLEET annual report The last year saw FLEET turn its focus onto ensuring a lasting legacy beyond the life of the Centre, a process that began with 2021's mid-term review.

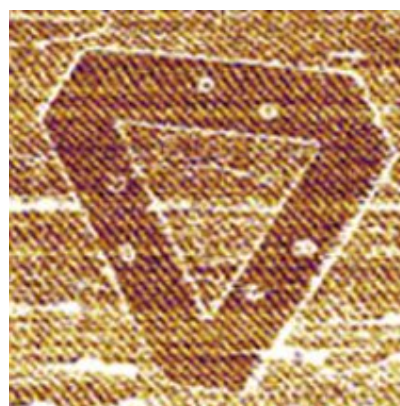
[See the Centre's 20220 annual report](#) for a year's worth of advances in translation, equity, research, outreach and training.


In this edition of FLEET News:

- [Nanoscale patterning at ANSTO](#) (UOW, Monash, RMIT, UNSW)
- [Can a solid be a supersolid](#) (UNSW, Antwerp, Camerino)
- [Read the ARC review](#)
- ['Mind-controlled' robots](#)
- [FLEET ECR authors this month](#)
- [Conferences, past talks and opportunities](#)

Nanoscale patterning engineering of advanced conducting materials

A new ANSTO-led technique engineers nanoscale conducting channels by 'drawing' topological edge state patterns on the surface of a material using ion-beam irradiation. With potential for advanced scalable electronic circuitry, researchers used ion implantation and lithography to create patterns of topological surface edge states on a topological material, making the surface edges conductive while the bulk layer beneath remained an insulator. [Read more online.](#)



Can a solid be a supersolid?

A collaboration of UNSW and European physicists predict that layered electronic 2D semiconductors can host a curious quantum phase of matter called the supersolid. This counterintuitive quantum material simultaneously forms a rigid crystal, and yet at the same time allows particles to flow without friction, with all the particles belong to the same single quantum state. [Read more online.](#)



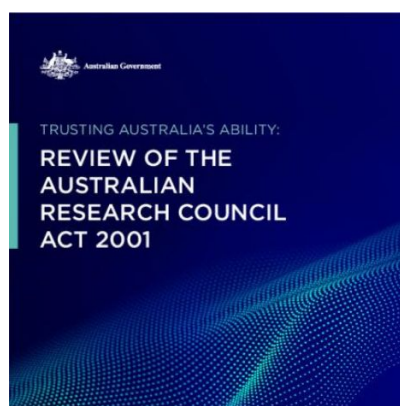
See coverage at [Phys.org](#) / [Science Daily](#) / [Nanowerk](#) / [AZO](#)

Quantum



Read the ARC review

A recent comprehensive review of the Australian Research Council provides interesting reading, including case studies demonstrating the outcomes of long-term basic and applied research, such as quantum technologies. [Read the review online.](#)



'Mind-controlled' robots

FLEET AI Francesca Iacopi and her TMOS colleagues have used 3D-surface graphene patterning to create new 'dry' (non sticky) sensors that can read brain activity, potentially allowing brain waves to control an external device, such as a prosthetic limb, robot or even a video game. [Read more online.](#)



Australian Academy of Science awards

Nominations are open for two awards aimed at Australian women: [Ruby Payne-Scott Medal and Lecture](#) (career medal) and [Nancy Millis Medal](#) (MCRs). See the nomination and eligibility guidelines at the AAS, and consider who you could nominate, and/or encourage to be nominated. **Deadline 1 May 2023 (today!)**

FLEET ECRs publishing in March

Congratulations to our early-career researchers who were first, second or third authors on papers published this month: Abdulhakim Bake, Alexander Nguyen, Babar Shabir, Mohammad Ghasemian, Qile Li, Weiyao Zhao and Yahua He. See more in [FLEET publications](#).



Catch up on past talks

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

- Andrey Chubukov (U Minnesota) **Twists and turns of superconductivity from a repulsive interaction**
- Yuerui Larry Lu (ANU) **Enhanced interactions of interlayer excitons in free-standing hetero-bilayers**
- Peggy Zhang (UNSW) **Stability of ferroelectric bubble domains**
- Jennifer Cano (Stony Brook) **Engineering topological phases with a superlattice potential**
- Semonti Bhattacharyya (Leiden) **Dirac fermions at interfaces**

Grants and opportunities

Science policy and advocacy internships at the Australian Academy of Science provide a 3 month opportunity for PhD students to complete a policy-focused research project under guidance from Academy staff. **Deadline 3 May.**

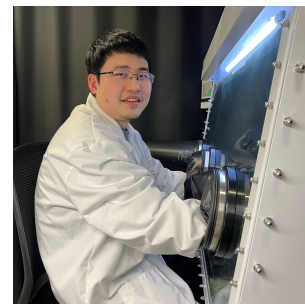
Sydney Quantum PhD Scholarships are available in quantum technology providing stipend up to AU\$35,000, career-development funding and exclusive SQA benefits. **Apply by 3 May.**

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+).

Previous news

Destroying superconductivity of a starlike kagome metal FLEET's Cheng Tan (RMIT) led a recent study in Nature Communications documenting the first discovery of distinct, disorder-driven superconductor-insulator transition in a 'kagome' (starlike structured) candidate material for low-energy beyond-CMOS electronics. [Read the article \(written by Cheng\) online.](#)



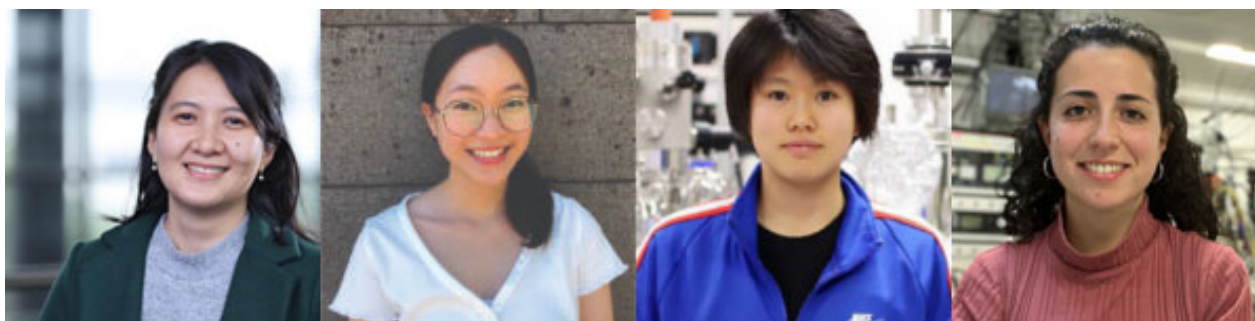
Jianbo Tang: nanoscience emerging investigator Congratulations to Jianbo Tang (FLEET/UNSW) for being chosen as a 2023 Nanoscale Emerging Investigator. [Read Jianbo's article](#) on the formation of inorganic liquid gallium particle–manganese oxide composites in Nanoscale's themed collection, gathering together the very best work from rising stars of nanoscience and nanotechnology research.

Michelle Spencer in high performance computing The International Conference for High Performance Computing has profiled Michelle Spencer (FLEET AI at RMIT), whose work in computational materials chemistry aims towards materials to make digital technological more sustainable. [Read online.](#)



Yuerui Lu receives Pawsey Medal For outstanding research and contributions to applied physics in nanotechnology, Yuerui (Larry) Lu at the Australian National University has been awarded the Australian Academy of Science 2023 Pawsey Medal. [Watch online.](#)

Women in Leadership Funding Four FLEET researchers have received partial Centre funding to attend Women & Leadership Australia Impact program. Congratulations to: PhD student Bianca Rae Fabricante (ANU), PhD student Patjaree Aukarasereenont (RMIT), Diversity in FLEET fellow Dr Mengting Zhao (Monash), and Research Fellow Dr Amelia Dominguez (Monash) [Read more about these four future leaders and the program online](#)



Liquid-metal sustainability Torben Daeneke (RMIT) talked recently about liquid-metal approaches to tackling climate change with journalist Patrick Abboud for the '100 Climate Conversations' series at the Powerhouse Museum in Sydney. [Listen/watch/read online.](#)



Angela awarded fellowship at EQUUS Angela White (UQ) has been awarded the [Deborah Jin Fellowship](#) at EQUUS, to continue her research

Lab tours for students and consulate advisors Monash New Horizons recently hosted tours for secondary students on the Brainstem mentoring program (thanks to tour-guide Julian Ceddia), as well as a visiting British consulate science advisor (thanks to Gary Bean, Mitko Oldfield, Amelia Dominguez and Kris Helmersen). FLEET members are helping mentor year 9/10 participants.



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.



