

Shuchen Li

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 [Portfolio Website](#)

 [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:

- Photolithography, E-beam lithography
- Wet etch, Reactive-Ion Etching (RIE), Ion Mill
- Sputtering, E-beam evaporation, CVD, Metal-Organic CVD

Metrology:

- AFM, SEM, XRD, XRR, Raman, RBS, Ellipsometry

Electrical:

- Lock-in amplifiers, RF/DC current sources, Oscilloscope, Vector Network Analyzer (VNA)
- Instrument communication protocols: GPIB, RS232, USB

Cryogenic and Superconducting system:

- PPMS, Dilution Fridge, Superconducting vector magnet

Software & Data Analysis:

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

PROFESSIONAL EXPERIENCE

Western Digital

San Jose, CA

Media Sputtering & Nano Fab Intern

May-Aug, 2025

- Thin Film Synthesis: synthesized thin film alloys with various compositions using magnetron sputtering for heat sink layers in heat-assisted magnetic recording technologies (HAMR).
- Metrology and Process Optimization: systematically refined recipes and growth parameters based on XRD, XRR, ellipsometry, and TEM characterization results.
- Data Analysis: built fitting models for ellipsometry results to get optical properties of thin films using J.A. Woollam software, observed heat sink layer laser absorption improvement by 20%.

University of Illinois Urbana-Champaign

Urbana, IL

Research Assistant, [Axel Hoffmann](#) Group

2020 - Present

- Process Development and Optimization: developed new sputtering 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.
- CAD and Fabrication: designed advanced waveguides and multi-terminal nano-devices using CAD and fabricated using lithography and etching techniques in a cleanroom environment.
- Automation: developed Python-based automation tools for data collection and analysis, real-time visualization, and control of parameters like temperature, current, and fields.
- Instrumentation Assembly: assembled Cryo-vector magnet and MOKE microscope systems, wrote Python and LabView codes for custom user needs.

University of Illinois Urbana-Champaign

Equipment Manager, [Axel Hoffmann](#) Group

Urbana, IL

2020 - Present

- Maintenance & Calibration: Performed routine maintenance on AJA Sputter, E-beam Evaporation, VNAs, vector magnets to ensure operational readiness for all lab users.
- Repair: Diagnosed and repaired critical hardware failures, including cryo-pump malfunctions and heating lamp failures, by interfacing directly with vendors.
- Process Documentation: Authored 5 Standard Operating Procedures (SOPs) covering Sputtering Ops, Cryo-Pump Maintenance, RF Power Tuning, Sand Blasting, and Temp PID Tuning.

PROJECTS

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

2020 - 2023

- Developed industry-compatible magnetron sputtering recipes to synthesize large area 1T' phase MoTe₂ thin films, as characterized by Raman, XRD, and TEM.
- Fabricated RF waveguides using photolithography and ion-milling; observed large unconventional torques (spin Hall angle = 40-60%) in MoTe₂/FM via GHz RF current measurements.

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 measurements in high field (9T) and cryogenic environment (mK).
- Observed gate-tunable chirality-dependent non-reciprocal magnetoresistance in chiral Te.

Giant Magnetoresistance and Spin Torques from Mn₃Sn

2022 – Present

- Achieved epitaxial Mn₃Sn (0001) thin films by magnetron sputtering, characterized by XRD & TEM.
- Fabricated RF waveguides on Mn₃Sn and performed GHz spin-torque characterizations.
- Performed temperature-dependent planar Hall and giant magnetoresistance (GMR) measurements in Mn₃Sn/Ferromagnetic devices using a superconducting 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)

PUBLICATIONS

1. Unconventional Spin-Orbit Torques from Sputtered MoTe₂ Films
S. Li, et al., *Phys. Rev. B*, 110, 024426 (2024)
2. Epitaxial Growth and Magnetic Properties of Kagome Metal FeSn/Elemental Ferromagnet
P. Laxmeesha, S. Li, et al., *Journal of Applied Physics*, 135, 085302 (2024)
3. Unconventional Spin-Orbit Torques Due to Reduced Crystal Symmetries
S. Li, et al., *IEEE Transactions on Magnetics* (2024)
4. Strong Damping-Like Torques in Wafer-Scale MoTe₂ Grown by MOCVD,
S. Chyczewski, S. Li, et al., *ACS Applied Materials & Interfaces* (2025)