

Exponent®
Engineering & Scientific Consulting

Jacob West, Ph.D., CFEI, P.E.

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Professional Profile

Dr. West is a mechanical engineer with expertise in heat transfer, single and multi-phase flows, thermodynamics, and combustion. He applies his expertise using experimental testing related to failures and product safety, as well as to the investigation of fires, explosions, and industrial process failures. He is experienced at using data analysis and developing computational models to answer engineering questions in the thermal sciences across a variety of applications, including utilities, industrial equipment, consumer products, and medical devices.

Dr. West performs risk assessments for industrial and consumer products involving ignition, burn injury, fire, and other safety issues. He has experience performing experimental testing according to standard methods (e.g., ASTM and UL standards; CFR regulations), as well as designing custom experimental tests for novel failure modes.

Prior to joining Exponent, Dr. West completed his M.S. and Ph.D. in Mechanical Engineering at Stanford University, where he used numerical simulations to study a variety of multi-phase flows, including turbulence with suspended particles, related to a novel solar energy concept. For his dissertation he developed simulation techniques for high-velocity impacts of metal projectiles resulting in severe material deformation and strain hardening, collaborating with scientists at Lawrence Livermore National Laboratory to expand and validate their simulation capabilities.

Dr. West has also practiced as a design engineer at Peterbilt Motors Company, focusing on design and integration of diesel emissions systems into heavy duty trucks. He has experience analyzing warranty data, creating testing protocols to detect faults before production, and determining the root cause of field failures.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2023

M.S., Mechanical Engineering, Stanford University, 2018

B.S., Mechanical Engineering, Olin College of Engineering, 2011

Argonne Training Program on Extreme-Scale Computing, 2020

Stanford Engineering Graduate Fellowship, 2016-2018

Franklin W. Olin Scholarship, 2007-2011

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Licenses and Certifications

Professional Engineer Mechanical, California, #43195

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Certified Fire and Explosion Investigator (CFEI)

Academic Appointments

Teaching Assistant for Engineering Design Optimization, Aeronautics and Astronautics, Stanford University, 2019

Teaching Assistant for Thermodynamics, Olin College, 2010-2011

Prior Experience

Graduate Research Assistant, Flow Physics and Aeroacoustics Laboratory, Stanford University, 2016-2023

High Energy Density Physics Intern, Lawrence Livermore National Laboratory, 2019

Design Engineer, Peterbilt Motors Company, 2013-2016

Associate Design Engineer, Peterbilt Motors Company, 2011-2013

Publications

Jacob R. West, Thibault Maurel–Oujia, Keigo Matsuda, Kai Schneider, Suhas S. Jain, Kazuki Maeda, “Clustering, rotation, and swirl of inertial particles in turbulent channel flow”, International Journal of Multiphase Flow, Volume 174, 2024, 104764, ISSN 0301-9322, https://doi.org/10.1016/j.ijmultiphaseflow.2024.104764.

Jacob R. West, Michael C. Adler, Sanjiva K. Lele, “A high-order, localized-artificial-diffusivity method for Eulerian simulation of multi-material elastic-plastic deformation with strain hardening”, Journal of Computational Physics, Volume 514, 2024, 113205, ISSN 0021-9991, https://doi.org/10.1016/j.jcp.2024.113205.

“Assessment of diffuse-interface methods for compressible multiphase fluid flows and elastic-plastic deformation in solids”. Jain, S.S.; Adler, M.C.; West, J.R.; Mani, A.; Moin, P.; Lele, S.K., Journal of Computational Physics, Volume 475, 2023, 111866 https://doi.org/10.1016/j.jcp.2022.111866.

“Scalable Parallel Linear Solver for Compact Banded Systems on Heterogeneous Architectures”. Song, Hang; Matsuno, K.V.; West, J.R.; Subramaniam, A.; Ghate, A.S. & Lele, S.K. Journal of Computational Physics, Volume 468, 2022, 111443 https://doi.org/10.1016/j.jcp.2022.111443.

“Wind Turbine Performance in Very Large Wind Farms: Betz Analysis Revisited”. West, J.R.; Lele, S.K. Energies 2020, 13, 1078 https://doi.org/10.3390/en13051078.

Presentations

“A high-order, localized artificial diffusivity method for Eulerian simulation of multi-material elastic-plastic deformation with strain hardening", West, J.R., Adler, M.C., & Lele, S. K. 17th International Workshop on the Physics of Compressible Turbulent Mixing, Atlanta, GA, 2022.

“Mean Velocity Scaling in Dilute Particle-Laden Channel Flow at Moderate Mass Loading", West, J.R. & Lele, S. K., 65th American Physical Society Division of Fluid Dynamics Annual Meeting, Phoenix, AZ, 2021.

“Toward a Mean Velocity Scaling in Variable Property Particle-Laden Channel Flow", West, J.R. & Lele, S. K., 64th American Physical Society Division of Fluid Dynamics Annual Meeting, Virtual, 2020.

“Particle-laden Channel Flow with Strong Radiative Heating", West, J.R. & Lele, S. K., 63rd American Physical Society Division of Fluid Dynamics Annual Meeting, Seattle, WA, 2019.

“Wind Turbine Performance in Very Large Wind Farms: Energy and Momentum Budgets for a Streamtube", West, J.R. & Lele, S. K., 62nd American Physical Society Division of Fluid Dynamics Annual Meeting, Atlanta, GA, 2018.

“Wind Turbine Performance in an Atmospheric Boundary Layer: Betz Analysis Revisited ", West, J.R. & Lele, S. K., 61st American Physical Society Division of Fluid Dynamics Annual Meeting, Denver, CO, 2017.