Alireza Mahdavi Nejad

US Citizen

Department of Mechanical and Materials Engineering
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Education

Worcester Polytechnic Institute, Worcester, MA
Ph.D. in Mechanical Engineering, August 2018
Theses: "Numerical Study of Heat and Mass Transfer Enhancement using Phase Change Materials"

Southern Illinois University, Edwardsville, IL
M.Sc. in Mechanical Engineering, May 2010
Theses: "Aerodynamics of a Flexible Membrane"

University of Tehran, Tehran, Iran
B.Sc. in Mechanical Engineering, September 2006

Professional Activities

Part-time Lecturer, Department of Mechanical and Industrial Engineering, Northeastern University, Boston, MA (January 2025 - Present)

Adjunct Teaching Faculty, Department of Civil, Environmental & Architectural, Engineering, Worcester Polytechnic Institute, Worcester, MA (August 2024 - Present)

Lecturer, Department of Mechanical and Aerospace Engineering, University of Houston, Houston, TX (August 2024 - November 2025)

Assistant Professor, Mechanical Engineering Program, School of Engineering, Wentworth Institute of Technology, Boston, MA (January 2019- August 2024)

Visiting Assistant Professor, Mechanical Engineering Program, School of Engineering, Wentworth Institute of Technology, Boston, MA (January 2018- December 2018)

Courses Taught at

Northeastern University
- **ME 7290, Convective Heat Transfer,** Spring 2025

University of Houston
- **MECE 2334, Thermodynamics,** Spring 2025
- **MECE 3336, Mechanics II (Dynamics),** Spring 2025
- **MECE 3338, Dynamics and Control of Mechanical Systems,** Fall 2024,2025
- **MECE 3345, Materials Science,** Fall 2024
- **MECE 3363, Introduction to Fluid Mechanics,** Spring 2025, Summer 2025
- **MECE 3369, Solid Mechanics,** Fall 2025

Worcester Polytechnic Institute
- **ES 3001, Introduction to Thermodynamics,** Spring 2025, Fall 2025
- **ME 4429, Thermofluid Application and Design,** Fall 2025
- **ME 5001, Applied Numerical Methods in Engineering,** Fall 2025
- **ME 5383 (and CE 514), Continuum Mechanics,** Fall 2024, 2025

Wentworth Institute of Technology
- **ENGR 1200, Engineering Laboratory,** Fall 2022
- **ENGR 1400, Applied Eng. Analysis,** Spring 2023, 2024
- **ENGR 1800, Programming with MATLAB,** Fall 2018, 2021, Spring 2022
- **MECH 2250, Thermodynamics I,** Fall 2018, 2019, 2020,2021, Spring 2023
- **MECH 2500, Mechanics of Materials,** Fall 2019, 2020, Spring 2022
- **MECH 2750, Thermodynamics II,** Fall 2021, 2022,2023
- **MECH 3100, Fluid Mechanics,** Spring 2019, 2020, 2021
- **MECH 3600, Materials Science,** Spring 2019, 2020, 2021
- **MECH 3800, Aerodynamics,** Summer 2019
- **MECH 3850, Engineering Dynamics,** Spring 2018
- **MECH 3800, Hydraulic Turbomachinery,** Summer 2019, 2023
- **MECH 3900, Heat Transfer,** Fall 2018, 2019, 2020, 2022, 2023, Spring 2023,2024, Summer 2023
- **MECH 4000, Mechanical Vibrations,** Spring 2018 (2 sections)
- **MECH 4400, Engineering Thermal Design**, Spring 2019, 2020, 2021

Course Development

Hydraulic Turbomachinery, WIT, Summer 2019
Engineering Thermal Design, WIT, Summer 2019
Aerodynamics, WIT, Summer 2019

Research

Thermal drying (Heat and mass transfer in moist porous media)
Phase change material (solid-liquid and solid-solid)
Renewable energy (Airborne wind energy and Tethered Undersea kite)
Fluid-Structure interaction
Computational methods

Peer-Reviewed Journal Publications

1. R. A. Mahdavinejad, **Alireza Mahdavi Nejad**, "ED Machining of WC-CO", Journal of Materials Processing Technology, Volumes 162, May 2005, Pages 637-643.
2. A. Pourshaghaghy, A. Hakkaki-Fard, **Alireza Mahdavi Nejad**, "Direct Simulation of Natural Convection in a Square Porous Media", Energy Conversion and Management, Volume 48, Issue 5, May 2007, Pages 1579-1589.
3. G. Guldentops, **Alireza Mahdavi Nejad**, C. Vuye, W. Van den bergh, N. Rahbar, "Performance of a pavement solar energy collector: Model development and validation", Applied Energy, Volume 163, February 2016, Pages 180–189.
4. **Alireza Mahdavi Nejad**, "Thermal Analysis of Paper Board Packaging with Phase Change Material: A Numerical Study", Journal of Packaging Technology and Research, Volume 3, May 2019, Pages 181-192.
5. **Alireza Mahdavi Nejad**, "Enhancement of drying of paper with phase change material: A numerical study", International Journal of Heat and Mass Transfer, Volume 149, March 2020, 119169.
6. M. K. Anvarifard, Z. Ramezani, I. S. Amiri, **Alireza Mahdavi Nejad**, "A Nanoscale-Modified band energy junctionless transistor with considerable progress on the electrical and frequency issue", Materials Science in Semiconductor Processing, Volume 107, March 2020, 104849.
7. **Alireza Mahdavi Nejad**, Gretar Tryggvason, "Power Generation Using Kites in a GroundGen Airborne Wind Energy System: A Numerical Study ", ASME Journal of Energy Resources Technology, Volume 142, Issue 6, June 2020, 061306.
8. F. Karimi, Z. Ramezani, I. S. Amiri, **Alireza Mahdavi Nejad**, "Electrothermal analysis of novel N-P-P FinFET with electrically doped drain: a dual material gate device for reliable nanoscale application", Applied Physics A, Volume 126, July 2020, Pages (609) 2-11.
9. M. K. Anvarifard, Z. Ramezani, I. S. Amiri, K. Tamersit, **Alireza Mahdavi Nejad**, "Profound analysis on sensing performance of Nanogap SiGe source DM-TFET biosensor", Journal of Materials Science: Materials in Electronics, Volume 31, November 2020, Pages 22699–22712.
10. M. Kiani, S. Omiddezyani, E. Houshfar, S. R. Miremadi, M. Ashjaee, **Alireza Mahdavi Nejad**, "Lithium-ion battery thermal management system with Al2O3/AgO/CuO nanofluids and phase change material", Applied Thermal Engineering, Volume 180, November 2020, 115840.

11. M. A. Mofid, **Alireza Mahdavi Nejad**, "Flame spray assisted TLP bonding of Ti alloy to Al alloy", Materials Chemistry and Physics, Volume 263, April 2021, 124404.
12. B. Taghilou, S. M. J. Sobhani, M. Pourjafar-Chelikdani, **Alireza Mahdavi Nejad,** R. Ghoroghi, K. Sadeghy "On the use of viscous micropumps for transporting viscoelastic fluids in channel flows: A numerical study", Journal of Non-Newtonian Fluid Mechanics, Volume 291, March 2021, 104528.
13. S. Gharehdaghi, S. F. Moujaes, **Alireza Mahdavi Nejad**, "Thermal-fluid analysis of a parabolic trough solar collector of a direct supercritical carbon dioxide Brayton cycle: A numerical study", Solar Energy, Volume 220, May 2021, Pages 766-787.
14. Z. Xiao, P. Mishra, **Alireza Mahdavi Nejad**, M. Tao, S. Granados-Focil, S. Van Dessel, "Thermal optimization of a novel thermo-optically responsive SS-PCM coatings for building enclosures", Energy and Buildings, Volume 247, September 2021, 111129.
15. **Alireza Mahdavi Nejad**, "A new drying approach deploying solid-solid phase change material: A numerical study", Energy, Volume 232, October 2021, 120990.
16. H. Jafari, M. Goharkhah, **Alireza Mahdavi Nejad**, "A comparative analysis on the single-phase and two-phase mixture models for calculation of ferrofluid convective heat transfer in the presence of a magnetic field: a numerical study", International Journal of Numerical Methods for Heat and Fluid Flow, Volume 32, Issue 7, November 2021, Pages 2406-2430.
17. M. Kiani, S. Omiddezyani, **Alireza Mahdavi Nejad**, M. Ashjaee, E. Houshfar "Novel hybrid thermal management for Li-ion batteries with nanofluid cooling in the presence of alternating magnetic field: An experimental study", Case Studies in Thermal Engineering, Volume 28, December 2021, 115840.
18. S. Dinarvand, **Alireza Mahdavi Nejad**, "Off-centered stagnation point flow of an experimental-based hybrid nanofluid impinging to a spinning disk with low to high non-alignments", International Journal of Numerical Methods for Heat and Fluid Flow, Volume 32, Issue 8, December 2021, Pages 2799-2818.
19. A. Saadatmand, M. Goharkhah, **Alireza Mahdavi Nejad**, "Heat transfer enhancement in mini channel heat sinks utilizing corona wind: A numerical study", International Journal of Heat and Mass Transfer, Volume 182, January 2022, 121970.
20. Karami, F. Kowsary, P. Hanafizadeh, **Alireza Mahdavi Nejad**, "Enhancement of convective drying of a moist porous material with impinging slot jet by implementation of micro-encapsulated phase change material: A numerical feasibility study", International Journal of Heat and Mass Transfer, Volume 191, Aug 2022, 122828.
21. M. Pourjafar-Chelikdani, B. Taghilou, N. P. Khabazi, **Alireza Mahdavi Nejad**, K. Sadeghy, "On the role played by extensional viscosity in peristaltic transport of circular solid particles suspended in Oldroyd-B liquids", Physics of Fluids, Volume 34, Issue 7, July 2022, Pages 073104 (1-17).
22. B. Taghilou, M. Pourjafar-Chelikdani, SM Taghavi, **Alireza Mahdavi Nejad**, A. Kuchumov, K. Sadeghy, "Numerical simulation of viscoelastic effects in peristaltic transport of drops", Journal of Non-Newtonian Fluid Mechanics, Volume 306, Aug 2022.
23. M. Pourjafar-Chelikdani, A. Lavaf, B. Taghilou, S. Almasi, S. Kowsar, H. Najafi-Astmal, **Alireza Mahdavi Nejad**, K. Sadeghy, "On the Use of Viscous Micropumps for the Transport of Yield-Stress Liquids in Microfluidic Systems", Journal of Non-Newtonian Fluid Mechanics, Volume 308, Oct 2022.

24. J. Ouaragli, Z. Xiao, **Alireza Mahdavi Nejad**, M. Tao, S. Granados-Focil, S. Van Dessel, Corrigendum to "A novel passive polymer-sorbent thermal battery for low-temperature energy applications: A numerical feasibility study", Journal of Energy Storage, Volume 78, 2024.
25. M Pourjafar-Chelikdani, MY Heidari, A Vakili, A Abdollahi, **Alireza Mahdavi Nejad**, K Sadeghy, "On the use of viscous micropumps for the transport of thixotropic fluids", Korea-Australia Rheology Journal, December 2023, Pages 1-15.
26. S. Beshkoofe, M. Baniassadi, **Alireza Mahdavi Nejad**, A. Sheidaei, M. Baghani, "Enhancing the Thermal Performance of Shape Memory Polymers: Designing a Minichannel Structure", Polymers, Volume 16, February 2024, Pages 1-23.
27. M. Hajiakbari, **Alireza Mahdavi Nejad**, E. Houshfar, "Enhancing diesel engine cooling efficiency: A comprehensive numerical study on nanofluid coolants with exergy and economic analysis", Case Studies in Thermal Engineering, Volume 56, April 2024, 104217.
28. F. Sedri, A. Riyasi, **Alireza Mahdavi Nejad**, H. Metghalchi, "Cavitation and Pulsation Reduction for External Gear Pumps Using Novel Core-Feed Inlets and Outlets: An Integrated Experimental and Numerical Study", ASME Journal of Energy Resources Technology, Volume 146, Issue 10, October 2024, pages 1-34.
29. M. Mardani, S. Siahtiri, M. Besati, M. Baghani, M. Baniassadi, **Alireza Mahdavi Nejad**, "Microencapsulation of natural products using spray drying; an overview", Journal of microencapsulation, Volume 41, Issue 7, October 2024, Pages 649-678.
30. S. Binas, M. Mardani, S. Siahtiri, **Alireza Mahdavi Nejad**, "Trehalose and Neurodegeneration: A Review of Its Role in Autophagy, Protein Aggregation, and Neuroprotection", ASME Open Journal of Engineering, Volume 4, July 2025.
31. A. Falatoori, A. Riasi, G. Tryggvason, **Alireza Mahdavi Nejad**, "Tethered Undersea Kite Turbine for Tidal Energy Harvesting: A Numerical Design Study", Renewable Energy, Volume 256, August 2025.

Non-Peer-Reviewed Publications

1. M. Sarvaghad-Moghaddam, A. Orouji, Z. Ramezani, I. Amiri, **Alireza Mahdavi Nejad**, "Reversible gates in emerging quantum-dot cellular automata technology: An innovative approach to design and simulation.", December 2019, arXiv preprint arXiv:1803.11017.

Conference Publications

1. R.A. Mahdavinejad, **Alireza Mahdavi Nejad**, "Conduction as a Major Mode in ED Machining Instability of Refel Sic", 13th International Conference AMPT 2006, July 30-Aug 3,2006, Las Vegas, USA.
2. R.A.Mahdavinejad, H.Sharifi-Bidgoli, **Alireza Mahdavi Nejad** "Finite Element Analysis of Air Gap Thickness Effect in Electro Slag Remeltiong" 3rd International Conference on Thermal Process Modeling and Simulation, April 26-28, 2006, Budapest, Hungry.
3. D. J. Olinger, **Alireza Mahdavi Nejad**, J. S. Goela, G. Tryggvason, "Modeling and Testing of a Kite-Powered Water pump", Abstract for the Airborne wind Energy Conference 2013, September 10-11, 2013, Berlin, Germany.

4. **Alireza Mahdavi Nejad**, D. J. Olinger, G. Tryggvason, "Numerical Modeling of Kites for Power Generation", ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 11th International Conference on Nanochannels, Microchannels, and Minichannels, August 3-7, 2014, Chicago, Illinois, USA.
5. C. Vuye, G. Guldentops, N. Rahbar, **Alireza Mahdavi Nejad**, W. Van den bergh, "Analysis of a heat exchanging asphalt layer using a finite element approach", Proceedings of the 6th Eurasphalt and Eurobitume Congress, 13 June 2016, Prague, Czech Republic.
6. M. Volf, M. Demianenko, O. Starynskyi, O. Liaposhchenko, **Alireza Mahdavi Nejad,** "Numerical Simulation of the Mass Transfer Process Between Ammonia and Water in the Absorption Chiller", Design, Simulation, Manufacturing: The Innovation Exchange DSMIE 2020: Advances in Design, Simulation and Manufacturing III , Pages 239-248.

Projects

- "Thermal optimization of a novel thermo-optically responsive SS-PCM coatings for building enclosures", Funded by NSF, Engineering, Division of Civil, Mechanical and Manufacturing Innovation (CMMI), Structural and Architectural Engineering and Materials program (SAEM) under award numbers CMMI-1662903 & CMMI-1662675.
- "Design of a Novel Smart Polymer-Sorbent based Thermal Battery System and its applications: A Numerical Feasibility Study", Funded by U.S. Army Natick Soldier Research, Development, and Engineering Center (NSRDEC) under grant number W911QY20P0076.
- "Interdisciplinary Solutions through Electromechanical Design", Presidential Epic mini-grants, WIT, principal investigator with prof. James McCusker, 02/19-09/19.
- "Numerical modeling of kites for power generation", under supervision of Prof. D. Olinger and Prof. G. Tryggvason, Funded by NSF (Grant CBET 1033812), Jun 2012 to August 2014.