William F. Li

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williamfli.github.io
scholar.google.com/citations?user=avkQHcwAAAAJ

Education

Harvard Medical School — Boston, MA
M.D. — 2024 – present
Harvard/MIT M.D.-Ph.D. Program

Massachusetts Institute of Technology — Cambridge, MA
S.B. Physics and Computer Science & Engineering — 2020 – 2024
GPA: 5.00/5.00, Phi Beta Kappa, minor in Biology

Positions

Harvard Department of Chemistry and Chemical Biology
Research Assistant — 2024 – present

- Principal Investigator: Xiaowei Zhuang
- Research topic:
  - 3D-genome imaging of the human brain

Broad Institute of MIT and Harvard
Undergraduate Researcher — 2022 – 2024

- Principal Investigator: Manolis Kellis
- Research topic:
  - Genetics of Alzheimer's disease heterogeneity

MIT Research Laboratory of Electronics
Undergraduate Researcher — 2020 – 2022

- Principal Investigators: Marin Soljačić, Steven Johnson
- Research topics:
  - X-ray imaging and detection with nanophotonic scintillators
  - Computational imaging with compressed sensing and end-to-end inverse design

Publications

3. Liu Z, Zhang S, James BT, Galani K, Mangan RJ, Fass SB, Liang C, Wagle MM, Boix CA, Tanigawa Y, Yun S, Sung Y, Xiong X, Sun N, Hou L, Wohlwend M, Qiu M, Han X, Xiong L, Preka E, Huang L, **Li WF**, Ho LL, Grayson A, Mantero J, Kozlenkov A, Mathys H, Chen T, Dracheva S, Bennett DA, Tsai LH, Kellis M. Single-cell multiregion epigenomic rewiring in Alzheimer's disease progression and cognitive resilience. *Cell*. 2025;188(18):4980–5002.

2. Arya G, **Li WF**, Roques-Carmes C, Soljačić M, Johnson SG, Lin Z. End-to-End Optimization of Metasurfaces for Imaging with Compressed Sensing. *ACS Photonics*. 2024;11(5):2077–2087.

1. **Li WF**, Arya G, Roques-Carmes C, Lin Z, Johnson SG, Soljačić M. Transcending shift-invariance in the paraxial regime via end-to-end inverse design of freeform nanophotonics. *Optics Express*. 2023;31(15):24260–24272. **Editors' Pick**.

Patents

1. Soljačić M, Roques-Carmes C, Rivera N, Lin Z, **Li WF**, inventors; Massachusetts Institute of Technology, assignee. Nanophotonic Scintillators for High-Energy Particles Detection, Imaging, and Spectroscopy. U.S. Patent Application 18/701,792. May 2025.

Presentations

5. **Li WF**, Ren P, Liu S, Wang CY, Zheng P, Ren B, Lein ES, Zhuang X. Comparative analysis of 3D-genome organization in the human and mouse brain. Poster presented at: Harvard/MIT M.D.-Ph.D. Program Retreat; September 2025; Cape Cod, MA.

4. **Li WF**, Roques-Carmes C, Lin Z, Johnson SG, Soljačić M. X-Ray Spectroscopy With End-to-End Optimized Nanophotonic Scintillators. Talk presented at: Conference on Lasers and Electro-Optics; May 2023; San Jose, CA.

3. **Li WF**, Tanigawa Y, Kellis M. Polygenic dissection of phenotypic heterogeneity in Alzheimer's disease. Poster presented at: Broad Institute Scientific Retreat; December 2022; Boston, MA.

2. **Li WF**, Arya G, Roques-Carmes C, Lin Z, Johnson SG, Soljačić M. Transcending shift-invariance in the paraxial regime via end-to-end inverse design of freeform nanophotonics. Talk presented at: MIT PRISM Undergraduate Physics Conference; September 2022; Cambridge, MA.

1. **Li WF**, Arya G, Roques-Carmes C, Lin Z, Johnson SG, Soljačić M. Angular and Spectral Sparse Sensing With End-to-End Optimized Nanophotonics. Talk presented at: Conference on Lasers and Electro-Optics; May 2022; San Jose, CA.

Abstracts

5. Ren P, **Li WF**, Wang CY, Liu S, Bintu B, Zheng P, Su JH, Kinrot S, Mateo LJ, Boetigger A, Ren B, Zhuang X. Tracing Chromosomes in Cells with Fluorescence Imaging. Poster presented at: Harvard Chemistry and Chemical Biology Graduate Open House; September 2025; Cambridge, MA.

4. Tian X, Fabiha T, **Li WF**, Dey KK, Kellis M, Tanigawa Y. Integrative polygenic score modeling with tissue-specific annotation improves polygenic scores transferability. Talk presented at: American Society of Human Genetics; November 2024; Denver, CO.

3. Tanigawa Y, Sun N, **Li WF**, Boix CA, Galani K, Mathys H, Bennett DA, Tsai LH, Kellis M. Multi-polygenic score model informs the genetic basis of heterogeneity in Alzheimer's disease. Talk presented at: Alzheimer's Association International Conference; July 2023; Amsterdam, Netherlands.

2. Tanigawa Y, Sun N, **Li WF**, von Maydell D, Boix CA, Akay LA, Galani K, Mathys H, Bennett DA, Tsai LH, Kellis M. Single-cell transcriptional hallmarks and individual subtyping for Alzheimer's Disease across 430 participants. Talk presented at: Society for Neuroscience; November 2022; Washington, DC.

1. Lin Z, Arya G, **Li WF**, Roques-Carmes C, Pestourie R, Li Z, Capasso F, Soljačić M, Johnson SG. End-to-end Nanophotonics Inverse Design for Computational Imaging. Talk presented at: Conference on Lasers and Electro-Optics; May 2022; San Jose, CA.

Honors

- HMS Summer Research Fellow 2025
- Phi Beta Kappa Liberal Arts and Sciences Honor Society 2024
- Sigma Pi Sigma Physics and Astronomy Honor Society 2024
- MIT News profile, MIT homepage spotlight for March 15, 2024 2024
- Gates Cambridge finalist (Chemistry, 3D-genome simulation), MIT nomination for Rhodes and Marshall 2023
- Medical College Admission Test (MCAT) Perfect Score (528/528) 2023
- MIT SuperUROP Outstanding Research Award, awarded to 2 in cohort 2023
- *Optics Express* Editors' Pick 2023
- Eric and Wendy Schmidt Center funded Research and Innovation Scholar 2022
- USA Astronomy and Astrophysics National Team, ranked 8th nationally 2020
- US Physics Team, USA Physics Olympiad Gold, top 20 nationally 2019

- 2-time US National Chemistry Olympiad National Exam Qualifier, 1-time Tampa Bay 1st place 2019, 2020
- Sunshine Scholar (Florida top STEM students) 2019
- 2-time National AP Scholar (5/5 on 19 of 19 AP exams taken) 2018, 2019
- USA Computing Olympiad Gold Division 2018
- 3-time AMC 12 Distinguished Honor Roll (top 1%), 1-time Florida 1st place 2018, 2019, 2020
- 2-time USA Math Olympiad Qualifier, 1-time Junior Math Olympiad Qualifier 2017, 2019, 2020
- National Mathcounts Qualifier, Florida 3rd place, Tampa Bay 1st place 2016

Service and Teaching

- Junior reviewer for *Nature Communications*
- MIT Epsilon Theta graduate resident advisor
- Harvard College Quincy House non-resident premedical tutor
- MIT Department of Physics: scribe, tutor, freshman pre-orientation program
- MIT Department of Electrical Engineering and Computer Science associate advisor
- Massachusetts General Hospital volunteer in patient transport and emergency department
- UPchieve volunteer tutor
- MIT Students for Open and Universal Learning course recruiter
- AwesomeMath Summer Program teaching assistant for combinatorics
- Byrd Alzheimer's Institute research volunteer with Prof. Laura Blair's lab
- Melodies for Life Assisted Living Music Group: volunteer cello, coordinator

Leadership and Activities

- Medical/Graduate School: Interventional Radiology Interest Group (mentorship & event chair), Radiology Interest Group, American Society of Human Genetics, American Medical Association, Massachusetts Medical Society, HSDM/HMS Run Club (2024 Newburyport Half Marathon, 2024 Cambridge Half Marathon, 2025 Multiple Myeloma Research Foundation 5k)
- Undergraduate: MIT Premedical Society (collegiate relations co-chair), Journal Club in Genomics (founder/organizer), MIT Next House Thanksgiving Committee, Institute of Electrical and Electronics Engineers
- High School: Florida Student Association of Mathematics (state co-president), Mu Alpha Theta (president), Science National Honor Society (president), Orchestra (all-county principal cello), Swim (varsity team)

Selected coursework

- **MIT**

  *Advanced Standing Exam credit

  †Graduate-level

  - **Physics:** Multivariable Calculus*, Differential Equations*, Linear Algebra*, Electricity and Magnetism*, Vibrations and Waves*, Quantum Physics I*, Quantum Physics II, Classical Mechanics II, Statistical Physics I, Experimental Physics I, Signal Processing, Fundamentals of Statistics†, Mathematical Methods in Nanophotonics†
  - **Computer Science & Engineering:** Introduction to Computer Science and Programming in Python*, Introduction to Computational Thinking and Data Science, Mathematics for Computer Science, Introduction to Machine Learning, Fundamentals of Programming, Software Construction, Introduction to Algorithms, Design and Analysis of Algorithms, Computation Structures, Computer Systems Engineering
  - **Computational Biology:** Introductory Biology*, Principles of Chemical Science*, General Biochemistry, Genetics, Cell Biology, Organic Chemistry I, Organic Chemistry II, Thermodynamics I, Thermodynamics II and Kinetics, Thermodynamics of Biomolecular Systems, Fundamentals of Experimental Molecular Biology, Laboratory Chemistry, Cellular Neurobiology, Seminar in Undergraduate Advanced Research (SuperUROP), Computational Biology†, Neurogenomics/Advanced Topics in Artificial Intelligence†, Topics in Computational Molecular Biology†