

AMIR NAZEMI

nazemi@umich.com • +1 734 882 8345 • [linkedin.com/in/amir-nzm](https://www.linkedin.com/in/amir-nzm) • github.com/amirnzm

EDUCATION

- University of Michigan**, Ann Arbor, MI August 2023 – Present
Ph.D. Candidate in Mechanical Engineering and Scientific Computing. GPA: 4.0 / 4.0
Research: Computational modeling of intrusion and interaction of deformable bodies in granular media using DEM and FEM.
- The University of British Columbia**, Canada January 2023
M.A.Sc. in Mechanical Engineering. GPA: 94.8 / 100
Research: Experimental characterization and multi-scale modeling of fiber-reinforced composites using MPM and FEM.
- Sharif University of Technology**, Iran August 2020
B.Sc. in Mechanical and Aerospace Engineering. GPA: 4.0 / 4.0 , Ranked **3rd** in Aerospace Engineering
Research: Studying the effect of slippage on free vibration and aeroelastic instability of sandwich beams.

WORK & RESEARCH EXPERIENCE

- University of Michigan** August 2023 – Present
Graduate Student Instructor and Research Assistant Ann Arbor, MI
- Developed a high-fidelity DEM-based simulation framework for analysis of locomotion in granular materials.
 - Integrated DEM and FEM approaches for modeling intrusion of deformable bodies in granular material.
 - Implemented parallelized algorithms for large-scale granular mechanics problems with non-spherical particles.
 - Designed and constructed an experimental apparatus to investigate compliant beam pull-out from granular media using in-situ X-ray imaging.
 - Presented lecture for graduate-level Finite Element Method course and provided instruction on the theory and programming of solving PDEs using ML techniques to the graduate and undergraduate students.
- University of British Columbia** January 2021 – August 2023
Graduate Research and Teaching Assistant Canada
- Utilized MPM-based multi-scale simulations for textile composites forming processes, published in *Composites Part A*.
 - Developed a Fortran subroutine for woven fabrics constitutive model in ABAQUS.
 - Programmed Python scripts for numerical modeling of hemisphere forming process in ABAQUS.
 - Implemented physics-informed neural network models to predict thermal properties of composites during the curing process.
 - Managed and led groups of students for their course projects, led and trained other TAs as Head TA, provided instruction on the theory of tutorials and lab procedures to the students in several engineering courses.
- NIEDNER INC.** December 2021 - June 2022
MITACS Research Intern Coaticook, Canada
- Experimentally characterized mechanical properties of 3D woven fabric composite hydraulic tubes.
 - Utilized numerical analysis of buckling-driven in-situ instabilities using the FEM and MPM.

PUBLICATIONS

1. **Nazemi, A.**, & Xiao, H. (2025). "Understanding the Propulsion of a Scallop-like Swimmer in Granular Media." manuscript submitted to *Journal of Fluid Mechanics*.
2. **Nazemi, A.**, & Milani, A. (2025). "Emerging Fast Simulations using Material Point Method." *Advanced Structural Textile Composites Forming* (pp. 419-445). Woodhead Publishing. [Link](#)
3. **Nazemi, A.**, & Milani, A. (2024). "A comparative study of emerging material point method and FEM for forming simulation of textile reinforcements." *Composites Part A: Applied Science and Manufacturing*, 108284. [Link](#)
4. Mahbod, M., Musolino, S. F., **Nazemi, A.**, Wulff, J. E., Vaziri, R., & Milani, A. S. (2024). "Synthesis and characterization of UHMWPE composite fabrics treated with bis-diazirine crosslinker and silica/PEG shear thickening fluid." *Composites Part C: Open Access*, 15, 100540. [Link](#)
5. Margoto, O. H., **Nazemi, A.**, Abdin, Y., & Milani, A. (2024). "On Drapability and Characterization of Flax Fabric Reinforcements." SAMPE Conference Proceedings. Long Beach, CA, May 20-23, 2024. *Society for the Advancement of Material and Process Engineering – North America*. [Link](#)
6. **Nazemi, A.**, Ramezankhani, M., Korber, M., & Milani, A. (2023). "Material Point Method as an Alternative to FEM for Fast Forming Simulation of Fabric Composites." SAMPE Conference Proceedings. Seattle, WA, April 17 -20, 2023. *Society for the Advancement of Material and Process Engineering – North America*. [Link](#)

7. Zarasvand, K. A., **Nazemi, A.**, Lahiri, S. K., Tetreault, A., Milani, A. S., Bender, T. P., & Golovin, K. (2023). "Skin-Inspired Nanofluid-Filled Surfaces with Tunable Icephobic, Photothermal, and Energy Absorption Properties." *Advanced Functional Materials*, 2305517. [Link](#)
8. Hashemi, A., Ghaffarkhah, A., Goodarzi, M., **Nazemi, A.**, Banvillet, G., Milani, A. S., Soroush, M., Rojas, O. J., Ramakrishna, S., Wuttke, S., Russell, T. P., Kamkar, M., & Arjmand, M. (2023). "Liquid-Templating Aerogels." *Advanced Materials*, 2302826. [Link](#)
9. Ramezankhani, M., **Nazemi, A.**, Narayan, A., Voggenreiter, H., Harandi, M., Seethaler, R., & Milani, A. (2022). "A Data-driven Multi-fidelity Physics-informed Learning Framework for Smart Manufacturing: A Composites Processing Case Study." 2022 5th IEEE International Conference on Industrial Cyber-Physical Systems (ICPS). Coventry, United Kingdom. pp. 01-07. [Link](#)

PRESENTATIONS

1. Society of Engineering Science Technical Meeting, "Interaction of Compliant Bodies with Granular Media: Coupled DEM-FEM Simulation and Experiment under X-ray Imaging", Atlanta, GA, October, 2025
2. 21st Northeastern Granular Materials Workshop at Yale University, "Effects of Particle Jamming and Swimmer Inertia on Granular Locomotion", New Haven, CT, June, 2025.
3. American Physical Society Global Physics Summit, "Effects of Particle Jamming and Swimmer Inertia on Granular Locomotion", Anaheim, CA, March, 2025.
4. American Physical Society Global Physics Summit, "Understanding the Dependence of Shear Response of Desert Sands on the Size and Shape of Constituent Particles", Anaheim, CA, March, 2025.
5. 20th Northeastern Granular Materials Workshop at College of the Holy Cross, "Understanding the Propulsion of a Scallop-like Swimmer in Granular Media", Worcester, MA, June, 2024.
6. 16th Annual Summer School on Soft Solids and Complex Fluids at UMass Amherst, "Understanding the Propulsion of a Scallop-like Swimmer in Granular Media", MA, June, 2024.
7. Society for the Advancement of Material and Process Engineering (SAMPE) Conference, "On Drapability and Characterization of Flax Fabric Reinforcements", Long Beach, CA, May, 2024.
8. American Physical Society March Meeting, "Understanding the Propulsion of a Scallop-like Swimmer in Granular Media", Minneapolis, MN, March, 2024.
9. Society for the Advancement of Material and Process Engineering (SAMPE) Conference, "Material Point Method as an Alternative to FEM for Fast Forming Simulation of Fabric Composites", Seattle, WA, April, 2023.

TEACHING EXPERIENCE

Laboratory II	4 credits, Graduate Student Instructor, UM-Ann Arbor	Winter 2026
Finite Element Methods in MEAM	3 credits, Graduate Student Instructor, UM-Ann Arbor	Fall 2025
Finite Element Methods in MEAM	3 credits, Graduate Student Instructor, UM-Ann Arbor	Fall 2024
Introductory Physics for the Life Sciences I Dynamics	3 credits, Lab Teaching Assistant, UBC	Summer 2023
Introductory Physics for the Life Sciences II Dynamics	3 credits, Tutorial Teaching Assistant, UBC	Summer 2023
Introductory Physics for the Life Sciences II Dynamics	3 credits, Lab Teaching Assistant, UBC	Spring 2023
Design of Machine Elements	3 credits, Tutorial Teaching Assistant, UBC	Spring 2023
Design of Machine Elements	3 credits, Tutorial Teaching Assistant, UBC	Spring 2023
Multi-Objective Optimization and Decision-Making	3 credits, Lab Teaching Assistant, UBC	Fall 2022
Kinematics and Dynamics of Machinery	3 credits, Tutorial Teaching Assistant, UBC	Fall 2022
Applied Research in Health	3 credits, Marking Teaching Assistant, UBC	Fall 2022
Introductory Physics for the Life Sciences I	3 credits, Marking Teaching Assistant, UBC	Fall 2022
Introductory Physics for the Life Sciences I	3 credits, Lab Teaching Assistant, UBC	Fall 2022
Introductory Physics for the Life Sciences II	3 credits, Lab Teaching Assistant, UBC	Summer 2022
Introductory Physics for the Life Sciences I Dynamics	3 credits, Lab Teaching Assistant, UBC	Summer 2022
Introductory Physics for the Life Sciences I Dynamics	3 credits, Tutorial Teaching Assistant, UBC	Summer 2022
Applied Research in Health	3 credits, Marking Teaching Assistant, UBC	Fall 2021
Engineering Drawing and CAD/CAM	3 credits, Marking Teaching Assistant, UBC	Fall 2021
Engineering Drawing and CAD/CAM	3 credits, Tutorial Teaching Assistant, UBC	Fall 2021
Design of Machine Elements	3 credits, Tutorial Teaching Assistant, UBC	Spring 2021
Mechanics of Materials	3 credits, Tutorial Teaching Assistant, UBC	Spring 2021
Mechanics of Materials	3 credits, Tutorial Teaching Assistant, SUT	Fall 2020
Structural Analysis	3 credits, Tutorial Teaching Assistant, SUT	Spring 2020
Engineering Vibrations	3 credits, Tutorial Teaching Assistant, SUT	Spring 2020
Mechanics of Materials	3 credits, Tutorial Teaching Assistant, SUT	Fall 2019
Introduction to ABAQUS	Workshop instructor, SUT	Summer 2019

Structural Analysis	3 credits, Tutorial Teaching Assistant, SUT	Spring 2019
Engineering Vibrations	3 credits, Tutorial Teaching Assistant, SUT	Spring 2019
Applied Finite Element	3 credits, Tutorial Teaching Assistant, SUT	Spring 2019
Airframe Structural Design	3 credits, Tutorial Teaching Assistant, SUT	Spring 2019
Structural Analysis	3 credits, Tutorial Teaching Assistant, SUT	Fall 2018
Engineering Vibrations	3 credits, Tutorial Teaching Assistant, SUT	Spring 2018
Statics	3 credits, Tutorial Teaching Assistant, SUT	Spring 2018
Mechanics of Materials	3 credits, Tutorial Teaching Assistant, SUT	Fall 2017

LEADERSHIP EXPERIENCE

Iranian Graduate Student Association, University of Michigan	September 2024 - Present
<i>President</i>	<i>Ann Arbor, MI</i>

- Leading the organization in planning cultural, academic, and networking events for Iranian graduate students.
- Managing funding applications, budget allocation, and collaborations with university departments and colleges.

Mechanical Engineering Graduate Council (MEGC), University of Michigan	January 2024 - Present
<i>Officer</i>	<i>Ann Arbor, MI</i>

- Mentoring two junior PhD students in their first semester, providing guidance on coursework, research expectations, and academic resources.
- Assisting in organizing social and mentorship events to support graduate students in the Mechanical Engineering department.
- Facilitating networking opportunities between new and senior graduate students to enhance academic and professional development.

Physics of Disordered Solids Research Group, University of Michigan	May 2024 - August 2025
<i>Graduate Mentor</i>	<i>BC, Canada</i>

- Mentored a high school student, an undergraduate student, a visiting scholar, and a master's student.
- Trained and supervised them on running discrete element simulations using MercuryDPM open-source package.
- Trained and supervised them on material preparation, conducting an impact test, and analyzing the results.

Composites Research Network, The University of British Columbia	September 2021 - August 2023
<i>Graduate Mentor</i>	<i>BC, Canada</i>

- Mentored an undergraduate student, a visiting scholar, three master's students, and a PhD student.
- Trained and supervised them on performing experimental tests using Instron dual column load frame, Instron droptower impact system, thermal conductivity tester, and friction/peel tester.
- Trained and supervised them on material preparation and characterization of fiber-reinforced composites, and analysis of the characterization results.
- Trained and supervised them on running finite element simulations using ABAQUS.

HONORS & AWARDS

Michigan Institute of Computational Discovery and Engineering Fellowship.	September 2025
Rackham Graduate Student Research Grant, University of Michigan.	June 2024
MITACS Accelerate Award, University of British Columbia.	August 2022
UBC Graduate Fellowship, University of British Columbia.	November 2021
1 st Place of American Institute of Aeronautics and Astronautics Engine Design Competition.	September 2018 – August 2019

SKILLS

Computational Methods: Finite Element Method (FEM), Discrete Element Method (DEM), Material Point Method (MPM)
Programming: Python, C++, Fortran, C#
Simulation Tools: ABAQUS, ANSYS, LAMMPS, MercuryDPM
Machine Learning: TensorFlow, Scikit-Learn
High-Performance Computing: OpenMP, MPI