Rozie Zangeneh, PhD

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Research Interests

- Computational thermo-fluid dynamics
- Data-driven and Reduced order models
- High-speed aero-thermodynamics
- Energy systems
- Aerodynamics of wind turbines

Professional Experience

Research Scientist *Department of Mechanical Engineering, Stanford University* *2023-current*

Post doctoral researcher *The State University of New York at Buffalo* *2022-2023*

Visiting Assistant Professor *Prairie View A&M University* *2020 - 2022*

Research Assistant and Graduate Instructor *University of Maine* *2014 - 2019*

Education

Ph.D., Mechanical Engineering, *University of Maine*, Orono, ME, USA *2019*

M.S., Mechanical Engineering *Tehran Polytechnic*, Tehran, Iran *2013*

B.S., Mechanical Engineering *Tehran Polytechnic*, Tehran, Iran *2011*

Honors & Awards

May 2021 American Society of Thermal Fluid Engineers (ASTFE) early career faculty/engineer travel grant
May 2018 University of Maine summer dissertation fellowship
Nov 2016 Bruce and Dorothy Rylander Johnson scholarship (SNAME best student of the year award)
Aug 2014 University of Maine Correll fellowship

Journal Papers (Forthcoming)

1. **Zangeneh, R.**, Mani, A., *Anisotropic Decay Modeling of Reynolds Stresses and Dissipation Rate Informed by Volumetrically Forced Turbulence.* Phys. Rev. Fluids, **2026**, In Prep.

Journal Papers

J. 10 **Zangeneh, R.**, Xue, W., Israel, D., Mani, A., *A variable-coefficient model for decay of isotropic turbulence capturing effects of finite cascade time and Reynolds number.* Phys. Rev. Fluids, **2026**. Accepted.

J. 9 **Zangeneh, R.**, *Dynamic Mode Decomposition of Wind Turbines Wake: A Path to Data-driven Reduced Order Modeling.* Int. Journal of Sustainable Energy, **2025**. Vol. 44, doi:10.1080/14786451.2025.2607286.

J. 8 **Zangeneh, R.**, *Unraveling Momentum and Heat Intercoupling in Reattaching Turbulent Boundary Layers Using Dynamic Mode Decomposition.* Int. Journal Computational Fluid Dynamics, **2026**. doi:10.1080/10618562.2026.2615936.

J. 7 Sementilli M.,**Zangeneh, R.**, Chen J., *Influence of Cross-perturbations on Turbulent Kelvin–Helmholtz Instability.* Fluids, Vol. 92, **2024**. doi:10.3390/fluids9030052

J. 6 **Zangeneh, R.**, *Heat Transfer Effects on Shock Unsteadiness in a Reattaching Compressible Turbulent Shear Layer.* Int. Journal of Heat and Fluid Flow, Vol. 52, **2022**. doi:10.1016/j.ijheatfluidflow.2021.108876

J. 5 **Zangeneh, R.**, *Parametric Study of Separation and Reattachment in Transonic Airfoil Flows.* AIAA Journal, Vol. 59 (11), 4465-4474, **2021**. doi:10.2514/1.J060520

J. 4 **Zangeneh, R.**, *Data-driven Model for Improving Wall-modeled Large-eddy Simulation of Supersonic Turbulent Flows with Separation.* Phys. of Fluids 33 (12), **2021**. doi:10.1063/5.0072550

J. 3 **Zangeneh, R.**, *Investigating Sweep Effects on the Stability of Leading-edge Vortices Over Finite-aspect Ratio Pitch-up Wings.* Phys. of Fluids 33 (10): **Special issue: Tribute to Frank M. White on his 88th Anniversary**, **2021**. doi:10.1063/5.0065686

J. 2 **Zangeneh, R.** Musa, S., *Development of a New Algorithm for Modeling Viscous Transonic Flow on Unstructured Grids at High Reynolds Numbers.* Journal of Fluids Engineering, Vol. 143(2): **2020**. doi:10.1115/1.4048611

J. 1 **Zangeneh, R.**, Musa, S., *A New Framework for Modeling Shock-Turbulence Interactions.* SAE International Journal of Aerospace, 2688-3627, **2019**. doi:10.4271/2020-01-5092

Selected Conference Papers

1. J Larsson, I Bermejo-Moreno, D Garmann, D Rizzetta, R Baurle, T Mukha, S Toosi, P Schlatter, C Brehm, S Ganju, AB Kahraman, W van Noordt, ZJ Wang, Z Duan, M Blind, A Beck, S Dave, A Korobenko, W Strasser, **R Zangeneh**, S Guzik, S Walters, M Galbraith,, Summary of the Smooth Body Separation Test Case at the 2022 High Fidelity CFD Verification Workshop AIAA SciTech, Orlando, FL. **Jan, 2023**, MD., doi:10.2514/6.2023-1241.

2. **Zangeneh, R.**, Heat transfer Mechanisms in Separated Turbulent Flows. Turbulence and Shear Flow Phenomena, Proceedings of TSFP-12, Osaka. **2022**.

3. **Zangeneh, R.**, On the Stability of Leading-edge Vortices for Flapping Wings with Deflected Leading-edge. AIAA SciTech, **Jan, 2022**. doi:10.2514/6.2022-0306.

4. **Zangeneh, R.**, Numerical Simulation of Laminar-Turbulent Transition in Hypersonic Flows: A Wall-modeled LES Approach. ASTFE 6th Thermal and Fluids Engineering Conference, 401-1407, **2021**. doi:0.1615/TFEC2021.tfl.036217

5. **Zangeneh, R.**, Wall-modeled Large-eddy Simulation of Hypersonic Turbulent Boundary-layers. AIAA Scitech, **2021**. doi:10.2514/6.2021-1076

6. Musa, S.,**Zangeneh, R.**, Deep Learning Technique for Modeling Fluid Moments of Swimming Robots. In: 2019 IEEE International Symposium on Measurement and Control in Robotics, pp. D3-2-1-D3-2-6, **2019**. doi:10.1109/ISMCR47492.2019.8955733

7. **Zangeneh, R.**, Sharman KP., Effect of Wind Loads and Damping on Stability of Wave Energy Converters. ASME 36th International Conference on Ocean, Offshore and Arctic Engineering. **2017**.

Conference Presentations

1. **Zangeneh, R.**, Mani, A., Assessment of anisotropy in the decay term of the dissipation equation for Reynolds stress transport models. In: APS Division of Fluid Dynamics, **2025**; Houston, TX.

2. **Zangeneh, R.**, Lavacot, D., Mani, A., Development of Anisotropic Decay Models for Reynolds Stress and Kinetic Energy Dissipation Equations. In: European Fluids Dynamics Conference, **2025**; Dublin, Irland.
3. **Zangeneh, R.**, Shende, O., Mani, A., Assessment of anisotropy in the decay term of the dissipation equation for Reynolds stress transport models. In: APS Division of Fluid Dynamics, **2024**; Salt lake city, UT.
4. **Zangeneh, R.**, DesJardin, P.E, Chen, J., Thermal and Momentum Profiles in Turbulent Boundary Layers with Surface Mass Transfer. In: APS Division of Fluid Dynamics, **2023**; Washington, DC. APS. A11.00007.
5. **Zangeneh, R.** Machine Learning-based Model to Improve Wall-modeled Large-eddy Simulation of Supersonic Turbulent Flows. In: APS Division of Fluid Dynamics, **2021**, Phoenix, AZ. APS. A11.00007.
6. **Zangeneh, R.** Effect of Temperature on Turbulent Shear-layer and Shockwave Interaction. In: APS Division of Fluid Dynamics, **2020**, Chicago, IL, online. APS. F08.00001
7. **Zangeneh, R.** On the Use of Non-Staggered Central Schemes for Large Eddy Simulation of the Canonical Shock-Turbulence Interaction. In: APS Division of Fluid Dynamics, **2019**, Seattle, WA. APS. DFDS05003Z.

Invited Seminars

April 2023 Presentation of a seminar on "Computational Modeling of Turbulent Flows for High-speed Aerothermodynamics and Combustion Efficiency", *University at Buffalo*, Buffalo, NY.

April 2022 Presentation of a seminar on "Heat Transfer Effects on Shock Unsteadiness in Hypersonic Flows, *University of Maine*, Orono, ME.

Feb 2022 Presentation of a seminar on "Data-driven Modeling in High-speed Aerodynamics", College of Engineering, *University of Texas at San Antonio*, San Antonio, TX .

Teaching & Mentoring Experience

Mentor: Stanford University

Student: Xinhao Quan, PhD student in mechanical engineering

Student: Atharva Aalok, Master student in aerospace engineering

Instructor: Prairie View A&M University

Courses: Thermodynamics, Fluid Mechanics, Aerodynamics, Intro to Renewable Energy

Graduate Instructor: University of Maine

Courses: Fluid-structure interaction

Workshops

Compressible Multiphase Flows Workshop *Stanford* (Organizing Committee) *November 5-6, 2023*

High Fidelity CFD Workshop *AIAA SciTech 2024* *January 6-7, 2024*

High Fidelity CFD Workshop *AIAA SciTech 2022* *January 8-9, 2022*

SERVICE

Research Community Engagement:

Co-organizer: Compressible Multiphase Flows Workshop Stanford *Nov 2023.*

NSF XSEDE-ACCESS resource allocations panelist 2021-Present
Session Chair: CFD: Applications APS DFD Conference, *Nov. 2025.*
Session Chair: Multiphase Flows APS DFD Conference, *Nov. 2024.*
Session Chair: Turbulent Boundary Layers: AIAA SciTech, *Jan 2024.*
Session Chair: Turbulence and Shear Flow Phenomena Symposium, *July 2022.*
Session Chair: Bio-Inspired and Low Reynolds Number Flows, Flow Control: AIAA SciTech, *Jan 2022.*
Session Chair: Applied CFD: AIAA Aviation, *Aug 2021.*

Ad-hoc Reviewer:

AIAA Journal
Physics of Fluids
Journal of Propulsion and Power
Propulsion and Power Research
Journal of Fluids Engineering
Journal of Fluids and Structures
Shock Waves
Fluids
Energies
Applied Sciences
AIAA SciTech 2020, 2022
AIAA Aviation 2021, 2022