

Amir Rajabpoor Alisepahi

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Acoustic / mechanical engineer and final-year Ph.D. candidate in Mechanical Engineering with a focus on mechanical/phononic metamaterials, waveguides, and thermo-mechanical behavior of device/package-like stacks. Experienced in building end-to-end integration flows that couple analytical models, FEM/COMSOL Multiphysics, and lab measurements (laser vibrometry, structural characterization) to improve performance and robustness. Trained in semiconductor devices and advanced packaging and previously led process-development and failure-analysis work in a high-throughput manufacturing environment.

EDUCATION

UNIVERSITY OF VERMONT

Jan 2022 - May 2026(expected)

- PhD student in Mechanical Engineering-GPA:3.9

Project: Topological Acoustic metamaterial with anomalous behavior

UNIVERSITY OF TEHRAN

Sep 2011 - Sep 2013

- M.Sc. in Mechanical Engineering-GPA:3.6

Project: Vibration and Buckling Analysis of FG Nanoplates using GDQ and FEM

RAZI UNIVERSITY OF KERMANSHAH

Sep 2006 - Sep 2011

- B.Sc. in Mechanical Engineering-GPA:3.3

Project: Low Velocity Impact on Functionally Graded Circular Plates

PROFESSIONAL EXPERIENCE

University of Vermont

Jan 2022 - current

✓ Acoustic -Material Science Engineer

- Owned end-to-end integration of acoustic/phononic structures from analytical design through custom FEM/COMSOL modeling to 3D fabrication and laser-vibrometer characterization, achieving 5% model-experiment deviation and 70% first-pass prototype success.
- Designed acoustic waveguides and architected lattices, using dispersion, mode-shape, and loss analysis to guide structural “layout” and materials choices.

✓ Lab safety officer of Laboratory for Advanced Materials

- Developed and updated laboratory SOPs; managed hazardous-waste streams; ensured continuous IBC compliance.
- Enforced lab safety and institutional security requirements for access-controlled equipment and data handling.
- Participated in recruitment, onboarding, and mentoring of undergraduate and graduate researchers, supporting their growth and internal talent mobility into more advanced technical roles.

University of Tehran-*Teaching Assistant*

Feb 2014 - Feb 2016

- Created structured CNC/machining materials and guided 100+ students in safe workshop practices and process fundamentals.
- Delivered in-class technical support and live CNC demonstrations to enhance learning outcomes.

FELEZ TABAN Co. - *Mechanical Engineer*

Mar 2016 - Dec 2021

- Led process development and optimization on production lines, tuning fixtures, racking, and process parameters to improve throughput, cost, and stability.
- Performed root-cause and failure analysis on nonconforming parts, collaborating with production, quality, and customer engineering to implement corrective actions that improved yield and reliability.

- Applied first-principles mechanical reasoning and data from tests/measurements to resolve complex process and product issues.

RESEARCH INTEREST

- Topological Metamaterials
- Bio-Inspired Metamaterials
- Structural stability
- Photonic–phononic interactions
- Data Science
- Finite Element
- Wave Propagation

PUBLICATION (452 H-index:5)

- Gapless Topological edge States in phononic 1D structures (In Manuscript)
- Unveiling Dual Topological States in a 1D Acoustic Analog of the SSH Model (In Manuscript)
- Rajabpoor Alisepahi, A.; Ma, J. In-Gap Edge and Domain-Wall States in Largely Perturbed Phononic Su–Schrieffer–Heeger Lattices. *Crystals* 2024, *14*, 102.
- Rajabpoor Alisepahi, A., Sarkar, S., Sun, K. et al. Breakdown of conventional winding number calculation in one-dimensional lattices with interactions beyond nearest neighbors. *Commun Physics* 6, 334 (2023) (Highlighted by the journal editor as a featured article)
- Ali Zargaripoor , Alireza Daneshmehr , Seyed Imman Isaac Hosseini, Amir Rajabpoor, Free Vibration Analysis of Nano plates Made of Functionally Graded Materials Based On Nonlocal Elasticity Theory Using Finite Element Method. *Journal of Computational Applied Mechanics*, 2018.
- Daneshmehr, A., A. Rajabpoor, and A. Hadi, Size dependent free vibration analysis of Nano plates made of functionally graded materials based on nonlocal elasticity theory with high order theories. *International Journal of Engineering Science*, 2015.
- Daneshmehr, A. And A. Rajabpoor, Stability of size dependent functionally graded Nano plate based on nonlocal elasticity and higher order plate theories and different boundary conditions. *International Journal of Engineering Science*, 2014.
- SM Mousavi Janbeh Sarayi, A. Rajabpoor Alisepahi, A Bahrami, Wave analysis of thick rectangular Graphene sheets: Thickness and small-scale effects on natural and bifurcation frequencies. *Sustainability* 2022. *14* (19), 12329
- Daneshmehr, A.R., M. Mohammad Abadi, and A. Rajabpoor. Thermal effect on static bending, vibration and buckling of Reddy beam based on modified couple stress theory. *Applied Mechanics and Materials*. 2013. Trans Tech Publ.

SELECTED PROJECTS

- ✓ Gapless Edge States in Long-Range Phononic Ladders - UVM
- Designed and experimentally validated a two-chain phononic ladder with long-range couplings showing gapless edge localization; used dispersion engineering , MATLAB/Python solvers, and laser-vibrometer measurements.
- ✓ Breakdown of Conventional Winding Number in 1D SSH Lattices
- Led theory/experiment on SSH-type chains with beyond-nearest-neighbor couplings, showing domain-wall states beyond the conventional winding number; applied Berry-connection / Jackiw–Rebbi analysis, supercell modeling, and precision mechanical lattice fabrication.
- ✓ Dual Topological States in a 1D Acoustic SSH Analog - UVM (in review / preprint)
- Designed a continuous 1D acoustic phononic crystal realizing SSH-like phases and dual interface states; used COMSOL band-structure simulations, Zak-phase/Wilson-loop analysis, and experimental verification of interface modes.
- ✓ MDPC OLED Edge-State & Photonic-Crystal Characterization – UVM (2025-present)
- Studying MDPC OLED stacks as 1D photonic crystals with edge states, using transfer-matrix modeling and optical measurements to relate spectra to layer design, mirrors, and fabrication tolerances; skills in thin-film optics, photonic-crystal dispersion, and data fitting.

- ✓ RF Ablation Electrode Modeling – Multiphysics RF Technology – UVM & Clinical Collaborators (ongoing)
- Built COMSOL RF-thermal models of ablation electrodes to predict lesion size and hot spots under varying geometry and power; experience in multiphysics coupling, parametric sweeps, mesh convergence, and reliability/overheating metrics.
- ✓ Phononic-Crystal Heat Management for CPUs / Packages – NSF I-Corps “CryoTherm Innovation” (2024-present)
- Developing phononic/thermal metamaterial concepts for chip- and package-level heat spreading.
currently under customer discovery in an NSF I-Corps team advanced to the next \$50,000 phase; combines thermal/packaging modeling with interviews of semiconductor and packaging engineers.

COURSE TAUGHT

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|---|-----------------------------|
| • Guest lecturer in Advanced Heat Transfer class (ME 6990) | <i>Spring 2025 and 2023</i> |
| • Teaching assistant in first year Design Engineer (ME 001) | <i>Spring 2022</i> |
| • Teaching assistant in Materials Engineering class (ME 101) | <i>Fall 2022</i> |
| • Guest lecturer in Materials Engineering class (ME 101) | <i>Fall 2022</i> |
| • Guest lecturer in the Energy Methods in Solid Mechanics class | <i>Spring 2013</i> |

KEY SKILLS

Software Skills

- Proficient in COMSOL
- Ansys
- SolidWorks
- Abaqus
- LAMPS

Coding Skills

- MATLAB
- Python

Semiconductors

- Familiar with OLED Devices
- CPU Packaging
- Heat Management

Engineering Skills

- Interpreting Engineering Standards, Specifications, and Drawings

Data science Techniques

- TensorFlow
- PyTorch
- SVM
- Classification
- Object Detection

Numerical Methods

- Proficient in FEM
- GDQ methods

Manufacturing

- 3D printing
- CNC Machining
- Klayout

Interpersonal Skills

- Accountability/reliability, Conflict resolution/negotiation

CERTIFICATE

- Complex Systems and Data Science -University of Vermont (Sep 2022 – Sep 2024)
Machine learning, data analysis, complex systems.
- Introduction to Semiconductor Devices - Coursera (Oct 2025)
PN junctions, MOS structures, carrier transport, device I–V behavior.
- Advanced Semiconductor Packaging - Coursera (Oct 2025)
Package architectures, thermal management, reliability, heterogeneous integration.

COURSE

- Machine Learning
- Advanced Neural network

- Advanced heat Transfer
- Advanced Neural Network
- Principal of Complex System
- Molecular Dynamics (LAMMPS)

HONORS

- Referred for the National Session in NSF I-Corps (50000 \$ Grant)
- Awarded the Best Researcher distinction at the University of Vermont.
- Achieved top 2% rank among more than 40,000 applicants of the Nationwide University Entrance Exam
- Editor's Highlight for article in Communications Physics, 2023
- Received a travel grant from SPIE in 2022

REFERENCES

- Matthew White-Associated Professor at university of Vermont
Mwhite25@uvm.edu
- Jihong Ma- Associated Professor at university of Vermont
Jihong.ma@uvm.edu
- Nic Fiorentino - Associate Professor, Department of Mechanical Engineering
Niccolo.fiorentino@uvm.edu
- Frederic Sansoz-Associated Professor at university of Vermont
Frederic.sansoz@uvm.edu