FLEET

ARC CENTRE OF EXCELLENCE IN FUTURE LOW-ENERGY ELECTRONICS TECHNOLOGIES

FLEET News: December 2022

Congratulations on making it to the end of what has felt like a very busy year, with many changes!

Kourosh's group here at FLEET has helped us celebrate the season with a timely gift of zinc snowflakes – read more about this and other exciting science below.

I wish everyone a relaxing and refreshing holiday break, and I look forward to seeing you next year.

Michael Fuhrer
Director, FLEET

In this edition of FLEET News:

Strategic meeting

FLEET's members gathered at RMIT in Melbourne last week to review progress against the Centre's strategic plan and legacy goals, and ensure we're on track for the remainder of the Centre. At the same time, FLEET's early-career researcher working group organised a three-day workshop building skills (communications and careers), with a writing retreat.

Shielding 2D materials by *adding* vibrations to reduce vibration problems

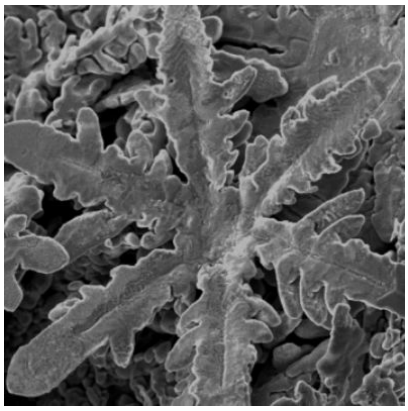
Matt Gebert led a Monash study demonstrating a new, counterintuitive way to protect atomically-thin electronics – adding vibrations, to reduce vibrations. By squeezing a thin liquid-gallium droplet, graphene devices are painted with a protective coating of gallium-oxide that can cover centimetre-wide scales, making it potentially applicable for industrial large-scale fabrication. **Read more online**.

See coverage at **Nanowerk** / Nanotechnology World Assoc

Women in Physics lecturer

Hot on the heels of being announced STA Superstar last month, Newcastle theoretical physicist Karen Livesey is the AIP 2023 Women in Physics Lecturer. Watch this space for 2023 tour dates and hear how nano-magnets are applied in cancer treatments, computing and self-repairing paints. **Read the announcement online**.

Let it snow inside liquid metals



New liquid-metal crystal extraction technique produces wide range of intricate-shaped, symmetrical metallic structures. The UNSW-led study of metallic crystals growing in a liquid-metal solvent finds similarities and differences between liquid-metal solvents and more familiar crystal growth in water, whether snowflakes or dissolved substances. Jianbo Tang and Kourosh Kalantar-zadeh led the new study, published in Science. **Read more about the study online**.

171 See coverage at **Phys.org** / **Science Daily** / **UNSW** / **UAuckland** / **LabManager** / **Chem & Eng News** / **Aust Manufacturing** / **Nanotechnology Now**

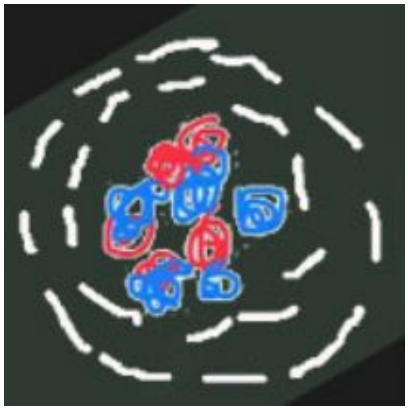
FLEET alum Charlotte Hurry

Centre alum Charlotte Hurry (Operations Team) now runs the ARC Industrial Transformation Training Centre OPTIMA, and reports how she built on and augmented previous job skills to prepare. Also, advice on balancing life and work, and her approach to job hunting. **Read more online**.

FLEET translation: extending LED device lifetime with liquid-metal printed oxides

FLEET translation funding is supporting the next step in a liquid-metal printing application with significant commercial promise, in a project being led by RMIT PhD candidate Patjaree Aukarasereenont, to kick off in 2023. **Read more online**.

Creating a quantum spark in primary students



A FLEET Primary School pilot workshop showed primary students can learn and conceptualize quantum physics and are adept at the Mexican wave. Meanwhile, 155 Hughesdale Primary School students got their first introduction to quantum physics. **Read more online**.

Developing research into impact: Idea Factory report

“It’s interesting to consider how to hold ourselves accountable to the taxpayers that ultimately fund scientific research.”

FLEET ECRs joined EQUS in Queensland this month, learning how to better translate their scientific discoveries to make an impact, with Idea Factory 2022 expanded to develop a wider understanding of research translation, the translation/commercialisation ecosystem, and learning to consider the impact of your research beyond the confines of academia. **Read participants' feedback online**.

Also read PhD candidate Maedehsadat Mousavi’s report from the following Sunrise Innovation Festival, building on her experiences at the EQUS-FLEET Idea Factory: “Previously, I would have never considered starting my own company or launching a start-up, but now I can see myself considering this future, and how an entrepreneur can have an impact on the world.”

ECR authors in December

Congratulations to our early-career researchers who were first, second or third authors on papers published this month: Iolanda di Bernardo, Matthew Gebert, Sangeet Kumar and Shao-Yu Chen. See more in **FLEET publications**.

Conferences

The 10th International Conference on Advanced Materials & Nanotechnology (AMN10) will be held in Rotorua, New Zealand, **6-10 February 2023**. This meeting is sponsored by FLEET partner organisation the MacDiarmid Institute and covers a broad variety of topics in nanotechology and materials science.

Wagga Wagga Annual Condensed Matter and Materials Meeting
The low-cost, friendly Wagga conference is back **7-10 February 2023**, bringing Australia's condensed matter fraternity together – particularly good for research students to present their work and meet colleagues from other institutions (including potential future employers!)

Quantum Australia Conference and Careers Fair in Sydney **21-23 February** will explore building a quantum economy, with Australian and international leaders, and a careers fair providing a platform for potential employers to engage with emerging quantum talent (and vice versa).

Catch up on past talks

If you missed any recent FLEET seminars or other talks, you can catch up on YouTube:

- 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**
- Rafael Fernandes (Minnesota) **Intertwined electronic phases in quantum materials**

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+).

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

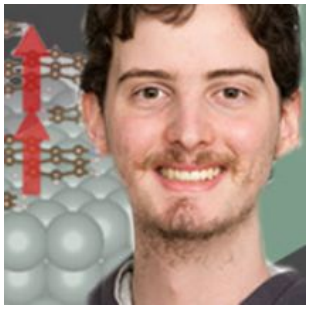
Interested in an **industry internship**? See active positions at **APR Interns**.

Previous news

Chemical reaction that's good as gold New study led by PhD candidate Ben Lowe (Monash) finds gold atoms could be key to unlocking organic reactions, potential building blocks in constructing materials with electronic properties useful in energy-efficient future technologies. **Read more online**.

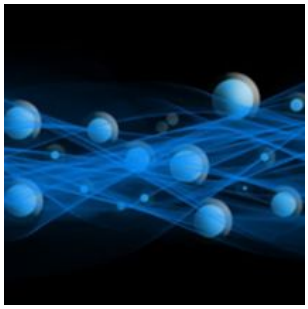
Karen Livesey Superstar of STEM Theoretical physicist and FLEET AI Karen Livesey (University of Newcastle) announced as one of Australia's newest Superstars of STEM, one of 60 diverse, brilliant scientists, technologists, engineers and mathematicians who want to step into the media spotlight as STEM experts. **Read more online**.

Zinc batteries cheaper safer better FLEET Translation funding progressing zinc-ion battery technology, offering decreased costs, better safety and environmental outcomes. The aqueous zinc-ion battery technology, invented by Priyank Kumar, Dipan Kundu and Yuan Shang at UNSW, boasts no toxic or flammable components, low-cost manufacturing, and recyclability. **Read online**.



Magnetism or no magnetism Tuneable electronic properties allow switching of phases such as magnetism off and on, with applications in future energy-efficient electronics. New theoretical study led by PhD candidate Bernard Field (Monash) illustrates substrates' affect on electronic interactions in 2D MOFs. **Read more online**.

Top 1% FLEET's Kourosh Kalantar-zadeh (UNSW) and Stefan Maier (Monash), named in the top 1% by citations in their fields, recognised by Clarivate Analytics which identifies influential researchers – those who have consistently won recognition in the form of high citation counts over a decade. **Read online**.



FLEET's quantum input Australia's national quantum strategy will directly affect the future careers of many FLEET ECRs, impacting research funding, research infrastructure, training and career pathways and international partnerships. **Read the Centre's submission here**, and let us know your thoughts.

Listen: Michael Fuhrer Climate Conversations Catch FLEET's Michael Fuhrer discussing ICT energy use in server farms, new ultra-efficient future 2D/topological materials transistor technologies, and creativity in science—with the ABC's Craig Reucassel. **Listen at 100climateconversations**

Nanotechnology World article First edition of new Nanotechnology World magazine focuses on nanotech solutions for semiconductor industry, features article by FLEET's Michael Fuhrer and Abigail Goff (RMIT) on liquid-metal technologies, with examples drawn from around the Centre. **Read the article online**.

Industry news Articles at AU Manufacturing introduce semiconductor technology to a wider audience, beginning with **a semiconductor explainer**, including **the impact of the chip**

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.