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Education

Ph.D. in Physics, University of Cambridge (2019)

- Thesis: Quantum transport in magnetic topological insulators
- Advisor: Prof. Charles Smith

M.S. in Physics, National Taiwan University (2011)

- Thesis: Transport in chemically reduced graphene oxide and $\text{GaP}_{1-x}\text{Sb}_x$
- Advisor: Prof. Chi-Te Liang

B.S. in Physics, National Cheng Kung University (2009)

Research Experience

Feb 2023 – present Assistant Professor at *Department of Physics, National Sun Yat-Sen University*

- Studying the quantum transport behaviour and phase transition mechanism in magnetic topological insulators and related heterostructures.
- Studying the transport properties in 2D van der Waals materials and related superlattice structures.

Nov 2021 – Jan 2023 Principal Engineer at *Pathfinding Department, TSMC*

- Developing pioneering integration process for transistor architecture beyond the 2-nm node.

Sep 2020 – Sep 2021 Postdoctoral Researcher at *Moodera Research Group, Francis Bitter Magnet Lab, Massachusetts Institute of Technology*

- Studying the exchange coupling at the interface between magnetic materials and topological insulators by transport measurement and MBE film growth.
- Investigating the magnetic switching of ferromagnetic layers driven by spin-orbit torque for realizing all-electric low-power spintronic devices.

May 2020 – Jul 2020 Postdoctoral Researcher at *Advanced Devices Group, Department of Materials Science and Engineering, National Chung Hsing University*

- Studying the properties of triboelectric nanogenerators and their potential applications for self-powered electronic devices.

Oct 2014 – Dec 2019 Ph.D. Student at *Semiconductor Physics Group, Cavendish Laboratory, Department of Physics, University of Cambridge*

- Studying the magnetic and electrical properties of magnetically-doped topological insulators $(\text{Bi,Sb})_2\text{Te}_3$ using scanning probe microscopy and transport measurement at millikelvin temperatures.
- Investigating the dissipation mechanism in the quantum anomalous Hall effect.
- Studying the carrier transport behaviour in monolayer and bilayer graphene using scanning probe microscopy and transport measurement.
- Developing an Akiyama probe-based scanning probe microscope system that works between 1.5 K and room temperature.

Aug 2012 – Sep 2014 Research Assistant (full-time) at Institute of Astronomy and Astrophysics, Academia Sinica

- Studying the cosmic infrared background radiation and stellar evolution by data reduction, image processing, and fluctuation spectrum analysis using the data collected by astronomical satellites and telescopes.

Sep 2009 – Jun 2011 Master's Student at Cryogenic Semiconductor Lab, Department of Physics, National Taiwan University

- Studying the carrier transport properties in reduced graphene oxide nanofilms and III-V semiconductors ($\text{GaP}_{1-x}\text{Sb}_x$ and GaAs).

July 2008 – Jun 2009 Undergraduate Research Assistant at Organic Optoelectronic Device Lab, Institute of Electro-Optical Science and Engineering, National Cheng Kung University

- Investigating the influences of ultraviolet and O_2 plasma on the power conversion efficiency of pentacene/PTCDI solar cells.

Publications

1. M. Li, H.-W. Lu, Shu-Wei Wang, R.-P. Li, J.-Y. Chen, W.-S. Chuang, F.-S. Yang, Y.-F. Lin, C.-Y. Chen, and Y.-C. Lai, "Filling the gap between topological insulator nanomaterials and triboelectric nanogenerators". *Nature Communications* **13**, 938 (2022).
2. Shu-Wei Wang, D. Xiao, Z. Dou, M. Cao, Y.-F. Zhao, N. Samarth, C.-Z. Chang, M. R. Connolly, and C. G. Smith, "Demonstration of Dissipative Quasihelical Edge Transport in Quantum Anomalous Hall Insulators". *Physical Review Letters* **125**, 126801 (2020).
3. Z. Dou, S. Morikawa, A. Cresti, Shu-Wei Wang, C. G. Smith, C. Melios, O. Kazakova, K. Watanabe, T. Taniguchi, S. Masubuchi, T. Machida, and M. R. Connolly, "Imaging Bulk and Edge Transport near the Dirac Point in Graphene Moiré Superlattices". *Nano Letters* **18**, 2530 (2018).
4. S. Morikawa, Z. Dou, Shu-Wei Wang, C. G. Smith, K. Watanabe, T. Taniguchi, S. Masubuchi, T. Machida, and M. R. Connolly, "Imaging ballistic carrier trajectories in graphene using scanning gate microscopy". *Applied Physics Letters* **107**, 243102 (2015).
5. S.-T. Lo, H. E. Lin, Shu-Wei Wang, H.-D. Lin, Y.-C. Chin, H.-H. Lin, J.-C. Lin, and C.-T. Liang, "Electron transport in a GaPSb film". *Nanoscale Research Letters* **7**, 640 (2012).
6. Shu-Wei Wang, H. E. Lin, H.-D. Lin, K. Y. Chen, K.-H. Tu, C. W. Chen, J.-Y. Chen, C.-H. Liu, C.-T. Liang and Y. F. Chen, "Transport behavior and negative magnetoresistance in chemically reduced graphene oxide nanofilms". *Nanotechnology* **22**, 335701 (2011).

Honours and Awards

1. Perry Fund (2018)
2. Lundgren Research Award (2017)
3. Taiwan-Cambridge Scholarship (2014)
4. Lam Research Award (2011)
5. Dean's Award of College of Science (2011)
6. PSROC Postgraduates Student Thesis Award (2011)

Teaching Experience

2023 – present Assistant Professor, Department of Physics, National Sun Yat-sen

University

- *General Physics (II)*
- *General Physics Laboratory (II)*

2009 – 2011 Teaching assistant, *Department of Physics, National Taiwan University*, of the following courses:

- *Electricity and Magnetism (I) and (II)*
- *History of Physics*
- *Freshman seminar*
- *General education: Evolution, Cosmos, Man*

Professional Skills

- 1. Transport measurement:** Low-noise electrical transport measurement between 10 mK and room temperature using cryostats, ^3He systems and wet/dry dilution refrigerators.
- 2. Scanning probe microscopy:** Atomic force microscopy, electrostatic force microscopy, magnetic force microscopy, Kelvin probe microscopy, scanning gate microscopy, scanning Hall probe microscopy, and scanning tunnelling microscopy between 30 mK and room temperature.
- 3. Sample fabrication:** Photolithography and e-beam lithography; mask design; ion milling; molecular beam epitaxy (MBE); metal deposition; ball/wedge/conductive paste bonding techniques.