FLEET ARC CENTRE OF EXCELLENCE IN FUTURE LOW-ENERGY ELECTRONICS TECHNOLOGIES

FLEET News: October 2019

This month's newsletter includes quantum-dot research at Monash, liquid metals at UNSW/RMIT and a warm welcome to new FLEET PI Mingliang Tian at the Chinese Academy of Science.

Also, UNSW PhD student Oliver Paull describes his high-power XFEL research. Read on for these stories, workshops, development opportunities, and more news from around the Centre.

Regards,
Dr Charlotte Hurry
Executive Officer, FLEET

Catch up on previous editions of FLEET News

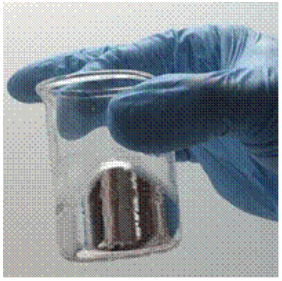
In this edition:

Controlling individual molecules in 2D, quantum-dot nanoarray

A Monash Uni Science study out this month demonstrates quantum-dot arrays an order of magnitude better than conventional inorganic systems. “We would be able to achieve densities tens of times larger than state-of-the-art, top-down synthesised inorganic systems," explains lead author, FLEET's Dhaneesh Kumar.

Read more online.

Liquid metal applications in carbon capture, filtration



Kourosh Kalantar-Zadeh (UNSW , RMIT University) has led a new study using liquid metals as catalysts, with exciting applications in carbon capture and water filtration.

Read more about the new study online.

Why students stand in front of lasers

“It’s pretty surreal being at the pointy end of an almost kilometre-long laser” FLEET PhD student Oliver Paull (UNSW) describes his XFEL experiments at near Osaka, Japan, using a facility trillions of times brighter than the Sun.

Read Oliver's article online.

New PI: Mingliang Tian

FLEET extends a warm welcome to Professor Mingliang Tian, who joins the Centre as a new Partner Investigator. Professor Tian is vice-director of the Chinese Academy of Science’s High Magnetic Field Laboratory in Anhui province, China, which becomes a new partner organisation for FLEET.

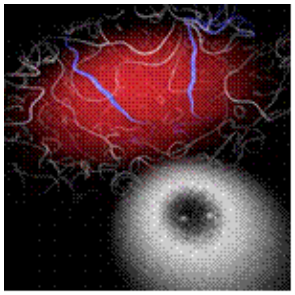
Read more online.

Topological funding

Congratulations to FLEET's Dimi Culcer whose ARC Future Fellowship proposal was funded in this year’s round, announced this month. We are looking forward to seeing more exciting spin-torque and topological electronics work coming from Dimi and his team at UNSW.

Spontaneous coherence & collective quantum phenomena

How do quantum systems reach equilibrium, and what happens if they don't?

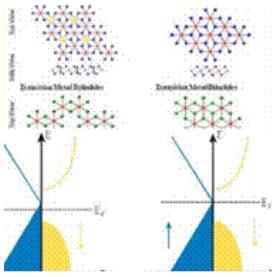


Summer School 13-24 January 2020 This year's Canberra Physics Summer School will explore Bose-Einstein condensates, superfluids, excitons, and other spontaneous collective quantum phenomena at the ANU, targeting Australian-NZ postgrads, senior undergrads and ECRs.

ICSCE10 Conference 28-31 January in Melbourne Poster submissions are still open for the 10th International Conference on Spontaneous Coherence in Excitonic Systems in Melbourne at the end of January.

meet the speakers | register!

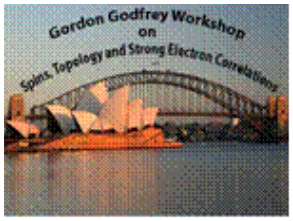
Spintronics reviewed



Two FLEET studies appear in Applied Physics Review's "must read" spintronics research list.

Read the article about Dirac spin-gapless semiconductors and long-range intrinsic ferromagnetism studies at UOW and Monash.

Workshops: Gordon Godfrey, AIP



Join us at the Gordon Godfrey workshop (UNSW 25-29 November) to discuss spin/pseudospin and correlations in low dimensional systems and nanostructures, topological physics and materials, phase transitions, superconductivity and Bose condensation, and correlations in metal oxides. See more information online | share on Linkedin

Registration is still open for 2019 API Summer meeting (December, RMIT Melbourne). Get your work out in front of 800 physicists from around Australia, including professional scientists, academics, post-doctoral researchers and PhD students. FLEET is co-sponsoring this event. See more information online.

Internships APR

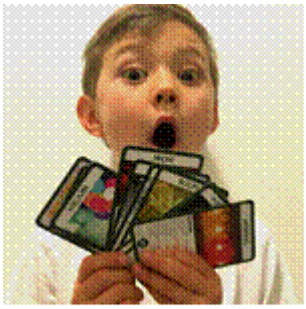
A number of research internship opportunities are available, listed at Australian Postgraduate Research Intern. Current opportunities include defence science, ambient noise assessment and machine learning. APR Intern provides short-term 3-5 month university research collaborations. Ask Dianne Ruka for additional details about the program.

Sydney semiconductor conference

Major semiconductor conference Sydney ICPS2020 next year will feature Nobel Prize laureates Donna Strickland (laser pulsing 2018), Klaus von Klitzing (QHE 1985), and Shuji Nakamura (blue LEDs 2014). ICPS2020.org

Previous news

Impossibly cool temperatures explained Shaun Johnstone (Monash) explains the counter-intuitive world of negative temperatures, following on from the recent vortex research at Monash and UQ (see FLEET News in July). Watch the explanation online, and feel free to share with other physics enthusiasts.

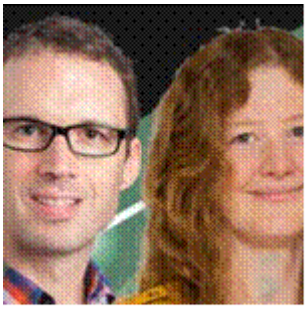


Cecilia captures science-outreach efforts There's been a lot of science outreach happening at FLEET-UNSW over the last month, as captured in an entertaining account by node coordinator Cecilia Bloise. Read more online.

Congratulations FLEET PhD student Stuart Burns, from Nagy's group at UNSW, who submitted his PhD thesis this month, and whose hard work was rewarded by a rare UNSW scholarship to continue research while his thesis is being reviewed. Read more online.

The inaugural Monash Energy Conference (co-sponsored by FLEET) hosted two days of talks on energy topics from solar generation and novel materials to better batteries and grid innovation. FLEET COO Tich-Lam Nguyen introduced the energy-engaged audience to the energy demands of computing, and the need for a low-energy alternative, beyond CMOS.

Ingestible capsule study at UNSW, led by FLEET's own Kourosh Kalantar-Zadeh, lifts the lid on gut gases and shows their importance for human health. Read more about the study online. Kourosh's group at UNSW hosted Australia's Chief Scientist last month, seen here discussing 'liquid metal electronics' with Kourosh.



New trans-Tasman partnership A new trans-Tasman FLEET-MacDiarmid partnership will advance shared research aims towards low-energy electronics via novel materials and devices. Read about the agreement, and meet new FLEET PIs Nicola Gaston and Justin Hodgkiss online. The partnership will also extend to education, outreach and public engagement, as well as sharing best practice on equity and diversity in STEM.

Events coming up

- **FLEET PI Peter Littlewood** at **Monash** 4-5 Nov
- **Science Says!** (ft Jared Cole) 6 Nov, **Melbourne**
- **Australasian Leadership Computing Symposium** 6-8 Nov, **Canberra**
- **Australasian Laboratory Management Conference** 11-13 Nov, **Parramatta NSW**
- **L'Oreal Girls in Science Forum** 19 Nov, **UNSW**
- FLEET-wide Colloquium 21 Nov **ONLINE**
- **Science Meets Parliament** (FLEET members attending) 26-27 Nov, **Canberra**
- **Gordon Godfrey Workshop** **25-29 Nov, UNSW**
- **Cavity QED seminar** **(Allan MacDonald) 2 Dec, Monash**
- **ANSTO User Meeting** **2-3 Dec, Macquarie University NSW**
- **IONS-KOALA** 2-6 Dec, **Dunedin NZ**
- **AIP Summer Meeting** **3-6 Dec, RMIT**
- **FLEET Annual Workshop** **8-11 Dec, Lorne**
- **Aust/NZ Conference on Optics and Photonics** 8-12 Dec, RMIT **Melbourne**
- **Canberra Summer school** **13-24 Jan, ANU**
- **ICSCE10** **28-31 Jan, Melbourne**

Participating organisations

FLEET is: the Australian Research Council Centre of Excellence in Future Low-Energy Electronics Technologies.

Participating nodes are: the Australian National University, Monash University, RMIT University, Swinburne University of Technology, the University of New South Wales, the University of Queensland and the University of Wollongong.