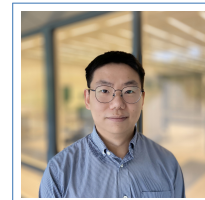# Jingxian Li

Curriculum Vitae

Materials Science and Engineering
University of Michigan, Ann Arbor
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My Webpage
Github   in Linkedin   Scholar

Education

2020–present	**Ph.D., Materials Science & Engineering**, *University of Michigan*, Ann Arbor.
GPA:	4.0/4.0
2022–present	**M.Sc., Computer Vision, Electrical & Computer Engineering**, *University of Michigan*.
GPA:	4.0/4.0
2015–2018	**M.Eng., Materials Science & Engineering**, *University of Science & Technology*, Beijing.
2011–2015	**B.Eng., Materials Physics**, *University of Science & Technology*, Beijing.
GPA:	92.7/100

Publications

Working Journal Article

2024 **Jingxian Li**, *et al.*, Compositional Phase Separation Enables Nonvolatile Memory, To be submitted.

2022 **Jingxian Li**, *et al.*, Thermodynamic Origin of Nonvolatility in Resistive Memory, Under review.

Journal Articles

2020 **Jingxian Li**, Yuchao Yang, Minghui Yin, Xinhao Sun, Lidong Li, and Ru Huang. Electrochemical and thermodynamic processes of metal nanoclusters enabled biorealistic synapses and leaky-integrate-and-fire neurons. ***Materials Horizons***, volume 7, pages 71–81, 2020.

2017 **Jingxian Li**, Qingxi Duan, Teng Zhang, Minghui Yin, Xinhao Sun, Yimao Cai, Lidong Li, Yuchao Yang, and Ru Huang. Tuning analog resistive switching and plasticity in bilayer transition metal oxide based memristive synapses. ***RSC Advances***, volume 7, pages 43132–43140, 2017.

2015 Chuang Yao†, **Jingxian Li†**, Jinshan Wang, Xinjun Xu, Ronghua Liu, and Lidong Li. Design, synthesis and characterization of a new blue phosphorescent ir complex. ***Journal of Materials Chemistry C***, volume 3, pages 8675–8683, 2015.

Conference Paper

2018 **Jingxian Li**, Teng Zhang, Qingxi Duan, Lidong Li, Yuchao Yang, and Ru Huang. Engineering resistive switching behavior in taox based memristive devices for non-von neumann computing applications. In *China Semiconductor Technology International Conference (CSTIC)*. IEEE, 2018.

Research Experience

University of Michigan, Ann Arbor

2022–present ***High Temperature Nonvolatile Electrochemical Random-access Memory***.
- Designed, fabricated and tested nonvolatile electrochemical devices.
- Combined Transmission Electron Microscopy (TEM) and phase-field model, confirming the phase separation mechanism.

2020–present ***Thermodynamic Origin of Nonvolatility in Resistive Memory***.
- Fabricated ReRAM devices, switched their resistance states, and evaluated their retention behavior.
- Designed novel model structures to evaluate the speed and direction of oxygen transport.
- Developed a phase-field model to simulate both the device and materials characterization results.

University of Science & Technology, Beijing

2018–2020 ***Electrochemical and Thermodynamic Processes of Metal Nanoclusters***.
- Designed, fabricated and tested memristive synapses based on Ag nanoclusters to emulate the calcium ion dynamics in biological synapses.
- Explained the operation mechanism of the memristive synapses using TEM and EDS.

2017–2018 ***Engineered Switching Behavior in TaOx based Memristor for Nonvolatile Computing***.
- Engineered the analog switching linearity in TaOx based artificial synapses with ion diffusion limiting layer (1 nm Al_2O_3).
- Achieved high on/off ratio with ion diffusion limiting layer (2 nm Al_2O_3) and implemented Boolean logic.

2016–2017 ***Modulated Analog Resistive Switching in Bilayer Oxide based Memristive Synapses***.
- Discovered that rich suboxide phases in the switching material is favorable for increasing the number of resistance states, which was proved by analog switching characteristics of different materials, XPS, SEM, and TEM characterization results.

2015–2016 ***The Study on Electroluminescence Properties of a New Blue Phosphorescent dye***.
- Fabricated organic light-emitting diodes (OLED) based on a new blue phosphorescent dye (Cz-C8-FIrpic).
- Explored photophysical properties of Cz-C8-FIrpic using UV-vis absorption and photoluminescence spectra.

Honors & Awards

2023 ***MRS Graduate Student Silver Award***, Materials Research Society (MRS), 2023 Fall.

2023 ***APL Machine Learning Outstanding Oral Presentation Award***, EL20 Symposium Session, Materials Research Society (MRS), 2023 Fall.

2023 ***Final List of Student Oral Award***, Electronic Materials Conference (EMC), 2023.

2023 ***Gold Poster Award Winner***, Annual Symposium Poster Session of Michigan Materials Research Institute (MMRI), University of Michigan, 2023.

2015 ***Outstanding Graduate of Beijing***, Top 1% of Students in University of Science & Technology, Beijing.

2014 ***China Undergraduate Mathematical Contest in Modelling, 1st Prize, Beijing***, Beijing Mathematical Society, 2014.

2014 ***Merit Student of Beijing***, Top 0.1% of Students in University of Science & Technology, Beijing.

2012 & 2013 ***National Scholarship***, Top 1% of Students in University of Science & Technology, Beijing.

2012 ***Undergraduate Physics Competitions of Beijing, 2nd Prize***, Beijing Physics Society, 2012.

2012 ***Undergraduate Mathematics Competitions of Beijing, 3rd Prize***, Beijing Mathematical Society, 2012.

Research Skills

Programming	Python, C++, MATLAB, LaTeX, HTML
Package	Pytorch, Scikit-learn, Numpy, Pandas, Git
Software	COMSOL, 3D-MAX, Adobe Illustrator, Origin Lab
Materials	PVD (e-beam evaporation, sputtering), PECVD, ALD
Device	Photolithography, Reactive-ion etching, Rapid thermal anneal
Test	Keysight B1500A & B1530A, Keithley 4200-SCS, Bio-logic SP300, NI DAQ-6358
Chacterization	TEM, EDS, FIB, SEM, XPS, XRD, AFM, AES, ToF-SIMS

Teaching Assistantship

Winter 2023 **MATSCIE 482: Product Design and Manufacturing**, University of Michigan, Ann Arbor.
I collaborated with professors to guide senior students in applying their accrued knowledge towards intricate projects. I honed my ability to promote effective teamwork among students by setting clear expectations and monitoring progress, while utilizing tools such as CATME to facilitate the assessment process.