

Abolfazl Fattahi

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Date of birth: 1986

Marriage status: single

RESEARCH INTERESTS

Renewable energy, combustion, CFD, heat and mass transfer, Energy Systems.

EDUCATION

- **PhD in Mechanical Engineering (Energy conversion)**, 2017 – Iran University of Science and Technology, Tehran, Iran, G.P.A: 19.06/20.

Dissertation: *Analytical, numerical and experimental analysis of entropy waves' dissipation and dispersion.*

Supervisor: Prof. S. Mostafa Hosseinalipour, Iran University of Science and Technology

Dr. Nader Karimi, University of Glasgow.

- **MSc in Mechanical Engineering (Energy conversion)**, 2011 – University of Kashan, Iran, G.P.A: 18.80/20.
- **B.Eng in Mechanical Engineering (Heat and Fluid Flow)**, 2008 – University of Kashan, Iran, G.P.A: 17.16/20.

APPOINTMENTS

- Fixed-term lecturer: University of Kashan, Department of Mechanical Engineering, 2018 up to now.
- Teacher Assistant, Iran University of Science and Technology, 2013-2017

PUBLICATIONS

Peer-reviewed Journals

- 1- Hajjaligol, N., Sheikhzadeh, G.A., Ebrahim Qomi, M. and Fattahi, A., 2011. Laminar mixed convection of Cu-water nano-fluid in two-sided lid-driven enclosures. *Journal of Nanostructures*, 1(1), pp.44-53.
- 2- Hashemi, S.A., Fattahi, A., Sheikhzadeh, G.A. and Mehrabian, M.A., 2011. Investigation of the effect of air turbulence intensity on NOx emission in non-premixed hydrogen and hydrogen-hydrocarbon composite fuel combustion. *International journal of hydrogen energy*, 36(16), pp.10159-10168.
- 3- Hashemi, S., Fattahi, A. and Sheikhzade, G., 2012. Presumed PDF Modeling of Reactive oxy-fuel flow in a model combustor. *The Journal of Energy: Engineering & Management*, 2(4), pp.48-57.

- 4- Sheikhzadeh, G.A., Ebrahim Qomi, M., Hajialigol, N. and Fattahi, A., 2012. Laminar mixed convection of Al₂O₃-water nanofluid in a three-dimensional microchannel. *Journal of Nanostructures*, 2(1), pp.61-68.
- 5- Hashemi, S.A., Fattahi, A. and Sheikhzadeh, G.A., 2013. The Effect of Air Preheating on a Sudden-Expansion Turbulent Diffusion Air-fuel Flame. *Arabian Journal for Science and Engineering*, 38(10), pp.2801-2808.
- 6- Hashemi, S.A., Fattahi, A., Sheikhzadeh, G.A. and Mehrabian, M.A., 2012. The effect of oxidant flow rate on a coaxial oxy-fuel flame. *Heat and Mass Transfer*, 48(9), pp.1615-1626.
- 7- Hashemi, S.A., Fattahi, A., Sheikhzadeh, G.A., Hajialigol, N. and Nikfar, M., 2012. Numerical investigation of NO_x reduction in a sudden-expansion combustor with inclined turbulent air jet. *Journal of mechanical science and technology*, 26(11), pp.3723-3731.
- 8- Sheikhzadeh, G.A., Nikfar, M. and Fattahi, A., 2012. Numerical study of natural convection and entropy generation of Cu-water nanofluid around an obstacle in a cavity. *Journal of mechanical science and technology*, 26(10), pp.3347-3356.
- 9- Hashemi, S.A., Fattahi, A. and Sheikhzadeh, G.A., 2012. The effect of fuel turbulence intensity on NO_x formation in turbulent diffusion CH₄-air flames. *Kuwait J. Sci. Eng*, 39(1B), pp.233-246.
- 10-Sheikhzadeh, G.A., Qomi, M.E., Hajialigol, N. and Fattahi, A., 2012. Numerical study of mixed convection flows in a lid-driven enclosure filled with nanofluid using variable properties. *Results in Physics*, 2, pp.5-13.
- 11-Sheikhzadeh, G.A., Qomi, M.E., Hajialigol, N.A.J.M.E.H. and Fattahi, A., 2013. Effect of Al₂O₃-water nanofluid on heat transfer and pressure drop in a three-dimensional microchannel. *International Journal of Nano Dimension*, 3(4), pp.281-288.
- 12-Hashemi, S.A., Hajialigol, N., Fattahi, A., Mazaheri, K. and Heydari, R., 2013. Investigation of a flame holder geometry effect on flame structure in non-premixed combustion. *Journal of Mechanical Science and Technology*, 27(11), pp.3505-3512.
- 13-G.A. Sheikhzadeh, R. Heydari, N. Hajialigol, A. Fattahi and M.A. Mehrabian, 2013, Heat and mass transfer by natural convection around a hot body in a rectangular cavity, *Scientia Iranica B*, Vol. 20 (5), pp. 1474-1484.
- 14-S. A. Hashemi, N. Hajialigol, K. Mazaheri, A. Fattahi, 2013, Investigation of Air Turbulence Intensity Effect on the Flame Structure in Different Flame Holder Geometry, *International Journal of Engineering*, Vol. 26 (12) pp. 1423-1432.
- 15-A. Fattahi, M. Alizadeh, 2014, Numerical investigation of double-diffusive mixed convective flow in a lid-driven enclosure filled with Al₂O₃-water nanofluid, *Transport Phenomena in Nano and Micro Scales*, Vol. 2, pp. 68-80.
- 16-Hajialigol, N., Fattahi, A., Ahmadi, M.H., Qomi, M.E. and Kakoli, E., 2015. MHD mixed convection and entropy generation in a 3-D microchannel using Al₂O₃-water nanofluid. *Journal of the Taiwan Institute of Chemical Engineers*, 46, pp.30-42.

- 17-Hosseinalipour, S.M., Fattahi, A. and Karimi, N., 2016. Investigation of the transmitted noise of a combustor exit nozzle caused by burned hydrogen-hydrocarbon gases. *International Journal of Hydrogen Energy*, 41(3), pp.2075-2086.
- 18-Hosseinalipour, S.M., Fattahi, A. and Karimi, N., 2016. Analytical investigation of non-adiabatic effects on the dynamics of sound reflection and transmission in a combustor. *Applied Thermal Engineering*, 98, pp.553-567.
- 19-Hosseinalipour, S.M., Fattahi, A., Afshari, H. and Karimi, N., 2017. On the effects of convecting entropy waves on the combustor hydrodynamics. *Applied Thermal Engineering*, 110, pp.901-909.
- 20-Fattahi, A., Hosseinalipour, S.M. and Karimi, N., 2017. On the dissipation and dispersion of entropy waves in heat transferring channel flows. *Physics of Fluids*, 29(8), p.087104.
- 21-Fattahi, A., Hosseinalipour, S.M., Karimi, N., Saboohi, Z. and Ommi, F., 2019. On the response of a lean-premixed hydrogen combustor to acoustic and dissipative-dispersive entropy waves. *Energy*, 180, pp.272-291.
- 22-Hosseinalipour, S.M., Fattahi, A., Khalili, H., Tootoonchian, F. and Karimi, N., 2020. Experimental investigation of entropy waves' evolution for understanding of indirect combustion noise in gas turbine combustors. *Energy*, 195, p.116978.
- 23-Saboohi, Z., Ommi, F., Fattahi, A. and Karimi, N., 2020. Large eddy simulation of the destruction of convecting hot fluid pockets through a cold channel flow. *International Journal of Thermal Sciences*, 156, p.106475.
- 24-Abad, J.M.N., Alizadeh, R., Fattahi, A., Doranehgard, M.H., Alhajri, E. and Karimi, N., 2020. Analysis of transport processes in a reacting flow of hybrid nanofluid around a bluff-body embedded in porous media using artificial neural network and particle swarm optimization. *Journal of Molecular Liquids*, p.113492.
- 25-Alizadeh, R., Mohebbi Najm Abad, J., Fattahi, A., Alhajri, E.S. and Karimi, N., 2020. Application of Machine Learning to Investigation of Heat and Mass Transfer Over a Cylinder Surrounded by Porous Media-The Radial Basic Function Network. *Journal of Energy Resources Technology*, pp.1-18.
- 26-Fattahi, A., Karimi, N. and Hajialigol, N., 2020. Dynamics of entropy wave generation in a simplified model of gas turbine combustor: A theoretical investigation. *Physics of Fluids*, 32(10), p.106107.
- 27-Hosseinalipour, S.M., Rahmani, E., Fattahi, A. and Karimi, N., 2020. Experimental investigation of the hydrodynamic effects upon convecting entropy waves in nozzle flows. *Aerospace Science and Technology*, 107, p.106301.
- 28-Tafakkori, R. and Fattahi, A., 2021. Introducing novel configurations for double-glazed windows with lower energy loss. *Sustainable Energy Technologies and Assessments*, 43, p.100919.

- 29-Khaledabadi, F.M. and Fattahi, A., 2020. Thermo-hydrodynamic analysis of a nanofluid flow over diamond-shaped tubes array of a heat exchanger. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, pp.1-14.
- 30-Javidi Sarafan, M., Alizadeh, R., Fattahi, A., Valizadeh Ardalan, M. and Karimi, N., 2020. Heat and mass transfer and thermodynamic analysis of power-law fluid flow in a porous microchannel. *Journal of Thermal Analysis and Calorimetry*, pp.1-20.
- 31-Fattahi, A., 2020. LBM simulation of thermo-hydrodynamic and irreversibility characteristics of a nanofluid in microchannel heat sink under affecting a magnetic field. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, pp.1-17.
- 32-Ebrahim Qomi, M., Sheikhzadeh, G.A. and Fattahi, A., 2020. Heat transfer enhancement in a microchannel using a pulsating MHD hybrid nanofluid flow. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, pp.1-16.
- 33-Alizadeh, R., Abad, J.M.N., Fattahi, A., Mohebbi, M.R., Doranehgard, M.H., Li, L.K., Alhajri, E. and Karimi, N., 2020. A machine learning approach to predicting the heat convection and thermodynamics of an external flow of hybrid nanofluid. *Journal of Energy Resources Technology*.
- 34-Hosseinalipour, S.M., Rahmani, E. and Fattahi, A., 2021. Comparison between the effects of zero and non-zero flow acceleration on the entropy wave decay: an experimental study. *Journal of Energy Resources Technology*, pp.1-15.
- 35-Rahmani, E., Moradi, T., Fattahi, A., Delpisheh, M., Karimi, N., Ommi, F. and Saboohi, Z., 2021. Numerical simulation of a solar air heater equipped with wavy and raccoon-shaped fins: The effect of fins' height. *Sustainable Energy Technologies and Assessments*, p.101227.
- 36-Fattahi, A., 2021. Numerical simulation of a solar collector equipped with a twisted tape and containing a hybrid nanofluid. *Sustainable Energy Technologies and Assessments*, 45, p.101200.
- 37-Alizadeh, R., Abad, J.M.N., Fattahi, A., Mohebbi, M.R., Doranehgard, M.H., Li, L.K., Alhajri, E. and Karimi, N., 2021. A machine learning approach to predicting the heat convection and thermodynamics of an external flow of hybrid nanofluid. *Journal of Energy Resources Technology*, 143(7), p.070902.
- 38-Fattahi, A., 2021. On the rotary concentrated solar collector containing twisted ribs and MgO-Ag-water nanofluid. *Journal of the Taiwan Institute of Chemical Engineers*.
- 39-Fattahi, A., 2021. The effect of cross-section geometry on the performance of a solar nanofluid heater in a parabolic solar receiver: A comparison study. *Journal of the Taiwan Institute of Chemical Engineers*.
- 40-Taherzadeh Fini, A. and Fattahi, A., 2021. Bioethanol Production from Wastes: An Experimental Evaluating Study for Iran. *Journal of Renewable Energy and Environment*, 8(3), pp.86-93.

- 41-Valizadeh Ardalan, M., Alizadeh, R., Fattahi, A., Adelian Rasi, N., Doranehgard, M.H. and Karimi, N., 2021. Analysis of unsteady mixed convection of Cu–water nanofluid in an oscillatory, lid-driven enclosure using lattice Boltzmann method. *Journal of Thermal Analysis and Calorimetry*, 145(4), pp.2045-2061.
- 42-Hajjaligol, N., Mazaheri, K. and Fattahi, A., 2021. Thermo-hydrodynamic effects of the Ethylene reactive flow on convecting hot spots using LES. *Chemical Engineering Communications*.
- 43-Alizadeh, R., Mohebbi Najm Abad, J., Fattahi, A., Mesgarpour, M., Doranehgard, M.H., Xiong, Q. and Karimi, N., 2021. Machine-Learning Enhanced Analysis of Mixed Biothermal Convection of Single Particle and Hybrid Nanofluids within a Complex Configuration. *Industrial & Engineering Chemistry Research*.
- 44-Rahmani, E., Fattahi, A., Karimi, N. and Hosseinalipour, S.M., 2022. A comparative analysis of the evolution of compositional and entropy waves in turbulent channel flows. *Physics of Fluids*, 34(1), p.017103.
- 45-Fattahi, A. and Karimi, N., 2022. Numerical simulation of the effects of superhydrophobic coating in an oval cross-sectional solar collector with a wavy absorber filled with water-based Al₂O₃-ZnO-Fe₃O₄ ternary hybrid nanofluid. *Sustainable Energy Technologies and Assessments*, 50, p.101881.
- 46-Qomi, M.E., Sheikhzadeh, G.A. and Fattahi, A., 2022. On the micro-scale battery cooling with a sinusoidal hybrid nanofluid flow. *Journal of Energy Storage*, 46, p.103819.
- 47-Saboohi, Z., Ommi, F., Rahmani, E., Moradi, T., Fattahi, A., Delpisheh, M. and Karimi, N., 2022. The effect of sinusoidal fins' amplitude on the thermo-hydraulic performance of a solar air heater. *Chemical Engineering Communications*, pp.1-15.
- 48-Rahmani, E., Fattahi, A., Moradi, T., Hajjaligol, N., Karimi, N. and Doranehgard, M.H., 2022. Enhancement of heat transfer in solar collectors by vortex generation. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, 44(1), pp.1731-1750.
- 49-Fini, A.T., Hashemi, S.A. and Fattahi, A., 2022. On the efficient topology of the exhaust heat exchangers equipped with thermoelectric generators for an internal combustion engine. *Energy Conversion and Management*, 268, p.115966.
- 50-Rahmani, E., Fattahi, A., Panahi, E. and Mahmoudi, Y., 2023. Thermal management improvement for a pack of cylindrical batteries using nanofluids and topological modifications. *Journal of Power Sources*, 564, p.232876.
- 51-Mazdak, S., Sheikhzadeh, G.A. and Fattahi, A., 2023. Numerical analysis of a heat exchanger with curved segmental baffle and Cassini oval cross-section tubes in various bundle arrangements. *Journal of Thermal Analysis and Calorimetry*, pp.1-18.
- 52-Asl, A.H., Fattahi, A. and Salehi, F., 2023. Film cooling improvement analysis in gas turbine blades by swirling coolant flow using a numerical study and an

- RBF artificial neural network. *Journal of the Taiwan Institute of Chemical Engineers*, p.104704.
- 53-Fini, A.T., Fattahi, A. and Musavi, S., 2023. Machine learning prediction and multiobjective optimization for cooling enhancement of a plate battery using the chaotic water-microencapsulated PCM fluid flows. *Journal of the Taiwan Institute of Chemical Engineers*, p.104680.
- 54-Fattahi, A., Hajjaligol, N., Delpisheh, M. and Karimi, N., 2023. Lattice-Boltzmann numerical simulation of double-diffusive natural convection and entropy generation in an n-shaped partially heated storage tank. *Engineering Analysis with Boundary Elements*, 146, pp.105-118.
- 55-Irani, A.S. and Fattahi, A., 2023. On the combined Brayton-Kalina cycle with PEM hydrogen production: An exergoeconomic analysis and multi-objective optimization with LINMAP decision maker. Accepted for publication in *International Journal of Hydrogen Energy*.
- 56-Salehi, A. and Fattahi, A., 2023. A numerical investigation of hydrogen impingement-effusion array jet for a heat sink cooling using solid/porous fins: A thermo-hydrodynamic analysis. *International Journal of Hydrogen Energy*.
- 57-Hajjaligol, N., Fattahi, A., Karimi, N., Jamali, M. and Keighobadi, S., 2023. Hybridized power-hydrogen generation using various configurations of Brayton-organic flash Rankine cycles fed by a sustainable fuel: Exergy and exergoeconomic analyses with ANN prediction. *Energy*, p.130166.

Conference Presentations

- 1- S. A. Hashemi, A. Fattahi, G. A. Sheikhzadeh, Numerical simulation of a coaxial oxy-fuel flame in a combustion chamber using presumed PDF model, ITSC 2011, Mashhad, Iran.
- 2- S.A. Hashemi, N. Hajjaligol, A. Fattahi, Investigation of the effect of flame holder geometry on flame structure in non-premixed combustion, 8th International Conference on Diffusion in Solids and Liquids, DSL, Istanbul-Turkey, 25-29 June, 2012.
- 3- E. Rahmani, A. Fattahi, N. Karimi, S.M. Hosseinalipour, On the decay of entropic-compositional sources of indirect noise in combustors, 51st International Congress and Exposition on Noise Control Engineering 2022, 21st - 24th August 2022 Glasgow, Scotland, UK.
- 4- 28 other full conference papers in national conferences, held in Iran (in Persian) from 2012 to 2023.

TEACHING EXPERIENCE

Fixed-term Lecturer, University of Kashan

- An introduction to computational fluid dynamics
- Turbomachinery

- Fuel and combustion
- Advanced fuel and combustion
- Thermodynamics II
- Engineering drawing (AutoCAD)
- CFD II (With a comprehensive review of the commercial computational package of ANSYS Fluent)

Teaching Assistant, Iran University of Science and Technology

- Advanced computational fluid dynamics
- Thermal power plants

SOFTWARE SKILLS

- ANSYS Fluent/Mesh/Geometry
- OpenFOAM
- MATLAB
- FORTRAN
- Tecplot
- EES
- Thermoflow
- Gaseq
- Maple

INTERNATIONAL COLLABORATION

- University of Glasgow, UK; entropy waves' evolution, 2014-2017.
- Queen Mary University of London, UK; renewable energies, entropy waves, 2018 up to now.

HONORS / AWARDS

- “Research prize”, University of Kashan, 2023.
- “Teaching prize”, University of Kashan, 2023.
- “Teaching prize”, University of Kashan, 2021.
- “Research prize”, University of Kashan, 2021.
- Academic awards of National Elite Foundation of Iran for three successive years, PhD period, 2015-2017.
- Top PhD graduate award, Iran University of Science and Technology, 2017.
- 1st ranked graduate in MSc, University of Kashan, 2010.
- Top researcher student, MSc, University of Kashan, 2010.
- 2st ranked graduate in B.Eng, University of Kashan, 2009.

GRANTS

- Research grant on PhD thesis from Iranian National Elite Foundation, 2014-2017.

SERVICE TO THE UNIVERSITY

- Representative of Mechanical engineering faculty in international collaboration group, University of Kashan, 2020 up to now.

LANGUAGE

- English: Good/Fluent
- Persian: mother tongue