Songhang Li

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EDUCATION

Columbia University **New York, NY**
B.S. in Electrical Engineering Class of 2027

Franklin & Marshall College **Lancaster, PA**
B.A. in Physics and Mathematics Class of 2025
Frank Durrell Enck Memorial Prize in Physics
Magna Cum Laude | ΦBK

University of California Berkeley **Berkely, CA**
Visiting Student, Physics Summer 2023
Boston University **Boston, MA**
Visiting Student, Mathematics Summer 2022

AWARDS & HONORS

The Alma Mater Singer 2025 Commencement, *F&M*
- 238th Commencement for Franklin & Marshall College, Songhang Li ’25, Baritone. https://www.youtube.com/watch?v=EVJXAYNtoso

Kershner Scholar in Mathematics Awarded Spring 2025, *F&M*
- Awarded to students based on their proficiency in Mathematics.

The Nolt Music Award Awarded Spring 2025, *F&M*
- Awarded to F&M student musicians to undertake musically enriching projects like senior recital.

Frank Durrell Enck Memorial Prize in Physics Awarded Fall 2024, *F&M*
- Established in 1975, traditionally awarded to a graduating Physics major whose overall departmental performance and involvement is most deserving of recognition.

Summer Scholar Award Awarded Summer 2024, *F&M*
- Awarded to the student researcher in the summer research with faculties.

Pi Mu Epsilon Math Honor Society Since Spring 2024, *U.S.A.*
- Pi Mu Epsilon is a nationally-recognized honorary society dedicated to furthering knowledge of mathematics.

Sigma Pi Sigma Physic & Astronomy Honor Society Since Spring 2023, *U.S.A.*
- Sigma Pi Sigma exists to honor outstanding scholarship in physics and astronomy

Student Independent Research Grants Awarded Fall 2023, *F&M*
- Awarded to student’s advanced research or project whose need exceeds the departmental budgets.

Kershner Scholar in Physics Awarded Spring 2023, *F&M*
- Awarded to students based on their proficiency in Physics.

Dean’s and Honors Lists Awarded Since Fall 2020, *F&M*
- A student earns Honors List recognition for achieving 3.7 or better grade point average.

PUBLICATION

J.K. Krebs, **Songhang Li**, Dragos Georgescu, and T. D. Pham. (Manuscript submitted for review). Eu3+ Luminescence as a Probe of Local Crystallinity in Combustion-Synthesized LaAlO3

Yuxuan Du, Wenya Du, Dabin Lin, Minghao Ai, **Songhang Li,** Lin Zhang. (2023). Recent Progress on Hydrogel-Based Piezoelectric Devices for Biomedical Applications. Micromachines, 14(1). doi:10.3390/mi14010167

PRESENTATIONS & CONFERENCES

Mid-Atlantic Section of the American Physical Society Meeting, *Temple University, PA* Nov. 15, 2024

- Rate equation model for fluorescence and phosphorescence in Eu^{3+} doped $LaAlO_3$.

Student Research Fair, *Franklin and Marshall College, PA* Oct. 18, 2024

- Photon Counting Experiment of Persistent Luminescence in Eu:LAP.

Student Research Fair, *Franklin and Marshall College, PA* Apr. 20, 2024

- Design, construction, testing, and improving: An introduction to Engineering Design Competitions.

ACADEMIC & RESEARCH EXPERIENCES

Photon Counting Experiment of Persistent Luminescence in Eu:LAP (Man. submitted) May 2024 – Jan.2025
Research Assistant *Advisor: Prof. Ken Krebs, Franklin & Marshall College, Lancaster, PA*

- Measure decay dynamics of excited population of impurity ions after UV laser excitation using photon counting.
- Developed a circuit solution using Arduino to precisely control excitation laser mechanical shutter, enabling photon counting of early state decay.
- Compared the emission spectra measurement with calculated energy levels of Eu^{3+} in $LaAlO_3$ using density functional theory.
- Conducted a literature review and originated a table summarizing experimental technique and materials.

Society of Automotive Engineers Aero Design Competition Preparation Sept. 2023 – May 2025
Team Leader, Pilot *Advisor: Prof. Ken Krebs, Franklin & Marshall College, Lancaster, PA*

- Designed a power and lift efficient, short-take-off-length 3.8 meters fixed wing plane for water delivery.
- Calculated the lift of the wing based on the structure of air foil in order to improve the load capacity.
- Fabricated the wings utilizing balsa wood and carbon fiber, employing laser cutter and heat-shrink covering film application techniques.
- Led the team members to write the design report and presented the result in research fair.
- Wrote a funding proposal and managed to receive a year-long student research grant from the grant committee.

Automation Algorithm for 4 DOF Robotic Arm Jan. 2023 – May 2023
Researcher *Advisor: Prof. Ken Krebs, Franklin & Marshall College, Lancaster, PA*

- Searched recent publications, textbooks, GitHub robotic arm fabrication and algorithm resources to assist designing a research outline for the group project.
- Designed and built a circuit for touch sensing of a grasping mechanism utilizing piezoresistance sensors.

Electrical and Optical Measurement of Ferroelectrics Material (PLZT) Sept. 2022 – Dec. 2022
Researcher *Advisor: Prof. Ken Krebs, Franklin & Marshall College, Lancaster, PA*

- Investigated the relation between the refraction index and dielectric constants of PLZT film.
- Built multilayer models by ellipsometry data analysis software CompleteEASE to model measurements of the thickness of thin films.
- Measured the refraction index using J.A. Woollam M-2000 spectrum ellipsometry.
- Made a two-plate capacitor with PLZT as dielectric layer to obtain the dielectric constant from capacitance measurements.

- Compared optical and electrical techniques for determination of dielectric constant and refractive index.

Universal Village Program regarding Smart Materials and Intelligent Electronics Jun. 2022 – Aug. 2022
Research Assistant *Advisor: Dr. Lin Zhang, Massachusetts Institute of Technology, Boston, MA*

- Designed a flexible electrode pattern exposure mask using AutoCAD, in preparation for printing of mask.
- Prepared piezoelectric 1-3 composites for piezoelectric sensors.
- Organized the piezoelectric hydrogel sensors comparison table and contributed to manuscript writing, see publication (Micromachines 2023, 14, 167).

SKILLS & INSTRUMENTATION

Hardware & Instrumentation: Oscilloscopes, Waveform Generators, HP LCR, M-2000 J.A. Woollam Spectrum ellipsometry, Monochrometer SR430, Stanford Research System Multichannel Photon Counter.
EDA Tools & Design Software: SPICE simulation, MATLAB, Simulink, Arduino IDE, Cadence, AutoCAD, Autodesk Fusion
Programming language: Python, Java, LaTeX, Mathematica, MATLAB, Arduino, R.
Software: SPICE, IntelliJ, Arduino IDE, AutoCAD, MATLAB, CompleteEASE(optical modeling and ellipsometry data fitting)
Design & Analysis Skills: Analog and digital circuit simulation (AC/DC/transient analysis), circuit design and debugging, PCB layout and soldering, signal characterization, test automation and data analysis with Python/MATLAB, Circuit testing, Characterization of electronic components and semiconductor materials, Embedded prototyping and validation,
Additional Technical Skills: Laser cutting/fabrication (Glowforge), technical documentation (LaTeX, Endnote), design visualization and project planning (X-mind), image processing (Adobe Lightroom, Photoshop)
Language: Mandarin native, Hakka native.

ACTIVITIES

F&M Tennis Club Sept. 2023 – May 2025

- Trained new tennis club members in collaboration with coach *Franklin and Marshall College*

Alumni Leaders of Tomorrow, Office of Alumni Engagement Jun. 2023 – May 2024

- Created alumni connection and networking programs. *Franklin and Marshall College*

Vocal Sept. 2021 – May 2025
Recital and College Chorus singer *Franklin and Marshall College*

- Sang Alma Mater at Class of 2025 Commencement
- Participated in College Chorus and performed at important school events like True Blue Weekend.
- Sang in vocal lesson recital at the end of every semester.

EXPERIENCES

Department of Physics and Astronomy Jan. 2024 – May 2025
Teaching and Research Assistant *Franklin and Marshall College, Lancaster, PA*

- Compared and contrasted two different textbooks and completed textbook exercises to help the professor mark the key points of instruction for PHY321 Introduction to Electronics.
- Experimented with different teaching kits chosen by the professor to facilitate in selecting a kit that is more conducive to teaching and learning.

Career Center Sept. 2022 – May 2025
Photographer *Franklin and Marshall College, Lancaster, PA*

- Took LinkedIn headshots and event pictures at career service center.

INTERESTS

RC airplane, singing, photography (fashion and documentary, film, and darkroom processing), tennis, swimming, cycling.