

Omkar B. Shende

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EXPERIENCE	Los Alamos National Laboratory Postdoctoral Research Associate Working in the Continuum Model and Numerical Methods (XCP-4) group	2025 –
	Lawrence Livermore National Laboratory Graduate Researcher Performed ILES and analysis of Richtmyer-Meshkov instabilities in multi-component flow to support strategic deterrence initiatives, including as an DSTI intern	2024
	Argonne National Laboratory SULI Intern Developed high secondary electron emission coefficient thin films using atomic layer deposition on microchannel plates and modeled mechanisms for gain with increased oxide thickness	2016
EDUCATION	Stanford University , Stanford, CA Ph.D., Mechanical Engineering ▪ Doctoral Advisor: Prof. Ali Mani ▪ Dissertation: Reduced-Order Modeling for Reactive Scalars in Turbulent Flows M.S., Mechanical Engineering ▪ Concentration: Flow Physics and Computational Engineering	Jan. 2025 June 2020
	Princeton University , Princeton, NJ B.S.E., Mechanical and Aerospace Engineering ▪ Certificate: <i>Materials Science and Engineering</i> ▪ Graduated <i>summa cum laude</i> , Phi Beta Kappa, Sigma Xi, Tau Beta Pi ▪ Thesis: On the Efficacy and Accuracy of Models for Large Eddy Simulations of Turbulent Premixed Combustion	June 2018
RESEARCH ACTIVITIES	Mani Group <i>Stanford University</i> Ph.D. Student – Reduced-order modeling for turbulent reacting flows – Eddy diffusivity for dilute multiphase turbulence – Quantifying Reynolds stress decay and transport in anisotropic turbulence – Developing solvers for numerical simulations of fluid flows Computational Turbulent Reacting Flow Laboratory <i>Princeton University</i> Student Researcher Studied LES model efficacy using <i>a priori</i> and <i>a posteriori</i> analysis of DNS of turbulent, premixed flow to analyze shear- versus combustion-driven turbulence	2019 – 2024 2017 – 2018

MANUSCRIPTS

1. K. Ferguson, B. J. Colombi, K. M. Church, **O. B. Shende**, Y. Zhou, J. W. Jacobs. *Experiments and Simulations on the Richtmyer-Meshkov Instability with a Thin Intermediate Layer*. In Preparation. 2025.
2. **O. B. Shende**, B. E. Morgan, and Y. Zhou. *Shock tube simulations for the three-layer Richtmyer-Meshkov instability with single- and multi-mode perturbations*. *Physics of Fluids* 37. 2025. 2024 ICTAM invited paper, featured article
3. K. P. Griffin, B. Lee, G. Vijayakumar, B. Bornhoft, **O. B. Shende**, and M. P. Whitmore. *Pressure-gradient-based RANS model for separation in transitional and turbulent flows*. Center for Turbulence Research Proceedings of the Summer Program. 2024.
4. A. Shih, S. J. Chung, **O. B. Shende**, S. E. Herwald, A. M. Vezeridis, and G. G. Fuller. *Viscoelastic measurements of abscess fluids using a magnetic stress rheometer*. *Physics of Fluids* 36. 2024. Cover article, featured article
5. T. Homan, **O. B. Shende**, and A. Mani. *A model form for Reynolds stress decay informed by anisotropically forced homogeneous turbulence*. *Physical Review Fluids* 9. 2024.
6. **O. B. Shende**, L. Storan, and A. Mani. *A Model for Drift Velocity Mediated Scalar Eddy Diffusivity in Homogeneous Turbulent Flows*. *Journal of Fluid Mechanics* 989. 2024.
7. N. J. Wei and **O. B. Shende**. *Modeling unsteady loads on wind-turbine blade sections from periodic structural oscillations and impinging gusts*. In Preparation. 2024.
8. **O. B. Shende** and A. Mani. *A Nonlocal Extension of Dispersion Analysis for Closures in Reactive Flows*. In Preparation. 2022.
9. **O. B. Shende** and A. Mani. *Closures for Multi-Component Reacting Flows based on Dispersion Analysis*. *Physical Review Fluids* 7. 2022.
10. J. Guo and **O. Shende**. *On the assessment of symmetries in large-eddy simulation subgrid-scale models*. Center for Turbulence Research Annual Research Briefs. 2020.
11. M. Kang, I. Beskin, A. A. Al-Heji, **O. Shende**, S. Huang, S. Jeon, and R. S. Goldman. *Evolution of ion-induced nanoparticle arrays on GaAs surfaces*. *Applied Physics Letters* 104. 2014.

PRESENTATIONS

1. **O. Shende**, T. Homan, and A. Mani. *Reynolds stress decay modeling informed by anisotropically forced homogeneous turbulence*. 77th Annual Meeting of the APS Division of Fluid Dynamics. 2024.
2. R. Zangeneh, **O. Shende**, and A. Mani. *Assessment of anisotropy in the decay term of the dissipation equation for Reynolds stress transport models*. 77th Annual Meeting of the APS Division of Fluid Dynamics. 2024.
3. **O. B. Shende** *A model for drift velocity mediated scalar eddy diffusivity in homogenous turbulent flows*. At the National Renewable Energy Laboratory. 2024.
4. **O. B. Shende** and A. Mani. *Particle drift modifies turbulent dispersion*. Thermal and Fluid Sciences Affiliate Conference Poster Session. 2024.
5. **O. Shende** and A. Mani. *Quantifying the Relative Importance of Transport and Reaction Closures in a Canonical Premixed Turbulent Flow Setting*. 76th Annual Meeting of the APS Division of Fluid Dynamics. 2023.

6. T. Homan, **O. Shende**, D. L. Lavacot, and A. Mani. *A Model Form for Reynolds Stress Decay Informed by Analysis of Anisotropically Forced Homogeneous Turbulence*. 76th Annual Meeting of the APS Division of Fluid Dynamics. 2023.
7. **O. Shende** and A. Mani. *Assessment of a Nonlocal Closure Model for Scalar Fields in Reacting Turbulent Flows*. 75th Annual Meeting of the APS Division of Fluid Dynamics. 2022.
8. K. P. Griffin, **O. Shende**, and J. Guo. *An illustrative example of the symbiosis between community outreach and internal science-communication training*. 74th Annual Meeting of the APS Division of Fluid Dynamics. 2021.
9. **O. Shende** and A. Mani. *Scalar transport closure for a nonlinear reaction problem*. 74th Annual Meeting of the APS Division of Fluid Dynamics. 2021.
10. **O. Shende** and A. Mani. *Weakly-Nonlinear Extension of Dispersion Analysis for Multi-Component Reacting Flows*. 73rd Annual Meeting of the APS Division of Fluid Dynamics. 2020.
11. **O. Shende** and A. Mani. *A dispersion model for multi-component reacting flows*. 2020 Spring Meeting of the Western States Section of The Combustion Institute. 2020. Meeting cancelled due to SARS-CoV-2 pandemic
12. **O. Shende** and A. Mani. *A Dispersion Model for Turbulent, Multi-Component Reacting Flows*. 72nd Annual Meeting of the APS Division of Fluid Dynamics. 2019.
13. **O. B. Shende** and M. Ihme. *Flame structure analysis of the Hi-Pilot stratified premixed jet flames using large eddy simulations*. 11th U.S. National Combustion Meeting. 2019.
14. **O. Shende**, A. Mane, and J. Elam. *ALD-Grown SEE Layer Studies for Microchannel Plates for Photodetection*. 2017 Materials Research Society Spring Meeting. 2017.

AWARDS & GRANTS

NSF ACCESS Award	2024
ACCESS Discover request awarded for studying turbulence model closures on allocated resources like Stampede3 and OSN	
Argonne Training Program on Extreme-Scale Computing	2022
Selected through competitive application process to attend two-week intensive HPC workshop at Argonne National Laboratory	
NSF Extreme Science and Engineering Discovery Environment Award	2019
XSEDE Startup request awarded for studying binary reactions in homogenous isotropic turbulence on Stampede2	
Stanford Graduate Fellowship in Science and Engineering	2018 – 2023
Selected as recipient of fellowship awarded to outstanding students pursuing doctoral degrees in science and engineering	
National Science Foundation Graduate Research Fellowship	2018 – 2023
Selected as recipient of national fellowship awarded to outstanding students pursuing research degrees	
Sigma Xi Book Award	2018
Awarded for writing one of the most outstanding senior theses in science and engineering at Princeton University	
Barry Goldwater Scholarship	2017
Selected by a Congressional agency as among the top undergraduates in the nation on the basis of merit and research potential in STEM fields	

Shapiro Prize for Academic Excellence

2015, 2016

Honored as among the top 40 students at Princeton University in sophomore and freshman years by academic standing

SERVICE

NSF Panelist

Present

Served as panelist and reviewer for NSF ACCESS computational allocations.

Reviewer and Panelist

Present

Provided peer review for *Physics of Fluids* and *Center for Turbulence Research Annual Research Briefs*.

Teaching Assistant

2021, 2023

Helped with homework/exam creation and grading, held office hours and related meetings, and guest lectured for ME 351A and ME351B, the introductory graduate fluid mechanics sequence.

Mechanical Engineering Graduate Student Committee

2018 – 2023

Served as committee member to run qualifying exam information panels, provide feedback, and manage other events to enhance academic and social life for department students.

seeME

2018 – 2024

Served as organizing team member and teacher to outreach program to high school and middle school students underrepresented in STEM fields.

Stanford SURF

2020 – 2021

Served as a mentor to undergraduates participating in a School of Engineering summer outreach program.

SKILLS

Software: C, C++, Java, Bash, ZSH, Fortran, Python, LabVIEW, \LaTeX , MATLAB, Mathematica, OpenMP, Intel MPI

CAE/CAD: PTC, Siemens PLM, STK, and Dassault CAE software, including NASTRAN

Citizenship: US