

# Mostafa Aghaei Jouybari, Ph.D.

Assistant Professor, University of Kansas

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🔗 [Google Scholar](#)

## PROFESSIONAL SUMMARY

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- Highly experienced Computational Fluid Dynamicist. Proficient in various aspects of Turbulence Simulation & Modeling (DNS/LES/RANS), Numerical Methods, Artificial Intelligence, High Performance Computing (HPC), Supersonic Flows, and Immersed Boundary Methods.
- Proven track record of successful research: Author and co-author of 10 peer-reviewed articles published in esteemed Fluid Mechanics journals and conference proceedings. Possesses exceptional problem-solving abilities, a collaborative mindset, and adeptness in communicating complex academic and technical concepts effectively.
- A dedicated instructor with a strong commitment to fostering a deep understanding of Fluid Mechanics among students, backed by extensive teaching experience.

## APPOINTMENTS

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**Assistant Professor,** *July 2024 - Present*  
Department of Aerospace Engineering,  
University of Kansas, KS, USA.

**ORISE Postdoctoral Fellow,** *March 2024 - July 2024*  
Division of Quantitative Method and Modeling, CDER, OGD  
US Food & Drug Administration (FDA), MD, USA.

**Postdoctoral Fellow, Mechanical Engineering,** *March 2021 - March 2024*  
Johns Hopkins University, MD, USA.

## EDUCATION

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**Ph.D. Mechanical Engineering,** *Dec 2020*  
Michigan State University, MI, USA.

- Thesis: *Simulation and modeling of compressible and incompressible turbulent channel flows over rough walls* ([link to abstract](#)).

**B.Sc. Mechanical Engineering,** *Jul 2016*  
Sharif University of Technology, Tehran, Iran.

**B.Sc. Aerospace Engineering,** *Jul 2016*  
Sharif University of Technology, Tehran, Iran.

## JOURNAL ARTICLES

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1. **M. Aghaei Jouybari**, J.H. Seo, S. Pinto, L. Cattafesta, C. Meneveau and R. Mittal (2024). Extended Darcy–Forchheimer law including inertial flow deflection effects. *Journal of Fluid Mechanics*, **980**, A13. <https://doi.org/10.1017/jfm.2023.1083>
2. **M. Aghaei Jouybari**, J. Yuan, Z. Li, G.J. Brereton and F.A. Jaberri (2023). Supersonic turbulent flows over sinusoidal rough walls. *Journal of Fluid Mechanics*, **956**, A3.

<https://doi.org/10.1017/jfm.2022.1049>

3. **M. Aghaei Jouybari**, J.H. Seo, J. Yuan, R. Mittal and C. Meneveau (2022). Contributions to pressure drag in rough-wall turbulent flows: Insights from force partitioning. *Physical Review Fluids*, **7**, 084602. <https://doi.org/10.1103/PhysRevFluids.7.084602>
4. **M. Aghaei Jouybari**, J. Yuan, G.J. Brereton and M.S. Murillo (2021). Data-driven prediction of the equivalent sand-grain height in rough-wall turbulent flows. *Journal of Fluid Mechanics*, **912**, A8. <https://doi.org/10.1017/jfm.2020.1085>
5. G.J. Brereton, **M. Aghaei Jouybari** and J. Yuan (2021). Toward modeling of turbulent flow over surfaces of arbitrary roughness. *Physics of Fluids*, **33**, 065121. <https://doi.org/10.1063/5.0051097>
6. **M. Aghaei Jouybari**, G.J. Brereton and J. Yuan (2019). Turbulence structures over realistic and synthetic wall roughness in open channel flow at  $Re_\tau = 1000$ . *Journal of Turbulence*, **20**, 723-749. <https://doi.org/10.1080/14685248.2019.1706741>
7. J. Yuan and **M. Aghaei Jouybari** (2018). Topographical effects of roughness on turbulence statistics in roughness sublayer. *Physical Review Fluids*, **3**, 114603. <https://doi.org/10.1103/PhysRevFluids.3.114603>

## REFEREED CONFERENCE PROCEEDINGS

1. S.N. Pinto, Y. Zhang, L.N. Cattafesta, R. Mittal, C. Meneveau, M. Luhar, **M. Aghaei Jouybari**, J.H. Seo, S. Vijay and I. Eizenberg (2023). Characterization of Periodic Lattice Anisotropic Porous Materials for Passive Flow Control. *AIAA AVIATION 2023 Forum*, AIAA 2023-3448.c1. <https://doi.org/10.2514/6.2023-3448.c1>
2. G.J. Brereton, J. Yuan, and **M. Aghaei Jouybari**. Surface body-force model for turbulent flow over rough walls. In Proc. 34<sup>th</sup> Symposium on Naval Hydrodynamics, Washington D.C., USA, 2022.
3. **M. Aghaei Jouybari**, J. Yuan, and G. J. Brereton. DNS data driven modeling of turbulent flows over rough walls. In Proc. 33<sup>rd</sup> Symposium on Naval Hydrodynamics, Osaka, Japan, 2020.

## CONFERENCE PRESENTATIONS

1. **M. Aghaei Jouybari**, J.H. Seo, S. Pinto, L. Cattafesta, C. Meneveau and R. Mittal. Darcy-Forchheimer law for porous media flows in the highly-nonlinear regime for passive flow control. Presented at the 75<sup>th</sup> annual meeting of APS-DFD, Indianapolis, IN, Nov 20–22, 2022.
2. J.H. Seo, **M. Aghaei Jouybari**, S. Pinto, C. Meneveau, L. Cattafesta and R. Mittal. Control of wall-mounted bluff body wake by a porous substrate. Presented at the 75<sup>th</sup> annual meeting of APS-DFD, Indianapolis, IN, Nov 20–22, 2022.
3. **M. Aghaei Jouybari**, J.H. Seo, J. Yuan, R. Mittal, and C. Meneveau. How are flow structures related to drag forces and equivalent sandgrain height in turbulent flows over rough walls? Presented at the 74<sup>th</sup> annual meeting of APS-DFD, Phoenix, AZ, Nov 21–23, 2021.
4. **M. Aghaei Jouybari**, J. Yuan, and G. J. Brereton. DNS data driven modeling of turbulent flows over rough walls. In proc. 33rd Symposium on Naval Hydrodynamics, Osaka, Japan, October 18-23, 2020.
5. **M. Aghaei Jouybari**, J. Yuan, F.A. Jaber and G.J. Brereton. Turbulence behavior in supersonic channel flows with two- and three-dimensional sinusoidal roughness. Presented at the 73<sup>rd</sup> annual

meeting of APS-DFD, Chicago, IL, Nov 22–24, 2020.

6. **M. Aghaei Jouybari**, G.J. Brereton and J. Yuan. Multi-parameter prediction of roughness function and drag profiles in turbulent channel flows over rough walls. Presented at the 72<sup>nd</sup> annual meeting of APS-DFD, Seattle, WA, Nov 23–26, 2019.
7. G.J. Brereton, J. Yuan and **M. Aghaei Jouybari**. Modeling turbulent rough-wall flow with pseudo body forces. Presented at the 72<sup>nd</sup> annual meeting of APS-DFD, Seattle, WA, Nov 23–26, 2019.
8. **M. Aghaei Jouybari**, J. Yuan and G.J. Brereton. Effects of irregular roughness on roughness-sublayer turbulence statistics and coherent motions. Presented at the 71<sup>st</sup> annual meeting of APS-DFD, Atlanta, GA, Nov 18–20, 2018.
9. **M. Aghaei Jouybari** and J. Yuan. Roughness topographical effects on mean momentum and stress budgets in developed turbulent channel flows. Presented at the 70<sup>th</sup> annual meeting of APS-DFD, Denver, CO, Nov 19–21, 2017.

## TEACHING & RESEARCH APPOINTMENTS

- Research Associate, Flow Physics and Computation Lab, Turbulence Research Group, Johns Hopkins University. *Mar 2021 – July 2024*
- Teaching Assistant and Guest Lecturer, Advanced Turbulence Course, Johns Hopkins University. *Fall 2021*
- CFD Lab Coordinator, Michigan State University. *May 2019 – Mar 2021*
- Research Assistant, TSM and CFD Labs, Michigan State University. *Sep 2016 – Mar 2021*
- Teaching Assistant, Fluid Mechanics Lab, Michigan State University. *Spring 2017*
- Teaching Assistant, Thermodynamics I, Sharif University. *Spring 2014*

## SKILLS

- Computational Fluid Dynamics — ViCar3D, LJCompressible, ANSYS-Fluent, OpenFOAM
- Turbulence Simulation & Modeling — DNS, LES, RANS
- Programming Languages — MATLAB, Python, Fortran, C++
- Machine Learning, AI — Supervised, Unsupervised, Reinforcement Learning
- High Performance Computing — OpenMP, MPI, GPU, SLURM, Bash
- Optimization — Genetic Algorithms, Gradient Descent

## SELECTED PROJECTS

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- Passive Control of Non-Canonical Flows with Anisotropic Porous Materials – DNS and LES. Supervised by Prof. C. Meneveau and Prof. R. Mittal, Johns Hopkins University. *Mar 2021 – July 2024*
- Simulation of compressible (sub- and supersonic) channel flows over rough surfaces using a new immersed boundary method. Supervised by Prof. F.A. Jaber and Prof. J. Yuan, Michigan State University. *Sep 2018 – Mar 2021*
- Simulation and modeling of incompressible turbulent flows over rough surfaces. Supervised by Prof. G.J. Brereton and Prof. J. Yuan, Michigan State University. *Sep 2016 – Dec 2020*
- Numerical study and point optimization of flat plate film cooling, using anti-kidney vortex pairs. Supervised by Prof. K. Mazaheri, Sharif University of Technology. *Jun 2015 – Jun 2016*

## REFERENCES

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- **Giles J. Brereton**,  
Professor of Mechanical Engineering,  
Michigan State University, East Lansing, MI 48824, USA.  
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- **Charles Meneveau**,  
Louis M. Sardella Professor of Mechanical Engineering,  
Director of Turbulence Research Group,  
Associate Director, Institute for Data Intensive Engineering and Science,  
Johns Hopkins University, Baltimore, MD 21218, USA.  
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- **Rajat Mittal**,  
Professor of Mechanical Engineering,  
Director of Flow Physics and Computation Lab,  
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- **Junlin Yuan**,  
Assistant Professor of Mechanical Engineering,  
Director of Turbulence Simulation and Modeling Lab,  
Michigan State University, East Lansing, MI 48824, USA.  
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