

Mohammad Hossein Doranehgard

Postdoctoral Research Associate

Department of Mechanical & Aerospace Engineering, University of South Florida, Tampa, FL

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WORK AUTHORIZATION

U.S. Green Card Holder

EDUCATION

Ph.D.	Mechanical Engineering	Hong Kong University of Science and Technology	Hong Kong	2024
M.S.	Petroleum Engineering	University of Alberta	Canada	2021
M.S.	Mechanical Engineering	Iran University of Science and Technology	Iran	2016
B.S.	Mechanical Engineering	Shahid Chamran University of Ahvaz	Iran	2014

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher	University of South Florida	2025 – present
Postdoctoral Researcher	Johns Hopkins University and Morgan State University	2024 – 2025
Visiting Scholar	Texas A&M University	2023 – 2024
Petroleum Engineer	University of Alberta	2018 – 2020

AWARDS AND HONORS

Among the Top 2% Scientists in the World, Elsevier–Stanford University List.

RedBird Scholarship, The Hong Kong University of Science and Technology (HKUST) — \$10,000.

Overseas Research Award, The Hong Kong University of Science and Technology (HKUST) — \$8,000.

Graduation Recruitment Award — \$5,000 CAD.

Alberta Graduate Excellence Award, Government of Alberta — \$12,000 CAD.

Jacob H. Masliyah Graduate Award in Oil Sands Engineering, University of Alberta — \$2,000 CAD.

Donald Lougheed Engineering Graduate Scholarship — \$6,000 CAD.

Jong and Sunjoo Lee Graduate Scholarship in Engineering — \$2,000 CAD.

GRANT WRITING EXPERIENCE

[1] Li, Z. (Principal Investigator). (2025). *Subject-specific modeling of drug absorption in the nasal cavity* (Award No. R16GM153629; \$152,437). National Institute of General Medical Sciences, National Institutes of Health. **Contributions to proposal writing and review by Mohammad Doranehgard.**

[2] Li, Z. (Principal Investigator) and Kimple, A.J. (Co-Principal Investigator). (2024). *Excellence in Research - Numerical and experimental investigations of droplet depositions in the nasal cavity from topical intranasal corticosteroid sprays among diverse groups* (Award No. 2401855; \$867,163). National Science Foundation. **Contributions to proposal writing and review by Mohammad Doranehgard.**

[3] Li, Z. (Principal Investigator). (2024). *Numerical Investigation of the Effects of Nasal Balloon Dilation on Airflow and Drug Deposition* (\$30,000). Acclarent Company. **Contributions to proposal writing and review by Mohammad Doranehgard.**

SELECTED PUBLICATIONS

Google Scholar: Click [Here](#)

Peer-reviewed Journal Papers: 92

Citations: 5,496

h-index: 46

i10-index: 74

Student mentees are indicated by an asterisk *.

Co-first authors are indicated by a dagger †.

The corresponding author's name is underlined.

[1] Doranehgard, M.H., Borazjani, I., Karimi, N., and Li, L.K.B. (2024). "Ruelle-Takens-Newhouse and degenerate period-doubling routes to chaos in a wavy-channel flow under mixed convection." *Physical Review Fluids* 9 (12): 124403. [[Link](#)]

[2] Doranehgard, M.H., Karimi, N., Borazjani, I., and Li, L.K.B. (2024). "Breaking the symmetry of a wavy channel alters the route to chaotic flow." *Physical Review E* 109 (4): 045103. [[Link](#)]

[3] Doranehgard, M.H., Gupta, V., and Li, L.K.B. (2022). "Quenching and amplification of thermoacoustic oscillations in two nonidentical Rijke tubes interacting via time-delay and dissipative coupling." *Physical Review E* 105 (6): 064206. [[Link](#)]

[4] Doranehgard, M.H., Samadyar, H., Mesbah, M., Haratipour, P., and Samiezade, S. (2017). "High-purity hydrogen production within situ CO₂ capture based on biomass gasification." *Fuel* 202: 29–35. [[Link](#)]

[5] Doranehgard, M.H., and Dehghanpour, H. (2020). "Quantification of convective and diffusive transport during CO₂ dissolution in oil: a numerical and analytical study." *Physics of Fluids* 32 (8): 085110. [[Link](#)]

[6] Doranehgard, M.H., Tran, S., and Dehghanpour, H. (2021). "Modeling of natural-gas diffusion in oil-saturated tight porous media." *Fuel* 300: 120999. [[Link](#)]

[7] Shahadat, M.R.B., Doranehgard, M.H. †, Cai, W., Meneveau, C., Schafer, B., and Li, Z. (2025). "An airfoil-based synthetic actuator disk model for wind turbine aerodynamic and structural analysis." *Renewable Energy* (2025): 123780. [[Link](#)]

[8] Shahadat, M.R.B. *, Doranehgard, M.H., Cai, W., and Li, Z. (2025). "Large eddy simulation of wind farm performance in horizontally and vertically staggered layouts." *Energy* 322 (2025): 135569. [[Link](#)]

[9] Saffarian, M.R., Moravej, M., and Doranehgard, M.H. (2020). "Heat transfer enhancement in a flat plate solar collector with different flow path shapes using nanofluid." *Renewable Energy* 146: 2316–2329. [[Link](#)]

- [10] Sohani, A. *, Sayyaadi, H., Cornaro, C., Shahverdian, M.H., Pierro, M., Moser, D., Karimi, N., **Doranehgard, M.H.**, and Li, L.K.B. (2022). “Using machine learning in photovoltaics to create smarter and cleaner energy generation systems: A comprehensive review.” *Journal of Cleaner Production* 364: 132701. [[Link](#)]
- [11] Abedinia, O., Zareinejad, M., **Doranehgard, M.H.**, Fathi, G., and Ghadimi, N. (2019). “Optimal offering and bidding strategies of renewable energy-based large consumers using a novel hybrid robust-stochastic approach.” *Journal of Cleaner Production* 215: 878–889. [[Link](#)]
- [12] Mesgarpour, M., Najm Abad, J.M., Alizadeh, R., Wongwises, S., **Doranehgard, M.H.**, Jowkar, S., and Karimi, N. (2022). “Predicting the effects of environmental parameters on the spatio-temporal distribution of the droplets carrying coronavirus in public transport—A machine learning approach.” *Chemical Engineering Journal* 430: 132761. [[Link](#)]
- [13] Mesgarpour, M., Najm Abad, J.M., Alizadeh, R., Wongwises, S., **Doranehgard, M.H.**, Ghaderi, S., and Karimi, N. (2021). “Prediction of the spread of coronavirus-carrying droplets in a bus—A computational-based artificial intelligence approach.” *Journal of Hazardous Materials* 413: 125358. [[Link](#)]
- [14] Ferahtia, S., Rezk, H., Olabi, A.G., Alhumade, H., Bamufleh, H.S., **Doranehgard, M.H.**, and Abdelkareem, M.A. (2022). “Optimal techno-economic multi-level energy management of renewable-based DC microgrid for commercial buildings applications.” *Applied Energy* 327: 120022. [[Link](#)]
- [15] Sohani, A. *, Sayyaadi, H., Miremadi, S.R., Samiezadeh, S., and **Doranehgard, M.H.** (2022). “Thermo-electro-environmental analysis of a photovoltaic solar panel using machine learning and real-time data for smart and sustainable energy generation.” *Journal of Cleaner Production* 353: 131611. [[Link](#)]
- [16] Osmani, K., Alkhedher, M., Ramadan, M., Choi, D.S., Li, L.K.B., **Doranehgard, M.H.**, and Olabi, A.G. (2023). “Recent progress in the thermal management of lithium-ion batteries.” *Journal of Cleaner Production* 389: 136024. [[Link](#)]
- [17] Bhatti, M.M., Arain, M.B., Zeeshan, A., Ellahi, R., and **Doranehgard, M.H.** (2022). “Swimming of gyrotactic microorganism in MHD Williamson nanofluid flow between rotating circular plates embedded in porous medium: Application of thermal energy storage.” *Journal of Energy Storage* 45: 103511. [[Link](#)]
- [18] Bozorg, M.V., **Doranehgard, M.H.** †, Hong, K., and Xiong, Q. (2020). “CFD study of heat transfer and fluid flow in a parabolic trough solar receiver with internal annular porous structure and synthetic oil–Al₂O₃ nanofluid.” *Renewable Energy* 145: 2598–2614. [[Link](#)]
- [19] Sohani, A. *, Cornaro, C., Shahverdian, M.H., Pierro, M., Moser, D., Nižetić, S., Karimi, N., Li, L.K.B., and **Doranehgard, M.H.** (2023). “Building integrated photovoltaic/thermal technologies in Middle Eastern and North African countries: Current trends and future perspectives.” *Renewable and Sustainable Energy Reviews* 182: 113370. [[Link](#)]
- [20] Sohani, A. *, Cornaro, C., Shahverdian, M.H., Moser, D., Pierro, M., Olabi, A.G., Karimi, N., Nižetić, S., Li, L.K.B., and **Doranehgard, M.H.** (2023). “Techno-economic evaluation of a hybrid photovoltaic system with hot/cold water storage for poly-generation in a residential building.” *Applied Energy* 331: 120391. [[Link](#)]
- [21] Sohani, A., Shahverdian, M.H., Sayyaadi, H., Nižetić, S., and **Doranehgard, M.H.** (2023). “An optimum energy, economic, and environmental design based on DEVAP concept to reach maximum heat recovery in a PV-wind turbine system with hydrogen storage.” *Energy Conversion and Management* 288: 117147. [[Link](#)]

- [22] Chung, R.C.C., Guan, Y., He, W., Ao, W., Yin, B., Yang, Z., **Doranehgard, M.H.**, and Li, L.K.B. (2024). “Ground-induced suppression of chaos in the self-excited flow behind a plunging airfoil.” *Physics of Fluids* 36 (3). [[Link](#)]
- [23] Kimishima, H., Yin, B., **Doranehgard, M.H.**, Gupta, V., and Li, L.K.B. (2025). “Cluster-based control of self-excited thermoacoustic oscillations.” *Physics of Fluids* 37 (7). [[Link](#)]
- [24] Wang, D., Feng, D., Peng, H., Mao, F., **Doranehgard, M.H.**, Gupta, V., Li, L.K.B., and Wan, M. (2023). “Implications of steep hilly terrain for modeling wind-turbine wakes.” *Journal of Cleaner Production* (2023): 136614. [[Link](#)]
- [25] He, G. *, Liu, Q., Cai, W., Wilson, A., **Doranehgard, M.H.**, Sayce, L., Luo, H., and Li, Z. (2025). “Fluid–structure interaction simulations to investigate the asymmetrical pattern and energy transfer during vocal fold vibrations.” *Physics of Fluids* 37 (9). [[Link](#)]
- [26] Habib, R., Karimi, N., Yadollahi, B., **Doranehgard, M.H.**, and Li, L.K.B. (2020). “A pore-scale assessment of the dynamic response of forced convection in porous media to inlet flow modulations.” *International Journal of Heat and Mass Transfer* 153: 119657. [[Link](#)]
- [27] Gholamalipour, P. *, Siavashi, M., and **Doranehgard, M.H.** (2019). “Eccentricity effects of heat source inside a porous annulus on the natural convection heat transfer and entropy generation of Cu-water nanofluid.” *International Communications in Heat and Mass Transfer* 109: 104367. [[Link](#)]
- [28] Siavashi, M., and **Doranehgard, M.H.** (2017). “Particle swarm optimization of thermal enhanced oil recovery from oilfields with temperature control.” *Applied Thermal Engineering* 123: 658–669. [[Link](#)]
- [29] **Doranehgard, M.H.**, and Siavashi, M. (2018). “The effect of temperature-dependent relative permeability on heavy oil recovery during hot water injection process using streamline-based simulation.” *Applied Thermal Engineering* 129: 106–116. [[Link](#)]
- [30] Sohani, A. *, Delfani, F., Hosseini, M., Sayyaadi, H., Karimi, N., Li, L.K.B., and **Doranehgard, M.H.** (2024). “Price inflation effects on a solar-geothermal system for combined production of hydrogen, power, freshwater and heat.” *International Journal of Hydrogen Energy* 52: 861–872. [[Link](#)]
- [31] Sohani, A. *, Delfani, F., Hosseini, M., Sayyaadi, H., Karimi, N., Li, L.K.B., and **Doranehgard, M.H.** (2022). “Dynamic multi-objective optimization applied to a solar-geothermal multi-generation system for hydrogen production, desalination, and energy storage.” *International Journal of Hydrogen Energy* 47 (74): 31730–31741. [[Link](#)]
- [32] Mesbah, M., Vatani, A., Siavashi, M., and **Doranehgard, M.H.** (2019). “Parallel processing of numerical simulation of two-phase flow in fractured reservoirs considering the effect of natural flow barriers using the streamline simulation method.” *International Journal of Heat and Mass Transfer* 131: 574–583. [[Link](#)]
- [33] Bozorg, M.V., **Doranehgard, M.H.**, Hong, K., Xiong, Q., and Li, L.K.B. (2020). “A numerical study on discrete combustion of polydisperse magnesium aero-suspensions.” *Energy* 194: 116872. [[Link](#)]
- [34] Habib, R., Yadollahi, B., Saeed, A., **Doranehgard, M.H.**, and Karimi, N. (2021). “Unsteady ultra-lean combustion of methane and biogas in a porous burner—An experimental study.” *Applied Thermal Engineering* 182: 116099. [[Link](#)]
- [35] Habib, R., Yadollahi, B., Saeed, A., **Doranehgard, M.H.**, and Karimi, N. (2021). “On the response of ultralean combustion of CH₄/H₂ blends in a porous burner to fluctuations in fuel flow—An experimental investigation.” *Energy & Fuels* 35 (10): 8909–8921. [[Link](#)]
- [36] Alizadeh, R., Najm Abad, J.M., 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* 61 (24): 8478–8494. [[Link](#)]

[37] Alizadeh, R., Najm Abad, J.M., Fattahi, A., Mohebbi, M.R., **Doranehgard, M.H.**, Li, L.K.B., 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): 070908. [[Link](#)]

[38] Selimefendigil, F., Öztö, H.F., **Doranehgard, M.H.**, and Karimi, N. (2021). “Phase change dynamics in a cylinder containing hybrid nanofluid and phase change material subjected to a rotating inner disk.” *Journal of Energy Storage* 42: 103007. [[Link](#)]

[39] Tran, S., Yassin, M.R., Eghbali, S., **Doranehgard, M.H.**, and Dehghanpour, H. (2021). “Quantifying oil-recovery mechanisms during natural-gas huff ‘n’ puff experiments on ultratight core plugs.” *SPE Journal* 26 (01): 498–514. [[Link](#)]

[40] Bozorg, M.V., Guan, Y., **Doranehgard, M.H.**, Hong, K., Xiong, Q., Karimi, N., and Li, L.K.B. (2020). “Numerical simulation of the heterogeneous combustion of dust clouds containing polydisperse porous iron particles.” *Energy* 212: 118759. [[Link](#)]

[41] Karimi, N., Li, L.K.B., Paul, M.C., **Doranehgard, M.H.**, and Sotoudeh, F. (2024). “Introduction to advances in sustainable hydrogen energy.” *RSC Advances* 14 (13): 9351–9352. [[Link](#)]

TEACHING EXPERIENCE

Morgan State University, Baltimore, MD, USA

Fall 2024	Instructor	Analytical Methods in Engineering (Undergraduate)
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The Hong Kong University of Science and Technology (HKUST), Hong Kong

Fall 2022	Instructor	Energy Conversion (Undergraduate)
Spring 2022	Instructor	Aerospace Laboratory (Undergraduate)

Iran University of Science and Technology, Tehran, Iran

Spring 2016	Teaching Assistant	Transport in Porous Media (Graduate)
Fall 2015	Teaching Assistant	Advanced Mathematics (Graduate)

STUDENTS & POSTDOCS MENTORED

Postdoctoral Fellow

Dr. Muhammad Rubayat Bin Shahadat, Morgan State University (Fall 2024 – Fall 2025)

Doctoral Students (Ph.D.)

Guiliang Liu, Morgan State University (Fall 2024 – Fall 2025)

Guofeng He, Morgan State University (Fall 2024 – present)

Ahmed Tolba, University of South Florida (Fall 2025 – present)

Michael Edgemon, University of South Florida (Fall 2025 – present)

Torge Bohlken, University of South Florida (Fall 2025 – present)

Master's Students (M.S.)

Mian Abul Fazal, University of South Florida (Fall 2025 – present)

Undergraduate Students (B.S.)

Mason Morgan, Morgan State University — Capstone Project Mentor

Sara Arroyave, University of South Florida (Fall 2025 – present)

SERVICE

Journal Editorial Service

Guest Editor, *Physics of Fluids* (American Institute of Physics, IF: 4.1), Special Issue on “Turbulent and Multiphase Flows” (Feb 2020 – Dec 2020) [[Link](#)].

Guest Editor, *International Journal of Thermofluids* (Elsevier), Special Issue on “Efficient Solutions for Sustainable Development of Energy Systems” (Sep 2023 – Apr 2024) [[Link](#)].

Guest Editor, *Energy* (Elsevier, IF: 9.4), Special Issue on “The Role of Smart Technologies in Energy Engineering” (Aug 2023 – Jan 2024) [[Link](#)].

Guest Editor, *Engineering Analysis with Boundary Elements* (Elsevier, IF: 4.2), Special Issue on “Applications of Machine Learning in Computational Mechanics” (Jan 2022 – Jan 2023) [[Link](#)].

Guest Editor, *RSC Advances* (Royal Society of Chemistry, IF: 4.6), Special Issue on “Introduction to Advances in Sustainable Hydrogen Energy” (Jan 2023 – Jan 2024) [[Link](#)].

Guest Editor, *International Journal of Hydrogen Energy* (Elsevier, IF: 8.3) (Jan 2023 – Sep 2023).

Guest Editor, *Sustainable Energy Technologies and Assessments* (Elsevier, IF: 7.1), Special Issue on “Current Challenges in Efficiency Improvement of Solar Thermal Technologies” (Dec 2020 – Sep 2021) [[Link](#)].

Guest Editor, *Journal of Energy Resources Technology* (ASME, IF: 2.9), Special Issue on “Multiphase Flow Applications in Energy Engineering” (Jan 2020 – Nov 2020) [[Link](#)].

Guest Editor, *Journal of Thermal Analysis and Calorimetry* (Springer, IF: 3.0), Special Issue on “Heat Transfer in Porous Media” (Jul 2019 – Apr 2020) [[Link](#)].

Editorial Board Member, *Journal of Energy Sources, Part A: Recovery, Utilization and Environmental Effects* (Taylor & Francis, IF: 2.5) (Feb 2020 – Feb 2024).

Guest Editor, *Journal of the Taiwan Institute of Chemical Engineers* (Elsevier, IF: 6.3), Special Issue on “Applications of Nanofluid in Renewable Energy” (Jan 2021 – Jul 2021) [[Link](#)].

Guest Editor, *Journal of the Taiwan Institute of Chemical Engineers* (Elsevier, IF: 6.3), Special Issue on “Optimization in Energy and Process Engineering” (Jan 2023 – Jul 2023) [[Link](#)].

Journal Peer-Review Service

International Journal of Heat and Mass Transfer (28 reviews)

Journal of Cleaner Production (48 reviews)

International Journal of Heat and Fluid Flow (12 reviews)

Applied Thermal Engineering (28 reviews)

Applied Energy (22 reviews)

Applied Soft Computing (6 reviews)

Energy Conversion and Management (6 reviews)

Energy (14 reviews)

Physics of Fluids (28 reviews)

Journal of Molecular Liquids (13 reviews)

International Communications in Heat and Mass Transfer (6 reviews)

International Journal of Hydrogen Energy (17 reviews)

Journal of Energy Storage (8 reviews)

Renewable Energy (12 reviews)

Results in Engineering (22 reviews)

Sustainable Energy Technologies and Assessments (25 reviews)

Thermal Science and Engineering Progress (16 reviews)

Journal of Thermal Analysis and Calorimetry (76 reviews)

Journal of Energy Sources, Part A (108 reviews)

Case Studies in Thermal Engineering (15 reviews)

PROFESSIONAL MEMBERSHIPS

American Society of Mechanical Engineers (ASME) 2020-present

American Physical Society (APS) 2021-present

Society of Petroleum Engineering (SPE) 2019-2021

REFERENCES

Dr. Ahmad Vasel-Be-Hagh

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Department of Mechanical and Aerospace Engineering

University of South Florida

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Relationship: Postdoctoral Supervisor

Dr. Zheng Li

Assistant Professor

Department of Mechatronics Engineering

Morgan State University

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Relationship: Postdoctoral Co-Supervisor

Dr. Larry K. B. Li

Associate Professor and Associate Head

Department of Mechanical and Aerospace Engineering

The Hong Kong University of Science and Technology

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Phone: +852 3469 2232

Relationship: Ph.D. Supervisor

Prof. Iman Borazjani

Professor & Sallie and Don Davis '61 Faculty Fellow

J. Mike Walker '66 Department of Mechanical Engineering

Texas A&M University

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Phone: +1 979-458-5787

Relationship: Visiting Scholar Supervisor