

ALIREZA DASTAN

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ACADEMIC POSITIONS

Assistant Professor

- Sep. 2020 – Present: Department of Mechanical Engineering, University of Isfahan, Iran.

Vice-Dean for Education

- Apr. 2023 – Apr. 2025: Department of Mechanical Engineering, University of Isfahan, Iran.

Postdoctoral Researcher

- Mar. 2018 – Aug. 2020: School of Mechanical Engineering, Shiraz University, Iran.

Research Assistant

- Jul. 2012 – Mar. 2014: School of Mechanical Engineering, Shiraz University, Iran.
- May. 2011 – Nov. 2011: School of Mechanical Engineering, Shiraz University, Iran.

Part-time Lecturer

- Feb. 2015 – Dec. 2016: *Associate Lecturer* at Sheffield Hallam University, Sheffield, UK.
 - Sep. 2011 – Feb. 2014: *Lecturer* at Azad University of Fasa, Fasa, Iran.
 - Feb. 2009 – Feb. 2012: *Lecturer* at University of Applied Science & Tech., Neyriz, Iran.
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EDUCATIONS

1. May. 2014 – Oct. 2017: **PhD**, Materials and Engineering Research Institute (MERI), Sheffield Hallam University, Sheffield, UK.
Thesis: Free Self-assembly of Spontaneously Chiral, Supramolecular Structures.
Supervisor: Prof Doug Cleaver
Summary: Molecular Dynamic simulations were performed to investigate the self-assembly of a range of objects formed from discotic building blocks. This was done through a developed in-house parallel code by which the spontaneous formation of helical structures such as nano-fibers, twisted bilayers and multilayers, tubes and double-helices was simulated.
Outcome of viva: Passed with NO modification.
2. Sep. 2007 – Sep. 2010: **MSc** in Mechanical Engineering, Shiraz University, Shiraz, Iran.
Thesis: Numerical Investigation of Fiber Web Effects on the Pressure Drop and Particle Collection in a Microchannel. (Grade: 20 / 20)
Supervisor: Prof Omid Abouali
Summary: The motion of fiber-like ellipsoidal particles was investigated in fluid flow of a microchannel. The flow-field was simulated in a commercial package and then its data was imported to an in-house computer code. Forces and torques applied by the flow were calculated and the translational and rotational equations of motion were integrated to simulate the motion and deposition of fibers.
3. Sep. 2002 – Oct. 2006: **BSc** in Mechanical Engineering, Shahid Bahonar University of Kerman, Kerman, Iran.

RESEARCH INTERESTS

- Computational Fluid Dynamics (CFD), mostly for:
 - Particle modelling in fluid flow
 - Bio-fluid modelling
 - Industrial ventilation
 - Air pollution modelling
 - Molecular Dynamics
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PUBLICATIONS

Journal Papers

1. Hasan Fatahi, **Alireza Dastan**, Sasan Sadrizadeh and Omid Abouali, 2025, “Numerical study of nasal hair effects on breathing comfort and particle deposition in a simplified vestibule region”. *Biomechanics and Modeling in Mechanobiology*, Vol. 24, pp. 1513-1533.
2. Mohammad Reza Rezazadeh, **Alireza Dastan**, Sasan Sadrizadeh and Omid Abouali, 2024, “A quasi-realistic computational model development and flow field study of the human upper and central airways”. *Medical & Biological Engineering & Computing*, Vol. 62, pp. 3025-3041.
3. **Alireza Dastan**, M. Rahiminejad, M. Sabz, M. Abbasi, A. Mokhtari, S. Sadrizadeh, and O. Abouali, 2023, “CFD simulations of a semi-transverse ventilation system in a long tunnel”. *Underground Space*, Vol. 11, pp.153-170.
4. **Alireza Dastan**, Elisabetta A. Matsumoto, William J. Frith and Douglas J. Cleaver, 2018, “Self-assembly of twisted, multi-sheet aggregates”, *Molecular Physics*, Vol. 116, Issue 21-22, pp. 2823-2835.
5. **Alireza Dastan**, William J. Frith and Douglas J. Cleaver, 2017, “Thermal Hysteresis and Seeding of Twisted Fibers Formed by Achiral Discotic Particles”, *The Journal of Physical Chemistry B*, Vol. 121, pp. 9920-9928.
6. Mohammad Rahiminejad, Abdalrahman Haghighi, **Alireza Dastan**, Omid Abouali, Mehrdad Farid and Goodarz Ahmadi, 2016, “Computer simulations of pressure and velocity fields in human upper airway during Sneezing”, *Computers in Biology and Medicine*, Vol. 71, pp.115-127.
7. Esmaeel Eftekharian, **Alireza Dastan**, Omid Abouali, Javad Meigolinedjad and Goodarz Ahmadi, 2014, “A numerical investigation into the performance of two types of jet fans in ventilation of an urban tunnel under traffic jam condition”, *Tunneling and Underground Space Technology*, Vol. 44, pp. 56-67.
8. **Alireza Dastan**, Omid Abouali and Goodarz Ahmadi, 2014, “CFD simulation of total and regional fiber deposition in human nasal cavities”, *Journal of Aerosol Science*, Vol. 69, pp. 132-149.
9. **Alireza Dastan** and Omid Abouali, 2013, “Microfiber motion and web formation in a microchannel heat sink: A numerical approach”, *Computers & Fluids*, Vol. 71, pp. 28-40.
10. **Alireza Dastan** and Omid Abouali, 2011, “Numerical analysis of the fiber web effects on the pressure drop, particles collection, and heat transfer in a microchannel”, *Heat Transfer Engineering*, Vol. 32, Issue 7&8, pp. 554-65.

Conference Contributions (The presenting author is underlined)

1. M. J. HajHashemi and **Alireza Dastan**, 2024, “Numerical investigation and comparison of pressure drops in inhalation and exhalation phases of different generations in human lung”, Proceedings of 32nd International Conference on Mechanical Engineering - ISME2024, Arak, Iran (Talk & full paper in Persian).
2. M. Mohammadi, M. Mosayebi, F. Faghihi, H. Ahmadikia and **Alireza Dastan**, 2023, “Simulation of air pollution emission from Isfahan power plants consuming mazut”, Proceedings of 20th International Conference on Fluid Dynamics - FDC2023, Semnan, Iran (Talk & full paper in Persian).
3. M. Mosayebi, M. Mohammadi, **Alireza Dastan** and H. Ahmadikia, 2023, “Simulation of dust emission and determination of its health costs in Isfahan”, Proceedings of 20th International Conference on Fluid Dynamics - FDC2023, Semnan, Iran (Talk & full paper in Persian).
4. M. Mohammadi, F. Faghihi, M. Sharifzade, **Alireza Dastan** and H. Ahmadikia, 2022, “The effects of traffic limitations due to the Covid-19 on the air pollution of Isfahan city”, Proceedings of 30th International Conference on Mechanical Engineering - ISME2022, Tehran, Iran (Talk & full paper in Persian).
5. M. Sharifzade, F. Faghihi, M. Mohammadi, **Alireza Dastan** and H. Ahmadikia, 2022, “Modelling of air pollution dispersion from stationary sources in Isfahan city by WRF-CMAQ”, Proceedings of 30th International Conference on Mechanical Engineering - ISME2022, Tehran, Iran (Talk & full paper in Persian).
6. A. Mohammadi-qaragoz and **Alireza Dastan**, “Numerical investigation of a simplified vehicle aerodynamics for traffic modelling in tunnels”, Proceedings of 30th International Conference on Mechanical Engineering - ISME2022, Tehran, Iran (Talk & full paper in Persian).
7. **Alireza Dastan**, Mohammad Rahiminejad, Meysam Abbasi and Omid Abouali, 2019, “CFD Simulations of Longitudinal Ventilation of a Road Tunnel in Congested Traffic Condition”, Proceedings of World Tunnel Congress (WTC2019), Naples, Italy (Full paper).
8. **Alireza Dastan**, Sabetta Matsumoto, Bill Frith and Doug Cleaver, 2018, “Exploring Hierarchical Structures Self-assembled by Amphiphilic Chromonics”, Proceedings of 7th International Conference on Nanostructures, Tehran, Iran. (Talk & full paper).
9. Doug Cleaver, **Alireza Dastan**, Bill Frith and Sabetta Matsumoto, 2017, “A Twist on self-Assembly: Hierarchical architectures formed by amphiphilic chromonics”, 2nd Joint German-British Liquid Crystal conference, Wurzburg, Germany (Talk).
10. **Alireza Dastan**, Bill Frith and Doug Cleaver, 2017, “An insight into fiber formation mechanisms through computer simulation”, The Topical Research Meeting on Physics in Food Manufacturing, Sheffield, UK (Talk).
11. **Alireza Dastan**, Bill Frith, Sabetta Matsumoto and Doug Cleaver, 2016, “Why be straight? Or: the undeniable pervasiveness of twisting”, Animal Vegetal Mineral Boden Research Conference, Yallingup, Australia (Talk).
12. **Alireza Dastan**, Bill Frith and Doug Cleaver, 2016, “Computer simulation of hierarchical self-assembly of amphiphilic discotic molecules”, CCP5 AGM, Newport, UK (Talk).
13. **Alireza Dastan**, Bill Frith, Sabetta Matsumoto and Doug Cleaver, 2016, “A Twist on self-Assembly: Hierarchical chiral architectures in amphiphilic chromonics”, The 26th International Liquid Crystal Conference, Kent, USA (Invited talk).

14. **Alireza Dastan**, Bill Frith and Doug Cleaver, 2016, “Self-assembly of discotic building blocks: From fibers to double-helices by controlling the amphiphilicity”, Methods to Simulate Nucleation and Growth from Solution Conference, Sheffield, UK (Talk).
15. **Alireza Dastan** and Doug Cleaver, 2016, “Seeding effects on the temperature dependent self-assembly of fibers”, The Second CCPBioSim/CCP5 Multiscale Modelling Conference, Manchester, UK (Poster).
16. **Alireza Dastan** and Doug Cleaver, 2015, “Self-assembly of fibers: A molecular dynamics simulation”, Shape up 2015, Berlin, Germany (Poster).
17. **Alireza Dastan** and Doug Cleaver, 2015, “Molecular dynamics simulation of fiber formation”, The British Liquid Crystal Society (BLCS) Annual Conference, Sheffield, UK (Poster).
18. **Alireza Dastan**, Omid Abouali and Nader Naeini, 2013, “Unsteady simulation of ventilation system in a metro tunnel under fire condition”, Proceedings of 3rd International Conference on Recent Advances in Railway Engineering, Tehran, Iran (Talk & full paper in Persian).
19. **Esmaeel Eftekharian**, **Alireza Dastan**, Omid Abouali and Javad Meigolinedjad, 2013, “Numerical investigation of CO dispersion in Northern-Koohsar urban tunnel in Shiraz”, Proceedings of 12th International Conference on Traffic and Transportation Engineering, Tehran, Iran (Talk & full paper).
20. **Alireza Dastan**, Omid Abouali and **Goodarz Ahmadi**, 2012, “A numerical investigation of regional fiber deposition in a realistic nasal cavity”, Proceedings of ASME 2012 Fluids Engineering Division Summer Meeting, Puerto Rico, USA (Talk & full paper).
21. **Alireza Dastan** and Omid Abouali, 2012, “Numerical study of fiber deposition in laminar flow of a 90° circular bend”, Proceedings of 20th International Conference on Mechanical Engineering - ISME2012, Shiraz, Iran (Talk & full paper).
22. **Alireza Dastan**, Omid Abouali and **Goodarz Ahmadi**, 2010, “Numerical study of ellipsoid (fibrous particle) deposition in a realistic human nasal cavity”, The 29th annual conference of American Association for Aerosol Research, Portland, USA (Poster).
23. **Alireza Dastan** and **Omid Abouali**, 2010, “Microfibers motion in a laminar flow in a microchannel”, Proceedings of 8th International ASME Conference on Nanochannels, Microchannels and Minichannels, Montreal, Canada (Talk & full paper).
24. **Alireza Dastan** and **Omid Abouali**, 2009, “Numerical investigation of fiber web effects on the pressure drop and particles collection in a microchannel”, Proceedings of 7th International ASME Conference on Nanochannels, Microchannels and Minichannels, Pohang, South Korea (Talk & full paper).
25. **Alireza Dastan**, 2007, “The study of the backlash effects on geometry factor of spur gears by the finite element method by using ANSYS”, Proceedings of International Conference on Computer Aided Engineering, Chennai, India (Full paper).
26. **Alireza Dastan**, 2006, “Investigation of the backlash effects on spur gear geometry factor by FEM (ANSYS)”, Proceedings of Regional Conference on Mechanical Engineering, Shahre-Mejlesi, Iran, (Poster & full paper in Persian).

ACHIEVEMENTS

- 2018: Winning the “*Laskowski Memorial Prize for Excellence in PhD Research*”, Sheffield Hallam University, Sheffield, UK.
- 2017: Passing the PhD viva with No modification, Sheffield Hallam University, Sheffield, UK (a rare outcome in the UK).

- 2016: The third best poster, BMRC/MERI winter poster event, Sheffield Hallam University, Sheffield, UK.
- 2016: The best PhD Talk Prize, MERI Research Symposium, Sheffield Hallam University, Sheffield, UK.
- 2016: The winning image for booklet front cover, MERI Research Symposium, Sheffield Hallam University, Sheffield, UK.
- 2015: The best Poster Prize (by Judges' vote), MERI Research Symposium, Sheffield Hallam University, Sheffield, UK.
- 2010: Ranked 4th among M.Sc. students of mechanical engineering for the same entrance year, Shiraz University, Shiraz, Iran.
- 2006: Ranked 4th among B.Sc. students of mechanical engineering for the same entrance year, Shahid Bahonar University of Kerman, Kerman, Iran.

TECHNICAL SKILLS

Languages

C, FORTRAN, Python, C#, MPI, OpenMP, CUDA (elementary).

Scientific Software

MATLAB, ANSYS-Fluent, Gambit, ICEM-CFD, WRF-CMAQ, Tecplot, SolidWorks, ...

General

Linux, Windows, VMware ESXi, Microsoft Office, L^AT_EX, Magicplot, Mendeley, ...