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ACADEMIC POSITIONS

2020-Present	Associate Professor Tarbiat Modares University
2014-2020	Assistant Professor Tarbiat Modares University
2012-2014	Assistant Professor K. N. Toosi University of Technology

RESEARCH INTERESTS

- Experimental and Numerical Heat Transfer
- Innovative Heat Transfer Enhancement Techniques
- Design and Optimization of Modern Thermal Systems
- Battery Thermal Management Systems
- Renewable Energy

EDUCATION

2012	**Ph.D. in Mechanical Engineering, University of Tehran, Tehran, Iran** Energy Conversion
2007	**M.Sc. in Mechanical Engineering, University of Tehran, Tehran, Iran** Energy Conversion
2005	**B.Sc. in Mechanical Engineering, Ferdowsi University of Mashhad, Mashhad, Iran** Heat and Fluids

SELECTED HONORS

2022-2024	World's Top 2% Scientists
2012	Selected Ph.D. Thesis from the Iranian Society of Mechanical Engineering (ISME)
2007	1st Rank Among Energy Conversion Attendees of Ph.D. Entrance Exam at the University of Tehran
2005	1st Rank Among Fluid Mechanics B.Sc. Students

SELECTED PUBLICATIONS

Peer-Reviewed Journal Papers

2025 Haghani, O., **Heyhat, M. M.**, & Mahian, O. (2025). Nature-inspired 3D interfacial solar evaporation system: Enhancing steam generation through efficient design and surface wettability. *Energy Conversion and Management*.

2025 Fekri, Y., **Heyhat, M. M.**, Salehzadeh, F. J., Wang, Z., & Rahbari, A. (2025). A review of thermal management systems for extreme fast charging Li-ion batteries. *Applied Thermal Engineering*.

2025 Jafari, H., **Heyhat, M. M.**, & Targhi, M. Z. (2025). Enhanced heat transfer in microchannel heat sinks using heart wave-like pulsating flow. *International Communications in Heat and Mass Transfer*.

2025 Keshtiban, M. M., Roozbehi, A. R., Fathi, M., Targhi, M. Z., & **Heyhat, M. M.** (2025). Experimental validation and machine learning assisted multi-objective optimization of variable cross-section channels in turbulent jet impingement cooling systems. *Applied Thermal Engineering*.

2025 Bahmani, M., **Heyhat, M. M.**, & Rahbari, A. (2025). Design evolution of a heat sink using constructal theory for a photovoltaic panel. *Energy*.

2025 Jafari, R., Targhi, M. Z., **Heyhat, M. M.**, & Maddahian, R. (2025). Thermal performance of flow boiling in hexagonal micro pin-fins: Towards effective electronic cooling solutions. *International Communications in Heat and Mass Transfer*.

2025 Farsad, E., **Heyhat, M. M.**, & Targhi, M. Z. (2025). The novel efficient protrusion-rib configuration for increasing the temperature uniformity in a multiple-jet microchannel heat sink. *Case Studies in Thermal Engineering*.

2024 Fathi, M., **Heyhat, M. M.**, Targhi, M. Z., & Emadi, A. (2024). Semi-porous-fin microchannel heat sinks for enhanced micro-electronics cooling. *International Communications in Heat and Mass Transfer*.

2024 Keshtiban, M. M., Targhi, M. Z., & **Heyhat, M. M.** (2024). Effects of radial fin arrangements on the thermal performance of turbulent liquid jet impingement heat sinks: Experimental and numerical approach. *Applied Thermal Engineering.*

2024 Chukami, B. S., & **Heyhat, M. M.** (2024). Numerical investigation on the effect of Al2O3-water nanofluid on direct steam generation in parabolic trough collectors. *Applied Thermal Engineering*.

2024 Farsad, E., **Heyhat, M. M.**, & Targhi, M. Z. (2024). On the effect of protrusion positioning in multi-jet microchannel heat sink thermo-hydraulic performance. *International Communications in Heat and Mass Transfer*.

2024 Arefimanesh, A., & **Heyhat, M. M.** (2024). Investigation of the simultaneous effect of fouling and ambient conditions on cooling performance and water consumption of a wet cooling tower. *Case Studies in Thermal Engineering*.

2024 Roozbehi, A. R., Targhi, M. Z., & **Heyhat, M. M.** (2024). Thermal-hydraulic performance enhancement of modified hexagonal micro-Pin fin heat sinks using rotational configurations. *Applied Thermal Engineering*.

2023 Fathi, M., **Heyhat, M. M.**, Targhi, M. Z., & Bigham, S. (2023). Porous-fin microchannel heat sinks for future micro-electronics cooling. *International Journal of Heat and Mass Transfer*.

2023 Fathi, M., **Heyhat, M. M.**, Targhi, M. Z., & Bigham, S. (2023). Bifurcated divergent microchannel heat sinks for enhanced micro-electronic cooling. *International Communications in Heat and Mass Transfer*.

2023 **Heyhat, M. M.**, & Khattar, M. Z. (2023). On the effect of different placement schemes of metal foam as volumetric absorber on the thermal performance of a direct absorption parabolic trough solar collector. *Energy*.

2023 **Heyhat, M. M.**, Abbood, M. Q. J., Ahbabi Saray, J., & Mokhtari Ardekani, A. (2023). Comparative assessmentof direct absorption solar collector performance in different climates. *Scientific Reports*.

2022 Saray, J. A., & **Heyhat, M. M.** (2022). Modeling of a direct absorption parabolic trough collector based on using nanofluid: 4E assessment and water-energy nexus analysis. *Energy*.

2022 Ghorbani, N., Targhi, M. Z., **Heyhat, M. M.**, & Alihosseini, Y. (2022). Investigation of wavy microchannel

ability on electronic devices cooling with the case study of choosing the most efficient microchannel pattern. *Scientific Reports*.

2022 Saray, J. A., & **Heyhat, M. M.** (2022). Modeling of a direct absorption parabolic trough collector based on using nanofluid: 4E assessment and water-energy nexus analysis. *Energy*.

2021 Mashhadian, A., **Heyhat, M. M.**, & Mahian, O. (2021). Improving environmental performance of a direct absorption parabolic trough collector by using hybrid nanofluids. *Energy Conversion and Management*.

2021 **Heyhat, M. M.**, Abbasi, M., & Rajabpour, A. (2021). Molecular dynamic simulation on the density of titanium dioxide and silver water-based nanofluids using ternary mixture model. *Journal of Molecular Liquids*, 333, 115966.

2021 Alihosseini, Y., Targhi, M. Z., & **Heyhat, M. M.** (2021). Thermo-hydraulic performance of wavy microchannel heat sink with oblique grooved finned. *Applied Thermal Engineering*.

2020 Jafarzad, A., & Heyhat, M. M. (2020). Thermal and exergy analysis of air-nanofluid bubbly flow in a double-pipe heat exchanger. *Powder Technology*.

2020 Abbasi, M., **Heyhat, M. M.**, & Rajabpour, A. (2020). Study of the effects of particle shape and base fluid type on density of nanofluids using ternary mixture formula: A molecular dynamics simulation. *Journal of Molecular Liquids*.

2020 **Heyhat, M. M.**, Mousavi, S., & Siavashi, M. (2020). Battery thermal management with thermal energy storage composites of PCM, metal foam, fin and nanoparticle. *Journal of Energy Storage*.

2020 Alihosseini, Y., Targhi, M. Z., **Heyhat, M. M.**, & Ghorbani, N. (2020). Effect of a micro heat sink geometric design on thermo-hydraulic performance: A review. *Applied Thermal Engineering*.

2020 Valizade, M., **Heyhat, M. M.**, & Maerefat, M. (2020). Experimental study of the thermal behavior of direct absorption parabolic trough collector by applying copper metal foam as volumetric solar absorption. *Renewable Energy*.

2019 Ardekani, A. M., Kalantar, V., & **Heyhat, M. M.** (2019). Experimental study on heat transfer enhancement of nanofluid flow through helical tubes. *Advanced Powder Technology*.

2019 Ardekani, A. M., Kalantar, V., & **Heyhat, M. M.** (2019). Experimental study on the flow and heat transfer characteristics of Ag/water and SiO2/water nanofluids flows in helically coiled tubes. *Journal of Thermal Analysis and Calorimetry*.

2019 Valizade, M., **Heyhat, M. M.**, & Maerefat, M. (2019). Experimental comparison of optical properties of nanofluid and metal foam for using in direct absorption solar collectors. *Solar Energy Materials and Solar Cells*.

2019 Mousavi, S. B., & **Heyhat, M. M.** (2019). Numerical study of heat transfer enhancement from a heated circular cylinder by using nanofluid and transverse oscillation: A comparative study. *Journal of Thermal Analysis and Calorimetry*.

2019 Zare, M., & **Heyhat, M. M.** (2019). Performance evaluation of nanofluid flow in conical and helical coiled tubes. *Journal of Thermal Analysis and Calorimetry*.

2018 **Heyhat, M. M.**, & Irannezhad, A. (2018). Experimental investigation on the competition between enhancement of electrical and thermal conductivities in water-based nanofluids. *Journal of Molecular Liquids*.

2018 **Heyhat, M. M.**, Abdi, A., & Jafarzad, A. (2018). Performance evaluation and exergy analysis of a double pipe heat exchanger under air bubble injection. *Applied Thermal Engineering*.

2016 Behrangzade, A., & **Heyhat, M. M.** (2016). The effect of using nano-silver dispersed water based nanofluid as a passive method for energy efficiency enhancement in a plate heat exchanger. *Applied Thermal Engineering*.

2013 Salehi, J. M., **Heyhat, M. M.**, & Rajabpour, A. (2013). Enhancement of thermal conductivity of silver nanofluid synthesized by a one-step method with the effect of polyvinylpyrrolidone on thermal behavior. *Applied Physics Letters.*

2013 **Heyhat, M. M.**, Kowsary, F., Rashidi, A. M., Momenpour, M. H., & Amrollahi, A. (2013). Experimental

investigation of laminar convective heat transfer and pressure drop of water-based Al2O3 nanofluids in fully developed flow regime. *Experimental Thermal and Fluid Science*.

2012 Kayhani, M. H., Soltanzadeh, H., **Heyhat, M. M.**, Nazari, M., & Kowsary, F. (2012). Experimental study of convective heat transfer and pressure drop of TiO2/water nanofluid. *International Communications in Heat and Mass Transfer*.

Peer-Reviewed Conference Papers

2025 Fekri, Y., & **Heyhat, M. M.** (2025, April). Temperature Estimation of a Prismatic Lithium-Ion Battery Through Various Heat Generation Approaches. *In 2025 10th International Conference on Technology and Energy Management (ICTEM) (pp. 1-4)*. IEEE.

2023 Fathi, M., **Heyhat, M. M.**, & Targhi, M. Z. (2023, February). Thermal performance enhancement of microchannel heat sinks with a decreasing-height bifurcation plate. *In 2023 8th International Conference on Technology and Energy Management (ICTEM) (pp. 1-5)*. IEEE.

2023 Keshtiban, M. M., Targi, M. Z., & **Heyhat, M. M.** (2023, February). Combination of Porous Layer and Jet impingement in an Annular Heat sink. *In 2023 8th International Conference on Technology and Energy Management (ICTEM) (pp. 1-5)*. IEEE.

2018 **Heyhat, M. M.**, Rajabpour, A., Abbasi, M., Arabha, S. (2018). Interfacial Nanolayer Effects on Density and Viscosity of Nanofluids: A Molecular Dynamics Study. In Hot Colloids, Ecole Normale de Lyon, France.

2017 Rajabpour, A., **Heyhat, M. M.** (2017). Temperature Effect on the Viscosity of Silver Nanofluid: A Molecular Dynamics Study. *In 25th Annual International Conference on Mechanical Engineering*.

2012 **Heyhat, M. M.**, Kowsary, F., Rashidi, A. M., Momenpour, M. H., & Amrollahi, A. (2012, May). Experimental determination of thermophysical properties of nanofluids containing spherical alumina nanoparticles. *In 20th Annual International Conference on Mechanical Engineering-ISME2012* (pp. 16-18).

2009 Moaveninejad, S., & **Heyhat, M. M.** (2009, January). Pressure Gradient Variations During Reflux Condensation in a Closed Thermosyphon. *In Heat Transfer Summer Conference* (Vol. 43581, pp. 417-424).

2008 Saeedi, A., Moghiman, M., & **Heyhat, M. M.** (2008, September). Numerical study of mist cooling in a turbulent impinging jet. *In Proceedings of the 1st WSEAS international conference on Finite differences-finite elements-finite volumes-boundary elements* (pp. 84-90).

2008 **Heyhat, M. M.**, Moghiman, M., & Mahjoub, S. (2008, June). Comparison of Mist Effect on the Heat Transfer Coefficient and Skin Friction Factor in an Impinging Jet. *In 2008 International Conference on Computational Sciences and Its Applications (pp. 245-251)*. IEEE.

RESEARCH REPORTS/BOOK CONTRIBUTIONS

Battery thermal engineering, under preparation

SELECTED PROFESSIONAL PROJECTS

2011 Islamic Azad University, Parand Branch, Study and modeling of cracking caused by hydrogen intrusion accompanied by stress in pressure vessels in an oil refinery, PI

2013 Islamic Azad University, Najafabad Branch, Design and construction of a system for experimental study and numerical simulation of nanofluid flow within a micromodel, PI

2013 Iranian National Science Foundation (INSF), Experimental study and molecular dynamics simulation of thermal conduction of nanofluids, Co. PI

2018 Iranian National Science Foundation (INSF), Experimental measurement of nanofluid viscosity along with molecular dynamics simulation and comparison with experimental results and existing models, PI

2019 Iranian National Science Foundation (INSF), Experimental and Numerical Investigation of Increasing the Thermal Performance in Direct Absorption Parabolic Trough Solar Collectors, PI
2021 Iranian National Science Foundation (INSF), Experimental study and simulation of performance improvement of microchannel heat sinks and the role of PCMs, PI
2023 Iranian National Science Foundation (INSF), Design, construction, and performance evaluation of a nature-inspired solar surface evaporation system considering surface wettability and wind flow, PI
2024 Iranian National Science Foundation (INSF), Investigation of efficiency improvement of mesh for fog harvesting, PI
2025 Iranian National Science Foundation (INSF), Simulation of an Impingement Jet-Based Cooling System for Lithium-ion Batteries During Fast Charging Conditions, PI

TEACHING EXPERIENCE

Advanced Heat Transfer / Graduate and Post Graduate Spring 2014, ’15, ’17, ’18, ’19, ‘20’, 21, ’22, ’23, ‘24’, 25
Role: Solo Instructor. This lesson presents the concepts of heat transfer mechanisms, including thermal conduction, convection, and radiation. Formulation of heat transfer problems in internal and external flow conditions is examined. Mass transfer is also taught at the end.

Enhanced Heat Transfer / Graduate and Post Graduate Fall 2015, ’17, ’19, ’21, ’23, ‘25
Role: Solo Instructor. This course examines methods for enhancing heat transfer. Active, passive, and hybrid methods are comprehensively introduced, and the characteristics and evaluation indices of each are discussed.

Advanced Engineering Mathematics / Graduate Fall 2013, ’14, ’15, ’16, ’17, ’18, ’19, ’20, ’21, ’22, ‘23 ’24, ’25
Role: Solo -Instructor. In this course, students will be introduced to methods for analyzing engineering problems using mathematical language. Some important outlines presented in this lesson include the Series Solution of ODEs. (Special Functions; Legendre & Bessel Equs.), Linear Algebra/ Tensors, Partial Differential Equations, Perturbation Methods, Complex Analysis.

Fundamentals of Renewable Energy Engineering / Graduate Spring 2022, ’23, ’24, ’25
Role: Co-Instructor. Introduction to renewable resources and how renewable systems work, learning the basics of renewable energy engineering, and understanding how to extract energy from renewable systems are of the goals of this course.

Solar Energy / Graduate Spring 2022, ’23, ’24, ’25
Role: Solo -Instructor. The objectives of this course are to introduce the process of extracting thermal and electrical energy from solar radiation, to identify the components of solar systems, and to familiarize oneself with both grid-connected and off-grid solar systems.

Advanced Thermodynamics / Graduate Spring 2024
Role: Solo -Instructor. Energy and exergy analysis of thermodynamic cycles is one of the objectives of this course.

Continuum Mechanics / Graduate Fall 2010, ’11, ’12, ’13, ’14
Role: Solo -Instructor. All engineering students, especially mechanics, can prepare themselves for core courses in heat and fluids, such as fluid mechanics, heat transfer, etc., or solid mechanics, such as strength of materials, elasticity, etc., by studying this course.

Thermodynamics 1&2 / Undergraduate Spring 2010, ’11, ’12, ’13, ’14

Role: Solo -Instructor. This course introduces the principles of thermodynamics and its processes. Methods for formulating and solving various applied problems in the field of thermodynamic engineering are part of this course.

Numerical Calculations/ Undergraduate Spring 2010, ’11, ’12, ’13, ’14
Role: Solo -Instructor. The main objective of this course is to familiarize students with some key concepts of numerical computation, especially sources of error and error analysis. It also introduces students to different methods for different computational topics, how to compare methods with each other, and how to choose a method based on two issues: accuracy and cost.

ACADEMIC ADVISING

Doctoral Dissertations Supervised/Co-Supervised: 6 completed (5 in progress)/ 2

Master’s Theses Supervised/Co-Supervised: 36 completed (5 in progress) / 12 (2 in

progress)

Undergraduate Theses Supervised: 4 completed

EDITORIAL/REVIEWER CONTRIBUTIONS

Applied Energy (Reviewer)

Applied Thermal Engineering (Reviewer)

Energy Conversion and Management (Reviewer)

International Communications in Heat and Mass Transfer (Reviewer)

International Journal of Heat and Mass Transfer (Reviewer)

Journal of Energy Storage (Reviewer)

Renewable Energy (Reviewer)

Solar Energy Materials and Solar Cells (Reviewer)

Thermal Science and Engineering Progress (Reviewer)

Sustainable Energy Technologies and Assessments (Reviewer)

Results in Engineering (Reviewer)

Journal of Molecular Liquids (Reviewer)

International Journal of Thermal Sciences (Reviewer)

International Journal of Heat and Fluid Flow (Reviewer)

Energy Reports (Reviewer)

Energy (Reviewer)

Case Studies in Thermal Engineering (Reviewer)

Alexandria Engineering Journal (Reviewer)

Journal of Central South University (Editor and Reviewer)

Modares Mechanical Engineering (Editor-in-Chief)