

Monan Ma | CV

Boston, MA – last updated: October 4, 2025

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Education

Boston University

Ph.D. candidate in Mechanical Engineering

GPA: 4.0/4.0, expected defense: December 2025

Boston, MA

09/2021 - present

Stony Brook University

M.Sc. and B.Eng. in Mechanical Engineering, minor: Music

GPA: 3.83/4.00, Magna Cum Laude

Stony Brook, NY

09/2014–05/2019

Academic Research

Boston University

Doctoral Research Fellow, Advisor: Prof. Kamil Ekinci

Boston, MA

09/2021 - present

- **Experimental research:** nonlinear nanomechanics and sensor physics
 - Built ultrasensitive optical and electrical detectors to interrogate nanoelectromechanical systems' (NEMS) response under deterministic, stochastic and environmental perturbations
 - Characterized nonlinear dynamics for the improvement of NEMS-based sensing applications
- **Computational research:** finite-element modeling, physics-informed machine learning
 - Developed and experimentally validated a 3D model in COMSOL® to fully capture the physics of electrothermal transducers, allowing for the estimate of transduction efficiency in various surrounding media
 - Adapted a data-driven technique to uncover the governing laws of nonlinear oscillators from experimental data
- **Fabrication techniques:** additive microfabrication and semiconductor clean room facilities
 - Two-photon polymerization (2PP) using Nanoscribe PPGT2®
 - Plasma cleaning, wire bonding, electrical testing

Skolkovo Institute of Science and Technology (Skoltech)

Visiting Student, Advisor: Prof. Artem Oganov

Moscow, Russia

12/2020 - 08/2021

- Research topic: Design and modeling of diamond anvil cells for studying superconductors under high pressure

Professional Research

Aramco Americas Research Center

Graduate Student Intern at the Sensor Development Team

Houston, TX

07/2025 - 09/2025

- Project topic: Development of sensory platforms for rheological measurements of non-Newtonian fluids

Brookhaven Technology Group

Undergraduate Engineering Intern supported by SPIR scholarship

Stony Brook, NY

06/2017 - 09/2018

- Project topic: Experimental and numerical studies of high-temperature superconducting cables for quantum computing and nuclear fusion

Teaching

Boston University

Graduate Student Teacher, Mechanical Engineering

Boston, MA

09/2022 - 05/2023

- Fluid Mechanics (Spring 2023): delivered a lecture on numerical simulations and graded the final project on modeling fluid-structure interactions and the Stokes' second problem
- Statics (Fall 2022): co-led and graded the experimental bridge design project

State University of New York (SUNY)

Visiting Assistant Professor, Mechanical Engineering Technology

Farmingdale, NY

08/2019 - 09/2020

- Primary instructor for teaching Thermodynamics, Engineering Dynamics, Statics, and CAD Design for a total of ~ 100 undergraduate students over one academic year
- Teaching reviews available at: <https://www.monan-ma.com/teaching>

Awards and Stipends

BU Engineering Portfolio (Website) Competition - Best Graduate Student Runner Up	2025
BU.Nano Cross-Disciplinary Fellowship: \$38,250	2022-2024
BU Nanotechnology Innovation Center Research Travel Grant: \$1,500	2024
MIT NT'24 Nanotechnology Conference Travel Grant: \$525	2024
3MT [®] Three-Minute Thesis Competition Finalist	2023
BU Graduate Student Organization Executive Board Service Award: \$250	2023
BU Mechanical Engineering Departmental Distinguished Fellowship: \$36,782	2021-2022
NCEES Fundamentals of (Mechanical) Engineering Certification	2018
Stony Brook Strategic Partnership for Industrial Resurgence (SPIR) Research Scholarship: ~\$7,500	2017

Journal Publications (* = under review, † = in preparation)

- 8.† **M. Ma**, N. W. Welles, C. Yanik, I. I. Kaya, M. R. Paul and K. L. Ekinici, "High-order Moments of a Fluctuating Nanomechanical Duffing Resonator."
- 7.* W.G.Jiang, **M. Ma**, H. Gress, K. L. Ekinici, and M. Gonzalez, "A Dual NEMS Sensor for Nanomechanical Hydrogen Sensing," *IEEE Sensors*, 2025.
6. N.W.Welles, **M. Ma**, K. L. Ekinici, and M. R. Paul, "Theoretical Modeling of the Dynamic Range of an Elastic Nanobeam under Tension with a Geometric Nonlinearity," *J. Appl. Phys.*, 2025.
5. **M. Ma**, N. W. Welles, C. Yanik, I. I. Kaya, O. Svitelskiy, M. R. Paul and K. L. Ekinici, "Mode Dependent Scaling of Nonlinearities in a NEMS Resonator," *Appl. Phys. Lett.*, 2024.
4. **M. Ma** and K. L. Ekinici, "Electrothermal Actuation of NEMS Resonators: Modeling and Experimental Validation," *J. Appl. Phys.*, 2023.
3. Ti C., G. McDaniel, A. Liem, H. Gress, **M. Ma**, S. Kyong, O. Svitelskiy, C. Yanik, I. I. Kaya, M. S. Hanay, M. Gonzalez, and K. L. Ekinici, "Dynamics of NEMS Resonators across Dissipation Limits," *Appl. Phys. Lett.*, 2022.
2. Solovyov, V., S. Rabbani, **M. Ma**, Z. Mendleson, Z. Wang, A. Polyanskii, and P. Farrell, "Electromechanical Properties of 1-mm-Wide Superconducting Cables Comprised of Exfoliated YBCO Filaments," *IEEE Trans. Appl. Supercond.*, 2019.
1. Solovyov, V., S. Rabbani, **M. Ma**, Z. Mendleson, T. Haugan, and P. Farrell, "Performance of Layer Wound Epoxy Impregnated Coils Made from Multi-filamentary Cable of Exfoliated YBCO," *Supercond. Sci. Technol.*, 2019.

Conference and Internal Talks

Talk: “Nonlinearity problem and big data solution in nanoscale sensors and devices,” *Gordon College Physics Department Colloquium Seminar*, Wenham, MA, 12/2024.

Poster: “Electrothermal actuation of nanoscale transducers,” *COMSOL Conference*, Burlington, MA, 10/2024.

Talk: “Nonlinearities in a NEMS Resonator: Mode-Dependent Scaling,” *19th International Workshop on Nanomechanical Sensing*, Vienna, Austria, 06/2024.

Poster: “Big data in nano sensors,” *BU Nanotechnology Innovation Center Annual Symposium*, Boston, MA, 11/2023.

Talk: “Integration of machine learning techniques for nanoscale systems and classical noise suppression,” *MIT AeroAstro*, Cambridge, MA, 01/2022. Hosting faculty: Prof. Chuchu Fan

Talk: “Research v. Industry: pathways to finding your niche,” *Gordon College Physics Department Colloquium Seminar*, Wenham, MA, 01/2022.

Media Coverage

“Monan Ma: Making Big Waves with Nanotechnology in the Ekinici Lab,” *BU Photonics News*, 2024. [[Link](#)]

Research Mentorship

○ Graduate students

- Ali Tarlani Beris, Spring 2023
Project: *Resonance tracking of quartz tuning forks using lock-in amplifiers*
- Eli Forstadt, Fall 2022
Project: *Building a high-frequency phase-locked loop using field-programmable gate arrays*

○ Undergraduate students

- Ricardo Gonzales, REU program in summer 2025, currently a junior at UC Davis
Project: *Physics-informed machine learning for studying nonlinear dynamics in NEMS*
- Zhiwen Liu, summer 2025, currently a sophomore at BU
Project: *Fabrication and transducer integration on a 2-D membrane*
- Vlad Pyltsov, UROP program in summer 2022, currently a Ph.D. student at Columbia University
Project: *Spectral measurements of an electromechanical resonator in laminar air flow*

Leadership and Service

Journal Referee: Nano Letters ($\times 4$), Phys. Rev. B ($\times 2$), Phys. Rev. Appl. ($\times 1$)

Outreach: Upward Bound Math Science program for first-generation college-bound high school students

Vice President: BU Graduate Student Organization

International Student Ambassador: Stony Brook U Admissions

Language and Leisure

Native speaker: Russian, Chinese. **Full proficiency:** English (IELTS score: 9.0/9.0)

Leisure interests: Tennis, boat sailing, playing piano