

Shuchen Li

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 [LinkedIn](#)

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EDUCATION

University of Illinois at Urbana-Champaign

Expected May 2026

Ph.D. in Materials Science and Engineering

Tulane University

2017 – 2020

B.S. in Physics Distinguished Scholar (2017 – 2020), Dean's List (2017 – 2020)

GPA: 3.98/4.00

SKILLS

○ Fabrication & Process:

- Cleanroom Device Fabrication (5 years of experience)
 - Photolithography: Heidelberg MLA150
 - E-beam lithography: Raith EBPG5150
- Etching: Wet etch, Reactive-Ion Etching (RIE), Ion Mill

○ Thin Film Deposition:

- AJA sputtering system, AJA e-beam evaporation system
 - Sputtering, E-beam Evaporation
 - Maintenance and troubleshooting
 - Developing and monitoring deposition processes
- CVD: Metal-Organic CVD, hydrothermal

○ Characterization & Measurement:

- Materials:
 - SEM, XRD, Raman, RBS, Ellipsometry, AFM
- Electrical & Device:
 - PPMS, Dilution Fridge, lock-in amplifiers, RF/DC current sources, VNA
 - Instrument communication protocols (GPIB, RS232, USB, etc.)

○ RF power delivery systems:

- Sputtering insulating materials, RF biasing
- Signal generator

○ Software & Data Analysis:

- CAD: SolidWorks, KLayout, Autodesk, PCB Design
- Programming & Automation: Python, Java, LabVIEW

EXPERIENCE

Equipment/Instrument Manager, [Axel Hoffmann](#) Group, UIUC

2021 - Present

- Performed routine maintenance on AJA Sputter, E-beam Evaporation and ion milling systems to ensure operational readiness for all lab users in Prof. Hoffmann's lab.
 - replacing targets for deposition | monitoring machine status | calibrating and developing process
- Authored and maintained 5 Standard Operating Procedures (SOPs) for sputtering, cryo-pump, sand blaster, RF power tuning, and PID control for both routine operation and troubleshooting.
- Trained 10+ users on the operations of deposition tools, ion etch, and electric measurements.
- Diagnosed and repaired critical AJA sputter system failures, including heating lamps and Cryo-pump malfunctions, by interfacing directly with AJA technicians.
- Upgraded the Sputter system by installing two additional guns for sputtering magnetic targets.
- Assembled the Cryo-vector magnet and magneto-optic Kerr effect microscope systems in the lab, involving writing codes for configuring and customizing instrumentations for different users' needs.

Research Assistant, [Axel Hoffmann](#) Group, UIUC 2020 - Present

- Developed new synthesis recipes from the ground up and optimized process by systematically characterizing properties such as phase, crystallinity, and stoichiometry using techniques including Raman, XRD, XRR, RBS, AFM, etc.
- Designed advanced waveguides and multi-terminal nano-devices using CAD and fabricated using lithography and etching techniques in a cleanroom environment for transport measurements.
- Established reliable recipes and processes in e-beam- and photo- lithographies by systematically refining exposure doses, spin coating times, and developing times.
- Set up and optimized measurements and material characterizations by developing Python-based automation tools for data collection and analysis, real-time visualization, and controlling parameters like temperature, current, and fields.
- Published research results in high-impact journals and presented at international conferences.

Research Mentor, [Axel Hoffmann](#) Group, UIUC 2022 – Present

- Guided NSF-funded REU students during summer research, trained them on film depositions, device fabrications, semiconductor processing, and various electrical measurements.
- Assisted and advised new lab members on experiments and research techniques.

Media Sputtering & Nano Fab Intern, [Western Digital](#), 5601 Great Oaks Park May-Aug, 2025

- Explored materials for heat sink layers in heat-assisted magnetic recording technologies (HAMR) by synthesizing thin film alloys with various compositions using magnetron sputtering, and characterized the thin films by XRD, XRR, and TEM.
- Improved heat sink layer laser absorption by 20% in HAMR as measured by ellipsometry, by working with experts and building fitting models for optical properties of thin films using J.A. Woollam software.

PROJECTS

Spin-Orbit Torques in MoTe₂/Ferromagnetic (FM) Devices 2020 - 2023

- Developed sputtering recipes to synthesize 1T' phase MoTe₂ thin films with good crystallinities, by systematically refining growth parameters, as characterized by Raman, XRD, and TEM.
- Fabricated MoTe₂ thin films into nano devices using photolithography and ion-milling for efficient GHz RF transport in MoTe₂ to study novel spin orbit torques in MoTe₂/Ferromagnetic (FM).
- Observed large unconventional torques (spin Hall angle = 40-60%) in MoTe₂/FM via harmonic Hall and ST-FMR measurements, promising faster and energy efficient magnetization switching.

Gate-tunable Magnetoresistance of Chiral Inorganic Tellurium (Te) 2022 – Present

- Fabricated 12-terminal nano-devices on Te flakes using E-beam lithography and ion milling.
- Conducted magnetoresistance (MR) measurements up to 9T and down to mK by using Python/LabVIEW to control PPMS/dilution fridge, lock-in amplifiers, and RF/DC sources.
- Observed gate-tunable unidirectional MR in chiral Te, under magnetic field & cryogenic environment, revealing chirality-induced spin polarizations and deep physics origins.

Giant Magnetoresistance and Spin Torques from Mn₃Sn 2022 – Present

- Developed sputtering recipes to synthesize high-quality epitaxial Mn₃Sn (0001) thin films on MgO (111) substrates, as characterized by XRD and TEM.
- Fabricated RF waveguides on Mn₃Sn and performed GHz spin-torque characterization measurements.
- Performed temperature-dependent planar Hall and giant magnetoresistance (AMR) measurements in Mn₃Sn/Ferromagnetic devices using a super conducting vector magnet.

PRESENTATIONS & AWARDS

- American Physical Society March Meeting [2022 (**travel award**), 2023, 2024, 2025]
- Magnetism and Magnetic Materials Annual Conference (2022, 2023, 2024, 2025)
- Gordon Research Conference [2023 (**best poster**)] & Spin Caloritronics XI (2022)