

FLEET News: June 2021

Is it only July? Since the last FLEET update, Melbourne has come out of lockdown, and much of the rest of the country has gone in (briefly, we hope). We are definitely in the second episode of the trilogy where the smooth storyline of the first becomes bumpy, the plot tangles, and new villains are introduced. I can't wait for the credits to roll and the triumphant third episode to begin. Almost there.



In the meantime, read on for the good news: great science, new promotions, honours, scholarships, and welcoming another cute new FLEETer.

Regards,
Prof Michael Fuhrer
Director, FLEET

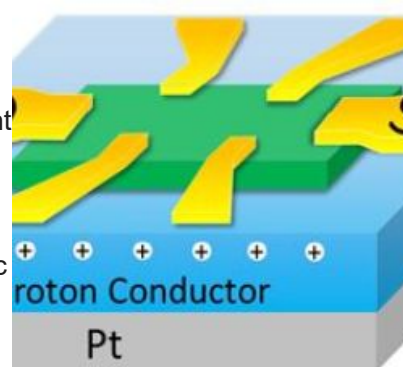
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Controlling spin with iron, protons

Magnetic-spin interactions, allowing spin-manipulation by electrical control, permit potential applications in energy-efficient spintronics: RMIT-led collaboration published this month in *Nature Communications* with Guolin Zhang, Lan Wang and FLEET partner investigator Mingliang Tian at the High Magnetic Field Laboratory (Anhui).



[Read more online](#)

Congratulations Meera and Agustin

Congratulations to two of FLEET's Chief Investigators, whose contributions have recently been recognised by the School of Physics and Astronomy at Monash University:

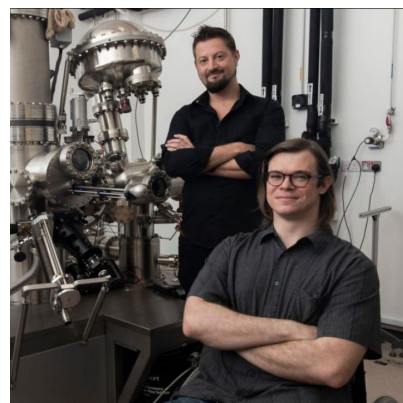
- Meera Parish promoted to full Professor
- Agustin Schiffrin promoted to Associate Professor



[Read more about Meera and Agustin's work online](#)

Electrons on the edge: 2D QSH review

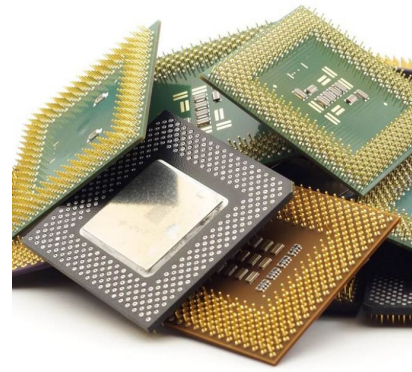
FLEET AI Bent Weber (NTU) has led a review of materials and theory advances wrt two-dimensional QSH, surveying the library of promising atomically-thin quantum spin Hall insulators with view on classical and quantum electronic device applications. [Read more online.](#)



Industry news: Michael Fuhrer on chipageddon

The global semiconductor shortage – delightfully nicknamed 'chipageddon' – is wreaking havoc across multiple industries, and raises a longer-term challenge in plateauing efficiency of CMOS chips. FLEET director Michael Fuhrer talked to *Cosmos magazine* about semiconductor manufacture and the end of Moore's Law.

[Read the article](#) | [Read the explainer](#)



Engaging with end-users: Melbourne Computer Club

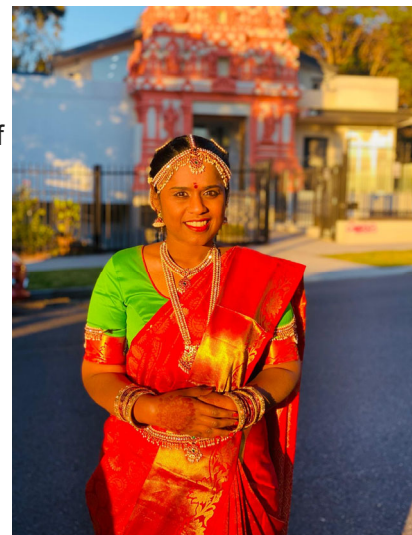
Engaging with the Melbourne computing and electronics community in a 'fireside chat' forum this month, FLEET's Torben Daeneke (RMIT) and Iolanda Di Bernardo (Monash) explained to the audience what the intrinsic limitations of the current CMOS-based technology are, and what some of the approaches are that FLEET members are looking into how to address these issues. [Read more online.](#)



Congratulations Vivasha Govinden

FLEET PhD student Vivasha Govinden had her hard work rewarded by a UNSW writing scholarship for the examination of her thesis, which she submitted at the end of May.

Vivasha also tied the knot this month (see pic, right), in a wonderful wedding celebration that included Nagy Valanoor putting his material science skills to work breaking open a coconut.



International lab collaboration in times of Covid

How does global research collaboration work, while Covid still prevents international in-lab visits? FLEET's Matthias Wurdack (ANU) and Semonti Bhattacharyya (Monash) worked with collaborators at Columbia University to find a creative solution, running in-lab demonstrations of new quantum technologies across multiple university labs on two continents. [Read more online.](#)



Cute alert! Welcome Nicole Xiang

Congratulations to Feixiang Xiang (UNSW) and partner Nina Zhu, who welcomed the safe arrival of their lovely baby daughter Nicole on Saturday 12 June.



Congratulations Jemima and Tommy

Congratulations to Jemima Goodwin (UQ) – the newest Women in FLEET Honours scholar – and Tommy Bartolo (RMIT), who has received a FLEET writeup scholarship (which was introduced based on needs and concerns identified in a recent Centre member survey). [Read more](#)

Industry talk today

In FLEET's next industry-engagement talk (starting in just a few minutes!), business-development manager Dr Sarah Jaber will share her career journey from a PhD in Chemistry to specialising in industry-academia collaborations. [Register online.](#)

Coming up As well as FLEET's strategic workshop (7-9 July) we have a panel discussion on [applying for a DECRA](#) (27 July) and a talk on [commercialising semiconductor research](#) (10 August).



Catch up on these recent FLEET talks :

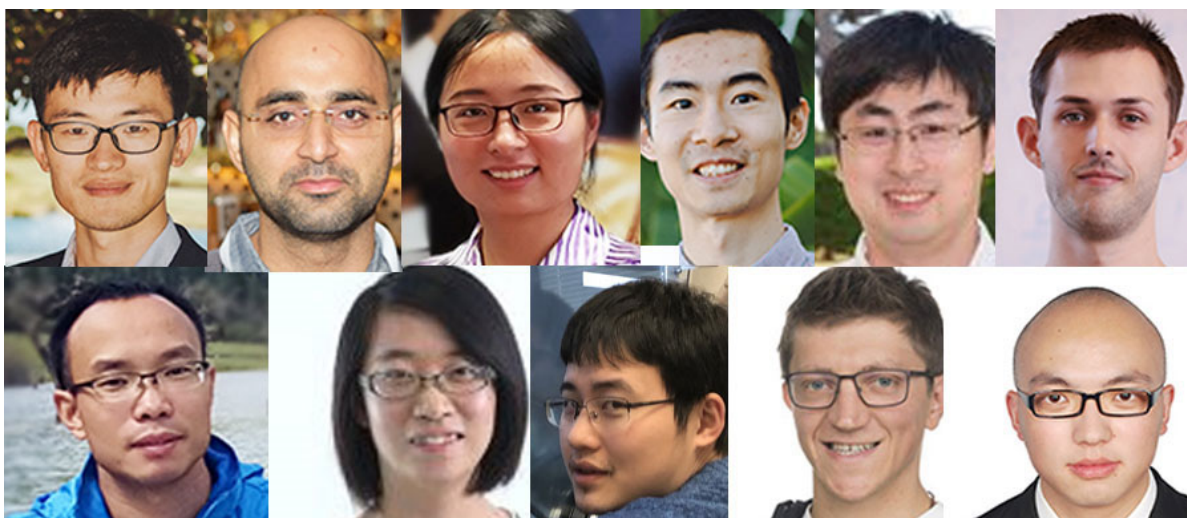
- Michael Barson (Monash) **Quantum microscopy**
- Brian LeRoy (U. Arizona) **Designer states in vdW heterostructures**
- Dimi Culcer (UNSW) **Anomalous Hall effect in non-mag. conductors**

Australian STEM recognised in Shanghai rankings

Great results for STEM in Australian universities in the Shanghai/ARWU 2021 rankings, with Australian universities represented in the world top-100 for all the natural sciences and engineering disciplines except maths. **See online for highlights amongst FLEET's participating nodes.**

Congratulations to our ECR authors this month

Congratulations to Cheng Tan, Fan Ji, Frank Fei Yun, Guangyao Li (alum), Guolin Zheng, James Cullen, Jiong Zhang, Olivier Bleu, Pankaj Bhalla, Weiyao Zhao and Zeb Krix... who are first or second authors in our **most-recent publications.**



Fresh Science: engage!

Nominations are open for Fresh Science, with ten ECRs in each Australian state gaining a day of free training, the opportunity to present in public, and media coverage for their science.

Deadline 29 July. **See nomination details**

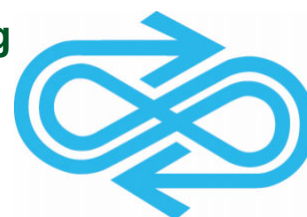
freshscience

Bring your physics to the AIP summer meeting

Abstract submissions are now open for the Australian Institute of Physics Summer Meeting (6–9 December) at QUT in Brisbane.

FLEET's Iolanda Di Bernardo (Monash) and Dongchen Qi (QUT) are

encouraging all physicists to consider attending to present their research. **Details online**



ECR women writing workshop

An ANU workshop in September will teach expert tips on writing grant applications and scientific papers. The workshop is aimed at strengthening the scientific writing, critical thinking and communication skills, providing mentoring, transparent peer review and centralised writing training opportunities. The workshop is currently planned to be onsite at ANU, with an online backup plan. [More information online.](#)

For other outreach/development opportunities see [In2science](#) mentoring, and [CSIRO STEM Professionals in Schools](#). Neuromorphic computing PhD scholarships are available with FLEET partner organisation MacDiarmid Institute, based at UCNZ, Christchurch New Zealand. [Read more.](#)

Previous news

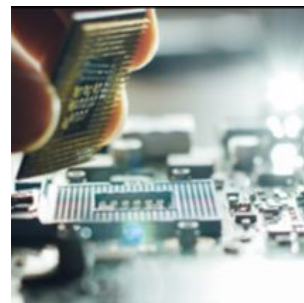
The liquid metal spinoff Liquid Metal Plus (LM+) initiated in 2020 with FLEET investigators Kourosh Kalantar-Zadeh and Torben Daeneke, with Dorna Esrafilzadeh (UNSW), launched in April. The company focuses liquid-metal technologies on 2D 'printed' semiconductors and CO₂ capture. [Read more.](#)



Thermoelectric industry-researchers'

Linkage Advanced materials can sustainably convert waste heat into useful forms of energy to benefit Australia. New research will be undertaken as part of an ARC Linkage Project awarded to a team led by FLEET's Xiaolin Wang and Zengji Yu (UOW), with FLEET PI Kirrily Rule at partner organisation ANSTO. Linkage projects promote partnerships between researchers and business and industry. [Read more.](#)

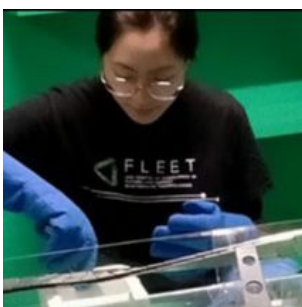
Topological patents reinforce position as world leader Two patent applications, one filed in 2020, reinforce FLEET's position as a world leader in topological transistors. The patents cover work in the 'switching' of topological material, to facilitate creation of a functioning topological transistor – and reinforce demonstration that topological transistors can overcome Boltzmann's tyranny to switch at lower energies, and topological insulator devices' recognition in the 2020 IEEE Roadmap. [Read more.](#)





Welcome Elodie Luna Sando and Axel Karel Congratulations to UNSW's Dan Sando and partner Candice, who welcomed Elodie Luna to the world on April 22. Dan reports that Mum and Elodie are both well, and thrilled!

And congratulations also to Julie Karel and partner Trent, who welcomed Axel Karel last month, slightly earlier than planned and unexpectedly for two parents that had planned to set up the baby room over the weekend. Julie reports: "Trent and I learned our first important lesson in parenting - it doesn't matter what your plans are, the baby has their own plans."



FLEET at Melbourne Knowledge Week Melbourne Knowledge Week was an opportunity for FLEET to engage with the public about the exciting future of computing, and a large cohort of Centre members from the three Victorian unis staffed the superconducting Mobius strip and talked to public about a sustainable future for computing. [Read more](#)

Tools of the Trade from Eli and Iolanda In two more articles for *Nature Reviews Physics*' "Tools of the Trade" series, [Eli Estrecho \(ANU\)](#) described laser trapping and manipulation of exciton-polariton quantum fluids, while [Iolanda Di Bernadro \(Monash\)](#) described non-disruptive techniques for depth profiling in photoemission spectroscopy.



Welcome to FLEET's three new Women in FLEET Honours students: Kyla Rutherford (RMIT), Olivia Kong (UNSW) and Robin Hu (ANU), who have all received Women in FLEET Honours Scholarships. [Read more about them, and their work.](#)

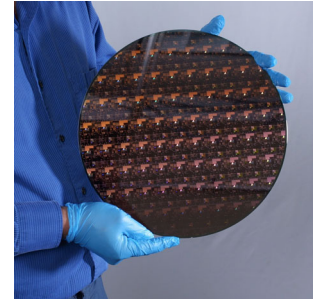
Congratulations to Susan Coppersmith (UNSW), announced last month as a new Fellow of the Australian Academy of Science. FLEET is fortunate to have the benefit of Prof Coppersmith's expertise in theoretical condensed-matter physics, specifically semiconductor technology towards advanced quantum-coherent nanodevices, including novel strategies to achieve artificially-engineered topological materials.





Congratulations also to FLEET's Jared Cole (RMIT) who has received a Royal Society of New Zealand international leader fellowship to work with FLEET partners the MacDiarmid Institute in Wellington. A great chance to help build up trans-Tasman skills in device modelling and advanced materials simulation.

Industry news Other than the ongoing 'chipageddon' chip shortage (which has helpfully spotlighted the importance of electronics to so many components of the economy), the biggest semiconductor-industry news last month has been the announcement of 2nm nodes at IBM, projected to achieve 75% lower energy use than 7nm node chips. [Read more on the IBM site.](#)



Congratulations to FLEET alum Dr Hareem Khan, whose work at RMIT with ,Kourosh Kalantar-Zadeh, Torben Daeneke and JianZhen Ou on the synthesis and study of atomically-thin materials was recognised this week by the RMIT HDR Impact Award, recognising considerable impact outside the academia in 2020. Meet other FLEET's alums at [FLEET.org.au/alums](https://www.fleet.org.au/alums)

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.



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