



ARC CENTRE OF EXCELLENCE IN
FUTURE LOW-ENERGY
ELECTRONICS TECHNOLOGIES

FLEET News: January 2021

Welcome to FLEET's first newsletter for the year!

I hope you've had some time during the end of year break to rest, reflect, and spend time with family and friends.

During the break I had some time to explore the Mallee and Buloke regions in the north west of Victoria. I was reminded of how lucky I am to call this beautiful country home! Coming from an immigrant family, I'm forever thankful for the education and opportunities Australia has given me. Otherwise I wouldn't have had the chance to work with such awesome people in FLEET! And for that, I am grateful!



This Feb 11th the Zodiac world officially farewells the year of the Rat! And what a ratty year it has been! Feb 12th welcomes the Ox, which represents character strength and relentless determination! I hope the Ox will bring you the strength and determination you need to achieve what you have set your mind to!

Regards,
Dr Tich-Lam Nguyen
FLEET Chief Operating Officer

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Putting FLEET science on the map

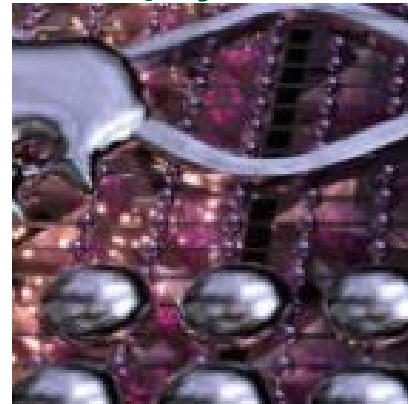
semiconductor industry in 2020 via its first inclusion in the global industry 'roadmap', the IRDS. For FLEET science to become more visible worldwide, particularly with the international semiconductor industry, it was vital that it be included in the IEEE roadmap, and this task was facilitated in 2020 by FLEET AI Prof Francesca Iacopi.

[Read more online](#)



Using exotic patterns to unlock liquid-metal physics

Pattern formation and pattern recognition entertains children and scientists alike. Alan Turing's 1950s model explaining patterns in two-substance systems is used by metallurgists to explain microscopic internal stripes and spots. A new UNSW study explains exotic patterns, counter to Turing's theory, forming on the liquid metal gallium. The previously ignored surface-solidification phenomenon improves fundamental understanding of liquid-metal alloys, with a potential patterning tool, and advanced applications in future electronics and optics. [Read more online](#)



One-dimensional nanowires fertile ground for Majorana modes

One-dimensional quantum nanowires are fertile ground for Majorana zero modes, which are their own antimatter particle. This new UNSW School of Physics study in *Nature Communications* has exciting applications in fault-resistant topological quantum computers and superconductivity. With Karina Hudson (UNSW Sydney Quantum Academy).

[Read more online](#)



Nano-thin piezoelectrics advance self-powered electronics

New ultra-efficient, nano-thin materials could advance self-powered electronics, wearable technologies – and even deliver pacemakers powered by heartbeats. The flexible, printable piezoelectric material was developed by an RMIT-led team with collaborators in Kourosh Kalantar-zadeh's team at UNSW. [Read more online](#)

Equity and diversity at FLEET in 2021

A theme in feedback from FLEET's 2020 survey was that while we are doing well in providing an inclusive environment, our members would like to see us do more to promote and celebrate our diversity in areas beyond gender equity. So in 2021 we'll expand our focus to include Indigenous Australians, LGBTQI, cultural diversity and people with disabilities.

FLEET event coming up: FLEET seminar – 4 February

Synthesis / electronic structure of nickelate superconductors Dr Danfeng Li (City University of Hong Kong) will describe his team's synthesis (soft-chemistry approach) and observation (anisotropy and phase diagram) of superconductivity in nickelate thin film – a system sharing a similar crystal structure and starting electronic configuration to high-temperature cuprate superconductors. [See more details online.](#)



Research commercialisation – 3 March

Scientist, educator and entrepreneur Dr Erol Harvey—founder of the world-leading microfluidic engineering company MiniFAB—will present a special FLEET seminar sharing his significant experience in research commercialisation and entrepreneurship. [Sign up online.](#)



ASTRO3D talk for the AIP – 5 February

The first 2021 talk in the ongoing FLEET-AIP series will introduce Australian Institute of Physics members and the Australian physics community to the work of the new ASTRO3D Centre of Excellence, with Lisa Kewley describing galaxy evolution. [See details online.](#)

Postdoc position at Monash

If you know any high-quality condensed-matter / surface science postdocs seeking a position, please direct them to the [latest position advertised on the FLEET website](#), working with Michael Fuhrer and Mark Edmonds at Monash. Applications close 21 February.

Congratulations to all our ECR authors this month

Congratulations to all the PhD students and other ECRs who are first or second authors in [recent publications](#): Marina Castelli, Jack Hellerstedt, Vivasha Govinden, Peggy Zhang and Jesse Vaitkus.



Development opportunities

FLEET will send four researchers to STA's annual **Science Meets Parliament** event (fully online in 2021). If you'd like to meet, and learn how to influence, Australia's science-policy makers, apply by 22 February. **What's in it for you? See notes from previous FLEET attendees**).



A complementary STA program, **Science Ambassadors**, aims to forge longer-term ties between MPs and STEM professionals – if you're keen on that program, apply by 7 February.

To get an early jump on outreach skills and development, see outreach and mentoring opportunities at **L'Oreal Women in Science**, **Techgirls coaching**, **In2science**, **CSIRO STEM Professionals in Schools**, and **Pint of Science** (seeking presenters and volunteers).

FameLab is a global science-communication competition for early-career researchers in STEM. Applications close February 25. **Apply online**.



Sustainable stand-up (online) teaches you how to describe your research and why it really matters, in a light-hearted, but compelling way. Bonus content: facing your fears about public speaking!

International Women's Day Science in the Pub (March 9) will coincide with presentation training. **Watch this space** for details.

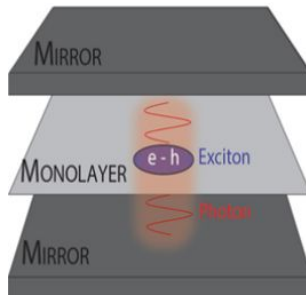
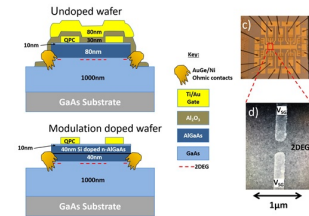
Prime Minister's Prizes for Science nominations open next week

ATSE Awards recognising outstanding Australian achievements in applied science, technology or engineering innovation and commercialisation deadline has been extended to 22 February

- Applications for **FLEET's PhD writeup scholarships** are accepted monthly.
- **Women in FLEET Scholarships** are open to students who identify as female and are accepted into an Honours or PhD program to work with any one of FLEET's investigators. Considered twice a year in June and November. Submit applications anytime.

Previous news

Removing random doping for better quantum devices UNSW's Ashwin Srinivasan led a collaboration that found removing random doping in quantum electronic devices dramatically improves their reproducibility – a key requirement for future applications such as quantum-information processing and spintronics. [Read more online.](#)



Polariton interactions: light matters Monash Research Fellow Olivier Bleu led a study explaining why exciton-polaritons (exotic quasiparticles that are part light / part matter), don't behave as predicted: continuing to interact with other particles when confined to 2D and ultra-cold temperatures. [Read more online](#)

Seeking answers in ferroelectric patterning Why do some ferroelectric materials display 'bubble'-shaped patterning, while others display complex, labyrinthine patterns? Peggy Qi Zhang and Vivasha Govinden (UNSW) with Yusra Nahas (Arkansas) led this FLEET paper in *Nature Communications*, investigating the changing patterns in ferroelectric thin films. [Read more online](#)



'New' PI Shaffique Adams FLEET's newest partner investigator is already very familiar to us all: **Shaffique Adam** has made significant contributions to FLEET to date as an Associate Investigator, and we're pleased to strengthen our partnership with the National University of Singapore by adding Shaffique officially as a partner investigator, alongside Antonio Castro Neto and Barbaros Oezylmaz.

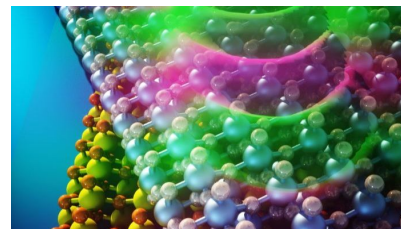
Electrical spin-filtering the key A UNSW study led by Elizabeth Marcellina is a step towards even-faster, more energy-efficient spintronics, applying 'spin-filtering' to separate spin orientation via electrical means—less energetically costly than magnetic. [Read more online](#)



Changes in the FLEET Operations Team Welcome on board **Jason Major** as FLEET training and outreach coordinator (replacing Diane Ruka), and **Catherine Taylor** (left) as UNSW node administrator (while Cecilia Bloise is on maternity leave).

Congratulations to **Charlotte Hurry** who left FLEET in January to start as manager for an ARC industry transformational research training centre. And farewell to **Kathleen Hicks** who has supported the FLEET-ANU crew since 2017. We'll miss them both, but we wish them all the best with their next journeys.

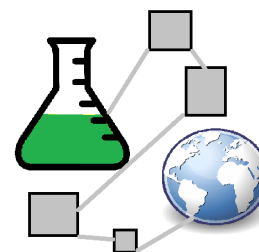
Twistronics in top ten Qingdong Ou and Qiaoliang Bao's (Monash) work earlier in 2020 on expanding twistronics to photons was selected as a TOP 10 Breakthrough of the Year in Physics World. [See the top ten list online](#)



Congratulations to Peggy Schoenherr (UNSW), Maria Javid (RMIT), Chi Xuan Trang (Monash) and Cecilia Bloise (UNSW) who successfully secured scholarships from Women and Leadership Australia and the FLEET equity & diversity committee to participate in the 2021 Leading Edge program. [Read more online](#)

NSW semiconductor study [A new report from the NSW Chief Scientist & Engineer's office](#) on NSW participation in the semiconductor industry, published last month, is worth a read to see some of the Australian businesses and research groups active in this space.

Developing members' research translation skills Two FLEET teams wrapped up their research-translation training last month in the Ascend program (FLEET participants: Abigail Goff, Yi-Hsun Chen, Matthias Wurdack, Patjaree Aukarasereenont, Jesse Vaitkus, Hareem Khan, Errol Hunt and Tich-Lam Nguyen). [See the teams' final 'pitch' presentations online](#) (FLEET starts 14:00).



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.



Australian Government
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