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Education

2012–2014 **Ph.D.**, *Mechanical & Aerospace Engineering*, Cornell University.
Thesis: *A mesoscopic formalism for simulating particle-laden flows with applications in energy conversion processes*

2011–2012 **M.S.**, *Mechanical & Aerospace Engineering*, Cornell University.

2009–2011 **M.S.**, *Mechanical Engineering*, University of Colorado Boulder.

2005–2009 **B.S.**, *Mechanical Engineering*, Binghamton University, *Cum Laude*.

Appointments

2022–present **Associate Professor**, *Department of Mechanical Engineering*, University of Michigan.

2022–present **Associate Professor**, *Department of Aerospace Engineering (0%)*, University of Michigan.

Aug–Dec 2022 **Visiting Professor**, *Department of Chemical Engineering*, Imperial College London.

2020–2022 **Assistant Professor**, *Department of Aerospace Engineering (0%)*, University of Michigan.

May–Aug 2018 **Visiting Professor**, *Research and Innovation Center*, Ford Motor Company.

2016–2022 **Assistant Professor**, *Department of Mechanical Engineering*, University of Michigan.

2014–2016 **Postdoctoral Researcher**, *Center for Exascale Simulation of Plasma-Coupled Combustion (XPACC)*, University of Illinois Urbana-Champaign.

2011–2014 **Graduate Research Assistant**, *Computational Thermo-Fluids Laboratory led by Prof. O. Desjardins*, Cornell University.

2010–2011 **Graduate Research Assistant**, *Computational Modeling of Energy Systems led by Prof. O. Desjardins*, University of Colorado Boulder.

Awards & Honors

National

2020 NASA Early Stage Investigation Award

2019 ASME Pi Tau Sigma Gold Medal *"for outstanding achievements in mechanical engineering within ten years of graduation"*

2019 National Science Foundation CAREER Award

2019 Office of Naval Research Young Investigator Award

2019 NASA Center Innovation Fund (CIF)

2010 Honorable Mention, NSF: Graduate Student Research Fellowship Program

2008 Tau Beta Pi, The Engineering Honor Society

2008 Pi Tau Sigma, The Mechanical Engineering Honor Society

Institutional

2021 Mechanical Engineering Department Achievement Award, University of Michigan

2020 Pi Tau Sigma Professor of the Term, University of Michigan

2019 Nominated for the university-wide Golden Apple Award, a student nominated award that recognizes outstanding university teaching, University of Michigan

2015 Video of the Month award: *Jet in Crossflow of a Spatially Evolving Turbulent Boundary Layer*, Coordinated Science Laboratory, University of Illinois at Urbana-Champaign

2014 The Jayesh Prize in recognition of outstanding presentation in the Cornell Fluid Dynamics Seminar

2011 Outstanding Teacher Assistant Award, Department of Mechanical Engineering, University of Colorado

Refereed Journal Articles[1]

57. Patel, M., Rubio, J.S., Shekhtman, D., Parziale, N., Rabinovitch, J., Ni, R., **Capecelatro, J.** (2024) Experimental and numerical investigation of 2 inertial particles in underexpanded jets. *Journal of Fluid Mechanics*. Submitted.

56. **Capecelatro, J.**, Wagner, J.L. (2024) Gas-particle dynamics in high-speed flows. *Annual Review of Fluid Mechanics*. 56, 379–403.

55. Kord, A., **Capecelatro, J.** (2023) A discrete-adjoint framework for optimizing high-fidelity simulations of turbulent reacting flows. *Proceedings of the Combustion Institute*. 39, 4.

54. Osnes, A., Vartdal, M., Khalloufi, M., **Capecelatro, J.**, Balachandar, S. (2023) Comprehensive quasi-steady force correlations for compressible flow through random particle suspensions. *International Journal of Multiphase Flow*. 165, 104485.

53. Khalloufi, M., **Capecelatro, J.** (2023) Drag force of compressible flows past random arrays of spheres. *International Journal of Multiphase Flow*. 165, 104496.

52. Pakseresht, P., Yao, Y., Fan, L., Theuerkauf, J., **Capecelatro, J.** (2023) A critical assessment of the Energy Minimization Multi-Scale (EMMS) model. *Powder Technology*. 425, 118569.

51. **Capecelatro, J.** (2023) Gas-particle dynamics in high-speed flows: Insights from 18th-century cannon firings to particle-resolved simulations. *Science Talks*. 6, 100213.

50. Kord, A., **Capecelatro, J.** (2023) Adaptive energy stable artificial dissipation for preserving scalar boundedness in turbulent flows. *Computers and Fluids*. 243, 105776.

49. Wakefield, J., Lattanzi, A.M., Pecha, B., Ciesielski, P.N., **Capecelatro, J.** (2023) Fast estimation of reaction rates in spherical and non-spherical porous catalysts. *Chemical Engineering Journal*. 454, 139637.

48. Yao, Y., Huan, X., **Capecelatro, J.** (2022) Multi-fidelity uncertainty quantification of particle deposition in turbulent pipe flow. *Journal of Aerosol Science*. 166, 106065.

47. **Capecelatro, J.**, Longest, P.W, Boerman, C., Sulaiman, M., Sundaresan, S. (2022) Recent developments in the computational simulation of dry powder inhalers. *Advanced Drug Delivery Reviews*. 188, 114461.

46. Lattanzi, A.M., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2022) Fluid-mediated sources of granular temperature at finite Reynolds numbers. *Journal of Fluid Mechanics*. 942, A7.

[1] Underlined names indicate students and postdocs advised at UM

45. Tan, S., Zhang, Z., Maki, K., Fidkowski, K.J., **Capecelatro, J.** (2022) Beyond well-mixed: a simple probabilistic model of airborne disease transmission in indoor spaces. *Indoor Air*. 32(3), 1-12.

44. Morris, S., McAtee, W., **Capecelatro**, J., Raghav, V. (2022) Influence of expiratory flow pulsatility on the effectiveness of a surgical mask. *Journal of Exposure Science & Environmental Epidemiology*. 1–9.

43. **Capecelatro, J.** (2022) Modeling high-speed gas–particle flows relevant to spacecraft landings. *International Journal of Multiphase Flow*. 150, 104008.

42. Lo, C., Bons, J., Yao, Y., **Capecelatro, J.** (2022) Assessment of stochastic models for predicting particle transport and deposition in turbulent pipe flows. *Journal of Aerosol Science*. 162, 105954.

41. Zhu, M., Medina, M., Nalliah, R. P., Kadhium, V., Bell, E., Han, T., Boehman, A., **Capecelatro**, J., Wooldridge, M. S. (2022) Experimental evaluation of aerosol mitigation strategies in large, open-plan, dental clinics. *Journal of the American Dental Association*. 153(3).

40. Lattanzi, A.M., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2022) Stochastic model for the hydrodynamic force in Euler-Lagrange simulations of particle-laden flows. *Physical Review Fluids*. 7, 014301.

39. Shallcross, G. S., **Capecelatro, J.** (2022) An explicit characteristic-based immersed boundary method for compressible flows, *Journal of Computational Physics*. 449, 110804.

38. Beetham, S., Lattanzi, A., **Capecelatro, J.** (2022) On the thermal entrance length of moderately dense gas-particle flows. *International Journal of Heat and Mass Transfer*. 182, 121985.

37. Zhang, Z., **Capecelatro, J.**, Maki, K. (2021) On the utility of a well-mixed model for predicting disease transmission on an urban bus. *AIP Advances*. 11, 085229.

36. Yao, Y., **Capecelatro, J.** (2021) An accurate particle-mesh method for simulating charged particles in wall-bounded flows, *Powder Technology*. 387, 239–250.

35. Monroe, K., Yao, Y., Lattanzi, A., Raghav, V., **Capecelatro, J.** (2021) Role of pulsatility on particle dispersion in expiratory flows, *Physics of Fluids*. 33, 4.

34. Beetham, S., Fox, R. O., **Capecelatro, J.** (2021) Sparse identification of multiphase turbulence closures for coupled fluid-particle flows. *Journal of Fluid Mechanics*. 914, A11.

33. Yao, Y., **Capecelatro, J.** (2021) Deagglomeration of cohesive particles by turbulence, *Journal of Fluid Mechanics*. 911, A10.

32. Zhang, Z., Han, T., Hee Yoo, K., **Capecelatro, J.**, Boehman, A., Maki, K. (2021) Disease transmission through expiratory aerosols on an urban bus. *Physics of Fluids*. 30, 1.

31. Iwashyna, T. J., Boehman, A., **Capecelatro, J.**, Cohn, A. M., Cooke, J. M., Costa, D. K., Eakin, R. M., Prescott, H. C., Wooldridge, M. S. (2020) Variation in aerosol production across oxygen delivery devices in spontaneously breathing human subjects, *medRxiv*.

30. Lattanzi, A.M., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2020) Stochastic models for capturing dispersion in particle-laden flows. *Journal of Fluid Mechanics*. 903, A7.

29. Beetham, S., **Capecelatro, J.** (2020) Formulating turbulence closures using sparse regression with embedded form invariance, *Physical Review Fluids*. 5, 08461.

28. Baker, M. C., Fox, R. O., Kong, B., **Capecelatro, J.**, Desjardins, O. (2020) Reynolds-stress modeling of cluster-induced turbulence in particle-laden vertical channel flow, *Physical Review Fluids*. 5, 074304.

27. Baker, M. C., Kong, B., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2020) Direct comparison of Eulerian–Eulerian and Eulerian–Lagrangian simulations for particle-laden vertical channel flow, *AIChE Journal*. 67, 1–13.

26. Shallcross, G. S., Fox, R. O., **Capecelatro, J.** (2020) A volume-filtered description of compressible particle-laden flows. *International Journal of Multiphase Flows*. 122, 1–19.

25. Yao, Y., **Capecelatro, J.** (2019) Electrohydrodynamic generation of atmospheric turbulence. *Physical Review Fluids*. 4, 1–19.

24. Wang, G., Fong, K. O., Coletti, F., **Capecelatro, J.**, Richter, D. (2019) Inertial particles distribution and modification of vertical turbulent channel flow: a numerical and experimental comparison. *International Journal of Multiphase Flows*. 120, 1–16.

23. Kord, A., **Capecelatro, J.** (2019) Optimal perturbations for controlling the growth of a Rayleigh–Taylor instability. *Journal of Fluid Mechanics*. 876, 150–185.

22. Buchta, D. A., Shallcross, G., **Capecelatro, J.** (2019) Sound and turbulence modulation by particles in high-speed shear flows. *Journal of Fluid Mechanics*. 875, 254–285.

21. Popov, P. P., Buchta, D. A., Anderson, M. J., Massa, L., **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2019) Learning-Assisted Early Ignition Prediction in a Complex Flow. *Combustion and Flame*. 206, 451–466.

20. Beetham, S., **Capecelatro, J.** (2019) Biomass pyrolysis in fully-developed turbulent riser flow. *Renewable Energy*. 140, 751–760.

19. Rao, A. A., **Capecelatro, J.** (2019) Coarse-grained modeling of sheared granular beds. *International Journal of Multiphase Flows*. 114, 258–267.

18. Guo, L., **Capecelatro, J.** (2019) The role of clusters on heat transfer in sedimenting gas-solid flows. *International Journal of Heat and Mass Transfer*. 132, 1217–1230.

17. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2018) Adjoint-based sensitivity and ignition threshold mapping in a turbulent mixing layer. *Combustion Theory and Modeling*. 23, 1–35.

16. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2018) On the transition between turbulence regimes in particle-laden channel flows, *Journal of Fluid Mechanics*. 845, 499–519.

15. Goyal, H., Desjardins, O., Pepiot, P., **Capecelatro, J.** (2018) A computational study of the effects of multiphase dynamics in catalytic upgrading of biomass pyrolysis vapor. *AIChE Journal*. 64, 3341-3353.

14. Yao, Y., **Capecelatro, J.** (2018) Competition between drag and Coulomb interactions in turbulent particle-laden flows using a coupled-fluid–Ewald-summation based approach. *Physical Review Fluids*. 3, 1–20.

13. **Capecelatro, J.** (2018) A purely Lagrangian method for simulating the shallow water equations on a sphere using smooth particle hydrodynamics, *Journal of Computational Physics*. 356, 174–191.

12. Patel, R., Kong, B., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2017) Verification of Eulerian–Eulerian and Eulerian–Lagrangian simulations for turbulent fluid–particle flows, *AIChE Journal*. 63, 5396–5412.

11. Kong, B., Feng, H., **Capecelatro, J.**, Patel, R., Desjardins, O., Fox, R. O. (2017) Euler–Euler anisotropic Gaussian mesoscale simulation of homogeneous cluster-induced gas–particle turbulence, *AIChE Journal*. 63, 2630–2643.

10. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) Strongly-coupled gas-particle flows in vertical channels. Part I: Reynolds-averaged two-phase statistics, *Physics of Fluids*. 28, 1–22.

9. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) Strongly-coupled gas-particle flows in vertical channels. Part II: Turbulence modeling, *Physics of Fluids*. 28, 1–22.

8. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) Effect of domain size on fluid-particle statistics in homogeneous gravity-driven cluster-induced turbulence, *Journal of Fluids Engineering*. 138, 1–8.

7. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2015) On fluid-particle dynamics in fully-developed cluster-induced turbulence, *Journal of Fluid Mechanics*. 780, 578–635.

6. **Capecelatro, J.**, Desjardins, O. (2015) Mass loading effects on turbulence modulation by particle clustering in dilute and moderately dilute channel flows, *Journal of Fluids Engineering*. 137, 1–8.

5. **Capecelatro, J.**, Pepiot, P., Desjardins, O. (2015) Numerical investigation and modeling of reacting gas-solid flows in the presence of clusters, *Chemical Engineering Science*. 122, 403–415.

4. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2014) Numerical study of collisional particle dynamics in cluster-induced turbulence, *Journal of Fluid Mechanics*. 747, R2 1–13.

3. **Capecelatro, J.**, Pepiot, P., Desjardins, O. (2014) Numerical characterization and modeling of particle clustering in wall-bounded vertical risers, *Chemical Engineering Journal*. 245, 295–310.

2. **Capecelatro, J.**, Desjardins, O. (2013) Eulerian-Lagrangian modeling of turbulent liquid-solid slurries in horizontal pipes, *International Journal of Multiphase Flow*. 55, 64–79.

1. **Capecelatro, J.**, Desjardins, O. (2013) An Euler-Lagrange strategy for simulating particle-laden flows, *Journal of Computational Physics*. 238, 1–31.

Book Chapters

1. **J. Capecelatro** & O. Desjardins (2023) "Volume-filtered Euler–Lagrange method for strongly coupled fluid–particle flows," in *Modeling Approaches and Computational Methods for Particle-laden Turbulent Flows* (edited by S. Subramaniam & S. Balachandar), Academic Press, Elsevier, pp. 383–417.

Refereed Conference Papers

4. Beetham, A., **Capecelatro, J.** (2023) Multiphase turbulence modeling using sparse regression and gene expression programming. *Nuclear Technology*. Selected papers from the 12th Japan-U.S. Seminar on Two-Phase Flow Dynamics 2022 special issue.

3. Agudelo, C., Vendula, R. T., **Capecelatro, J.**, Wang, Q. (2019) Design of Experiments for Effects and Interactions during Brake Emissions Testing Using High-Fidelity Computational Fluid Dynamics. *SAE Technical Paper*. 37th Annual Brake Colloquium & Exhibition. No. 2019-01-2139.

2. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2014) Investigating multiphase turbulence statistics of large-scale two-way coupled gravity-driven flows, *Proceedings of the ASME 2014*

4th Joint US-European Fluids Engineering Division Summer Meeting. August 3–7, 2014, Chicago, Illinois, USA.

1. **Capecelatro, J.**, Desjardins, O. (2014) Turbulence modulation by particle clustering in dilute and moderately dilute channel flows, *Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting*. August 3–7, 2014, Chicago, Illinois, USA.

Publications in Popular Press

1. **Capecelatro, J.** School bus safety during the COVID-19 pandemic: 8 recommendations, *The Conversation* URL: `https://theconversation.com/school-bus-safety-during-the-covid-19-pandemic-8-recommendations-145226`.

Proceedings and Presentations

184. Zinelis, K., Beetham, S., Abadie, T., McKinley, G.H., Matar O.K., **Capecelatro, J.** (2023) High-fidelity and reduced-order modelling of viscoelastic filaments, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

183. Beetham, S., Zinelis, K., Abadie, T., McKinley, G.H., Matar O.K., **Capecelatro, J.** (2023) Discovery of viscoelastic constitutive models with complexity-penalized sparse regression, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

182. Herzog, M., Bhargav, V., McAtee, W.N., Raghav, V., **Capecelatro, J.** (2023) Modeling particle dispersion in a turbulent puff, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

181. Wakefield, J., **Capecelatro, J.**, Subramaniam, S. (2023) Filtered volume fraction fluctuations: a measure to model clustering in dilute, non-collisional particle-laden flow, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

180. Malipeddi, A.R., Figueroa, C.A., **Capecelatro, J.** (2023) Euler-Lagrange scheme for modeling particle-laden flows in medical image-based geometries, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC. **Capecelatro, J.**,

179. Sridhar, A., Fox, R.O. (2023) Turbulence transport in particle-laden compressible flows, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

178. Patel, M., Ganesh, H., **Capecelatro, J.** (2023) Fast estimation of pressure from PTV measurements using smooth particle hydrodynamics, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

177. Mohit, A., Stolzman, J., Wooldridge, M., **Capecelatro, J.** (2023) Optimizing nozzle designs to improve upstream turbulent mixing and downstream combustion efficiency in flares, 76th Annual Meeting of the APS Division of Fluid Dynamics, Washington, DC.

176. **Capecelatro, J.** (2023) Multi-scale modeling of fluid-particle flows for biomass pyrolysis and CO2 adsorption, UNH Center for Fluid Dynamics of Energy and the Environment 2-Day Workshop: The Interaction of Experiments, Machine Learning, and Dynamical Systems Approaches to Complex and Turbluent Fluid Flows in Energy Systems and the Environment, Durham, NH.

175. Beetham, S., **Capecelatro, J.** (2023) Discovery of viscoelastic constitutive models with complexity-penalized sparse regression, UNH Center for Fluid Dynamics of Energy and the Environment 2-Day Workshop: The Interaction of Experiments, Machine Learning, and Dynamical Systems Approaches to Complex and Turbluent Fluid Flows in Energy Systems and the Environment, Durham, NH.

174. Grawe, R., **Capecelatro, J.** (2023) Modeling CO2 Adsorption in an Euler-Lagrange Framework Accounting for Pseudo-Turbulence and Intraparticle Diffusion, 2023 AIChE Annual Meeting, Orlando, FL.

173. Bhat, S., Pakseresht, P., Yao, Y., Fan, Y., Theuerkauf, J., **Capecelatro, J.** (2023) Numerical Study on Clustering of Polydisperse Group-A Particles in Riser Flow, 2023 AIChE Annual Meeting, Orlando, FL.

172. **Capecelatro, J.**, Archana, S. (2023) Turbulence transport in compressible gas-particle flows, Workshop on Compressible Multiphase Flows, Stanford University, CA.

171. Beetham, S., Zinelis, K., Abadie, T., McKinley, G.H., Matar, O.K., **Capecelatro, J.** (2023) Discovery of viscoelastic constitutive models with complexity-penalized sparse regression, SIAM Great Lakes 2023 meeting, Michigan State University, East Lansing, MI.

170. Herzog, M., Lattanzi, A., Wakefield, J., Subramaniam, S., **Capecelatro, J.**, (2023), Stochastic Lagrangian subgrid-scale models for dilute to dense particle-laden flows, 2nd IACM Mechanistic Machine Learning and Digital Engineering for Computational Science Engineering and Technology, El Paso, TX.

169. **Capecelatro, J.** (2023) Towards robust turbulence models for strongly-coupled gas-particle flows (keynote lecture), IUTAM Symposium on Turbulent Structure and Particles-Turbulence Interaction, Lanzhou, China.

168. Patel, M., Bhat, S., Ganesh, H., **Capecelatro, J.** (2023) Fast estimation of pressure from PTV measurements using smooth particle hydrodynamics, Proceedings of the 15th International Symposium on Particle Image Velocimetry (ISPIV 2023), San Diego, CA.

167. Pakseresht, P, Yao, Y., Fan, Y., Theuerkauf, J., Bhat, S., **Capecelatro, J.** (2023) A Critical Assessment of the Energy Minimization Multi-Scale (EMMS) Model for Turbulent Fluidized Beds, AIChE Fluidization 2023, Edinburgh, Scotland, United Kingdom.

166. Lindmüller, L., Watson, B., Heinrich, S., Theuerkauf, J., Yao, Y., Fan, Y., **Capecelatro, J.** (2023). Dynamic Bubble Tracking in Fluidized Beds Via Electrical Capacitance Volume Tomography, AIChE Fluidization 2023, Edinburgh, Scotland, United Kingdom.

165. Zinelis, K., Abadie, T., **Capecelatro, J.**, McKinley, G.H., Matar, O.K. (2023) Numerical simulations of viscoelastic jets using the FENE-P model, 11th International Conference on Multiphase Flow, Kobe, Japan.

164. Herzog, M., Wakefield, J., **Capecelatro, J.** (2023) A stochastic Lagrangian subgrid-scale model for capturing two-point statistics, 11th International Conference on Multiphase Flow, Kobe, Japan.

163. Patel, M., Rubio, J.S., Ni, R., Rabinovitch, J., **Capecelatro, J.** (2023) Inertial particle dynamics in underexpanded jets, 11th International Conference on Multiphase Flow, Kobe, Japan.

162. Sridhar, A., **Capecelatro, J.** (2023) Simulation and modeling of turbulence induced by shock–particle interactions, 11th International Conference on Multiphase Flow, Kobe, Japan.

161. Wakefield, J., Subramaniam, S., **Capecelatro, J.** (2022) Towards filter-dependent closure models for dilute and moderately dense particle-laden flow, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

160. Sridhar, A., Fox, R.O., **Capecelatro, J.** (2022) Modeling pseudo-turbulence for shock-induced flow through particle suspensions, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

159. Herzog, M.P., Wakefield, J., Subramaniam, S., **Capecelatro, J.** (2022) A spatially-correlated random walk model for capturing two-point statistics in turbulent particle-laden flows, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

158. Zhou, J., Vaideswaran, R.U., Herzog, M.P., Wakefield, J. Yeung, P.K., **Capecelatro, J.**, Subramaniam, S. (2022) Statistical analysis of DNS data on clustering in homogeneous particle-laden turbulent flow for stochastic model development, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

157. Patel, M., Rubio, J.S., Ni, R., Rabinovitch, **Capecelatro, J.** (2022) Particle-laden underexpanded jets: A numerical study, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

156. Rubio, J.S., Patel, M., **Capecelatro, J.**, Rabinovitch, R., Ni, R. (2022) Particle-laden underexpanded jets: An experimental study, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

155. Bhat, S., **Capecelatro, J.**, Ganesh, H. (2022) A Voronoi-based smooth particle hydrodynamics approach for estimating instantaneous pressure from PTV measurements, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

154. Malipeddi, A.R., Figueroa, C.A., **Capecelatro, J.** (2022) A scalable Euler-Lagrange strategy for particle-laden anatomical flows in subject-specific geometries, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

153. Morris, S., McAtee, W.N., Agrawal, V., **Capecelatro, J.**, Raghav, V. (2022) Mask deformation and flow leakage during pulsatile expiratory events, 75th Annual Meeting of the APS Division of Fluid Dynamics, Indianapolis, IN.

152. Pakseresht, P., **Capecelatro, J.**, Yao, Y., Fan, Y., Theuerkauf, J., Lindmuller, L., Heinrich, S. (2022) A Critical Assessment of the Energy Minimization Multi-Scale (EMMS) Model for Turbulent Fluidized Beds, 2022 AIChE Annual Meeting, Phoenix, AZ.

151. **Capecelatro, J.**, Herzog, M., Lattanzi, A., Subramaniam, S. (2022) Subgrid-scale models for turbulent particle-laden flows from dilute to dense regimes, 1st European-American-Japanese Two-Phase Flow Group Meeting, Chamonix, France.

150. Herzog, M., Lattanzi, A., Wakefield, J., Subramaniam, S., **Capecelatro, J.** (2022) Accurate Lagrangian subgrid-scale models for turbulent particle-laden flows, International Conference on Numerical Methods in Multiphase Flows, Venice, Italy.

149. Lattanzi, A., Subramaniam, S., **Capecelatro, J.** (2022) A stochastic model for the drag force acting on a suspension of particles, IUTAM Symposium: From Stokesian suspension dynamics to particulate flows in turbulence, Toulouse, France.

148. **Capecelatro, J.** (2022) Simulation and modeling of airborne disease transmission in indoor spaces, 18th Annual Midwest Area Biosafety Network (MABioN) Symposium, Ann Arbor, MI.

147. Herzog, M., Lattanzi, A., Wakefield, J., Subramaniam, S., **Capecelatro, J.** (2022) Stochastic Lagrangian Subgrid-Scale Models for Turbulent Particle- Laden Flows, NETL 2022 Workshop on Multiphase Flow Science, Virtual.

146. Grawe, R., Wakefield, J., Lattanzi, A., **Capecelatro, J.** (2022) Fast Estimation of Reaction Rates in Catalysts and Sorbents, NETL 2022 Workshop on Multiphase Flow Science, Virtual.

145. Fontenot, R.L., Talbot, J., Gale, M., Mehta, R., **Capecelatro, J.** (2022) Modeling Enhancements for Eulerian-Eulerian Two-Fluid Methods in Compressible Particle-Laden Flows with

Plume-Surface Interaction Applications, NETL 2022 Workshop on Multiphase Flow Science, Virtual.

144. Kord, A., **Capecelatro, J.** (2022) A discrete-adjoint framework for optimizing high-fidelity simulations of turbulent reacting flows, 39th International Symposium on Combustion, Vancouver, Canada

143. Sridhar, A., Khalloufi, M., **Capecelatro, J.** (2022) Numerical investigation of drag and turbulence in compressible flows through particle suspensions, 17th International Workshop on the Physics of Compressible Turbulent Mixing, Atlanta, GA.

142. Patel, M., **Capecelatro, J.** (2022) An Euler–Lagrange approach for turbulent particle-laden compressible flows, 17th International Workshop on the Physics of Compressible Turbulent Mixing, Atlanta, GA.

141. Patel, M., **Capecelatro, J.** (2022) A high-order low-dissipation Euler–Lagrange method for compressible gas-particle flows, International Conference on Computational Fluid Dynamics 11, Maui, HI.

140. Lattanzi, A., Subramaniam, S., **Capecelatro, J.** (2022) A stochastic model for the drag force acting on a suspension of particles, EUROMECH Colloquium 625–Advances in LES of Turbulent Multiphase Flows, Udine, Italy.

139. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2022) Fluid-Mediated Sources to Granular Temperature in Homogeneous Fluidization, 19th U.S. National Congress on Theoretical & Applied Mechanics, Austin, TX.

138. Beetham, S., **Capecelatro, J.** (2022) Sparse Identification of Turbulence Closures Applied to Single Phase and Particle-Laden Flows, 19th U.S. National Congress on Theoretical & Applied Mechanics, Austin, TX.

137. Sridhar, A., Khalloufi, M., **Capecelatro, J.** (2022) Drag and Turbulence in Particle-Laden Compressible Flows, 19th U.S. National Congress on Theoretical & Applied Mechanics, Austin, TX.

136. Peng, C., **Capecelatro, J.**, Lattanzi, A., Fox, R.O. (2022) Effect of the fluid-mediated particle–particle force in liquid–solid sedimentation, 6th International Conference on Turbulence & Interactions, Elba Island, Italy.

135. Beetham, S., **Capecelatro, J.** (2022) Multiphase turbulence modeling using sparse regression and gene expression programming, 12th Japan-U.S. Seminar on Two-Phase Flow Dynamics 2022, University of Michigan.

134. Beetham, S., **Capecelatro, J.** (2022) Sparse identification of multiphase turbulence closures for strongly-coupled gas-particle flows, APS March Meeting 2022, Chicago, IL.

133. Kord, A., **Capecelatro, J.** (2022) Adjoint-based optimization of large-scale reacting turbulent flow simulations, APS March Meeting 2022, Chicago, IL.

132. Khalloufi, M., **Capecelatro, J.** (2022) Assessment of High-Order Upwind SBP Finite Difference Operators for Compressible Turbulent Flows, 2022 AIAA SciTech Forum (virtual).

131. Patel, M., Rabinovitch, J., **Capecelatro, J.** (2022) Eulerian–Lagrangian Simulations of Plume-Induced Sheared Granular beds under Martian Conditions, 2022 AIAA SciTech Forum (virtual).

130. Fontenot, R.L., Talbot, J., Gale, M., Mehta, R., **Capecelatro, J.** (2022) Modeling Enhancements for Eulerian-Eulerian Two-Fluid Methods in Compressible Particle-Laden Flows with Plume-Surface Interaction Applications, 2022 AIAA SciTech Forum, San Diego, CA.

129. Beetham, S., Lattanzi, A., **Capecelatro, J.** (2021) The effect of particle clustering on the thermal entrance length in moderately dense gas-solid flows, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

128. Patel, M., **Capecelatro, J.** (2021) Numerical simulations of granular bed erosion under Martian conditions, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

127. Lattanzi, A., Tavanashad, V., Subramanian S., **Capecelatro, J.** (2021) Fluid-Mediated Sources to Granular Temperature in Homogeneous Fluidization, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

126. Kord, A., **Capecelatro, J.** (2021) Adjoint-based sensitivity of turbulent reacting jets, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

125. **Capecelatro, J.**, Shallcross, G. (2021) Numerical simulations of an underexpand jet impinging on a granular bed, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

124. Sridhar, A., **Capecelatro, J.** (2021) Particle-resolved simulations of shock-induced size segregation, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

123. Khalloufi, M., **Capecelatro, J.** (2021) Particle-resolved simulations of compressible gas-particle flows at finite Mach number and volume fraction, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

122. Morris, S., McAtee, W., **Capecelatro, J.**, Raghav, V. (2021) Effect of coughing pulsatility on the effectiveness of a surgical mask, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, AZ.

121. Wakefield, J., Pecha, M. B., Ciesielski, P. N., **Capecelatro, J.** (2021) An Open-Source Library for Multi-Step Reactions in Spherical and Cylindrical Particles, 2021 AIChE Annual Meeting, Boston, MA.

120. Lattanzi, A., Tavanashad, V., Subramanian S., **Capecelatro, J.** (2021) Fluid-Mediated Sources to Granular Temperature in Homogeneous Fluidization, 2021 AIChE Annual Meeting, Boston, MA.

119. **Capecelatro, J.**, Beetham, S. (2021) Sparse identification of multiphase turbulence closures for strongly-coupled gas-particle flows, IACM Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology, San Diego, CA. Invited.

118. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2021) Stochastic modeling of drag forces in Euler–Lagrange simulations of particle-laden flows, NETL 2021 Workshop on Multiphase Flow Science, Virtual.

117. Wakefield, J., Lattanzi, A., **Capecelatro, J.** (2021) An open-source library for multi-step reactions in spherical and cylindrical particles, NETL 2021 Workshop on Multiphase Flow Science, Virtual.

116. Yao, Y., Huan, X., **Capecelatro, J.** (2021) Multi-fidelity uncertainty quantification for gas-solid flows, NETL 2021 Workshop on Multiphase Flow Science, Virtual.

115. Beetham, S., Lattanzi, A., **Capecelatro, J.** (2021) Simulation and modeling of thermally evolving, moderately dense gas-particle flows, NETL 2021 Workshop on Multiphase Flow Science, Virtual.

114. Beetham, S., Lattanzi, A., **Capecelatro, J.** (2021) Simulation and modeling of thermally evolving, moderately dense gas-particle flows, 2021 EUROMECH Colloquia (virtual).

113. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2021) Stochastic modeling of drag forces in strongly-coupled particle-laden flows, 2021 EUROMECH Colloquia (virtual).

112. **Capecelatro, J.** (2021) Understanding the fluid dynamics of airborne disease transmission from the microscale to the macroscale, 7th Micro and Nano Flows Conference 2021 (virtual). Invited.

111. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2021) A stochastic Euler-Lagrange (EL) framework for inertial particle suspensions, 2021 SIAM Conference on Computational Science and Engineering (virtual). Invited.

110. Khalloufi, M., Shallcross, G., Lattanzi, A., **Capecelatro, J.** (2021) Quantification of drag statistics for compressible flows past particles at finite Mach number and volume fraction, 2021 AIAA SciTech Forum (virtual).

109. Patel, M., Shallcross, G., Fox, R. O., **Capecelatro, J.** (2021) A Two Equation Eulerian-Lagrangian Model for Simulation of Shock Induced Flow Through Particle Suspensions, 2021 AIAA SciTech Forum (virtual).

108. Yao, Y., **Capecelatro, J.** (2021) Accurate Particle-Mesh Method for Simulating Charged Particles in Wall-bounded Flows, 2021 AIAA SciTech Forum (virtual).

107. **Capecelatro, J.** (2020) Modeling thermal transport in gas-particle flows using machine learning, NSF Workshop: New Frontiers of Thermal Transport (virtual)

106. Khalloufi, M., Shallcross, G., **Capecelatro, J.** (2020) Particle-resolved direct numerical simulations of compressible flows past particles at finite Mach number and volume fraction, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

105. Patel, M., Rubio, J., Ni, R. Rabinovitch, J., **Capecelatro, J.** (2020) Numerical Simulation of Particle-Laden Underexpanded Jets, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

104. Rubio, J., Patel, M., **Capecelatro, J.**, Rabinovitch, J., Ni, R. (2020) Experimental Investigation of Two-Way Coupling in Particle-Laden Compressible Flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

103. Ni, M., Mehrabadi, M., **Capecelatro, J.**, Subramaniam, S. (2020) Residual Terms in the Spatially Filtered Fluid Momentum Equation for a Particle–laden Suspension, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

102. Monroe, K., Lattanzi, A., Yao, Y., Raghav, V., **Capecelatro, J.** (2020) Role of Pulsatility on Aerosol Dispersion in Expiratory Flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

101. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2020) Stochastic methods for capturing dispersion in particle-laden flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

100. Beetham, S., Lattanzi, A., **Capecelatro, J.** (2020) Toward improved heat transfer models for strongly-coupled particle-laden flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

99. Kord, A., **Capecelatro, J.** (2020) A Discrete Adjoint-Based Method for High-Fidelity Simulations of Turbulent Reacting Flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

98. Yao, Y., **Capecelatro, J.** (2020) Numerical modeling of the breakup of cohesive particles by turbulence, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

97. Shallcross, G., **Capecelatro, J.** (2020) An explicit characteristic based immersed boundary method for compressible flows, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Chicago, IL (virtual).

96. Lattanzi, A., Tavanashad, V., Subramaniam, S., **Capecelatro, J.** (2020) Stochastic Drag Formulations for Particle-Laden Flows, 2020 AIChE Annual Meeting, Virtual.

95. Beetham, S., Hacker, K., Lattanzi, A., **Capecelatro, J.** (2020) Heat Transfer in Clustered Gas-Solids Flows, 2020 AIChE Annual Meeting, Virtual.

94. Yao, Y., **Capecelatro, J.** (2020) Numerical Modeling of Deagglomeration of Cohesive Particles By Turbulence, 2020 AIChE Annual Meeting, Virtual.

93. Kord, A., Huang, C., Duraisamy, K., J., **Capecelatro, J.** (2020) Sensitivity of flame characteristics in a coaxial jet using an adjoint-based flamelet-progress variable approach, AIAA Aviation Forum, Virtual (due to COVID-19).

92. Yao, Y., Shallcross, G., Ni, R., Kim, T., Mehta, M., Rabinovitch, J., **Capecelatro, J.** (2020) The dynamics of inertial particles in under-expanded jets: A numerical study, 58th AIAA Aerospace Sciences Meeting, Orlando, FL.

91. Kim, T., Ni, R., **Capecelatro, J.**, Yao, Y., Shallcross, G., Mehta, M., Rabinovitch, J. (2020) The dynamics of inertial particles in underexpanded jets: An experimental study, 58th AIAA Aerospace Sciences Meeting, Orlando, FL.

90. Yao, Y., Rabinovitch, J., **Capecelatro, J.** (2019) Numerical modeling of inertial particles in under-expanded jets, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

89. Lattanzi, A. M., Beetham, S., Fong, K. O., Coletti, F., **Capecelatro, J.** (2019) Clustering of gas-solids flows in a vertical duct, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

88. Shallcross, G., Fox, R. O., **Capecelatro, J.** (2019) Modeling pseudo-turbulence in compressible particle-laden flows, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

87. Beetham, S., **Capecelatro, J.** (2019) Modeling particle-induced turbulence using sparse regression with embedded invariance, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

86. **Capecelatro, J.** (2019) Conveying principles of fluid mechanics... through dance, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

85. Kim, T., Ni, R., **Capecelatro, J.**, Yao, Y., Shallcross, G., Mehta, M., Rabinovitch, J. (2019) Experimental investigation of particle-laden under-expanded jets, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

84. Richter, D., Wang, G., Fong, K. O., Coletti, F., **Capecelatro, J.** (2019) Inertial particle velocity and distribution in vertical turbulent channel flow: a numerical and experimental comparison, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA.

83. Beetham, S., **Capecelatro, J.** (2019) Modeling Particle-Induced Turbulence Using Sparse Regression with Embedded Invariance, 2019 AIChE Annual Meeting, Orlando, FL.

82. **Capecelatro, J.**, Shallcross, G. (2019) Volume-filtered framework for compressible particle-laden flows, AIAA Aviation Forum, Dallas, TX.

81. Shallcross, G., **Capecelatro, J.** (2019) A volume-filtered description of shock-particle interactions, 21st Biennial Conference of the APS Topical Group on Shock Compression of Condensed Matter, Portland, OR.

80. **Capecelatro, J.**, Shallcross, G., Buchta, D. (2019) The sound of two-phase flows: Particle-turbulence effects on the pressure field in high-speed mixing layers, 10th International Conference on Multiphase Flow, Rio de Janeiro, Brazil.

79. Beetham, S., **Capecelatro, J.** (2019) Modeling turbulent flows using sparse regression with embedded invariance, 16th Pan-American Congress of Applied Mechanics, Ann Arbor, MI.

78. Agudelo, C., **Capecelatro, J.**, Wang, Q., Bautell, J. (2019) High-Fidelity Modelling and Characterization of Dynamometer Enclosure Interactions Using a DOE Approach for Brake Emissions Measurements, EuroBrake, Dresden, Germany.

77. Beetham, S., **Capecelatro, J.** (2018) Sparse identification of particle-laden turbulence closures, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA.

76. Kord, A., **Capecelatro, J.** (2018) Controlling multi-component flow instabilities using adjoints, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA.

75. Yao, Y., **Capecelatro, J.** (2018) Theoretical and Numerical Study of Electrohydrodynamic Generation of Atmospheric Turbulence, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA.

74. Shallcross, G., Buchta, D., **Capecelatro, J.** (2018) Sound and turbulence modulation by particles in high-speed shear flows, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA.

73. **Capecelatro, J.** (2018) The role of particle-turbulence interactions on fluid and thermal transport, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA.

72. **Capecelatro, J.** (2018) Data-driven methods for multiphase turbulence modeling, Banff International Research Station, Oaxaca, Mexico.

71. Beetham, S., **Capecelatro, J.** (2018) Data-driven closure framework for multiphase turbulence modeling, NETL 2018 Workshop on Multiphase Flow Science, Houston, TX.

70. **Capecelatro, J.** (2018) Understanding and modeling the effect of clusters on heat transfer in gas-solid suspensions, NETL 2018 Workshop on Multiphase Flow Science, Houston, TX.

69. Shallcross, G., **Capecelatro, J.** (2018) A parametric study of particle-laden shock tubes using an Eulerian-Lagrangian framework, 56th AIAA Aerospace Sciences Meeting, Kissimmee, FL.

68. **Capecelatro, J.**, Shallcross, G., Buchta, D. (2017) The role of particle-turbulence interactions on the pressure field near high-speed shear flows, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

67. Shallcross, G., **Capecelatro, J.** (2017) A volume-filtered formulation to capture particle-shock interactions in multiphase compressible flows, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

66. Yao, Y., **Capecelatro, J.** (2017) Numerical study of charged inertial particles in turbulence using a coupled fluid–P^3M approach, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

65. Kord, A., **Capecelatro, J.** (2017) Manipulating Rayleigh–Taylor growth using adjoints, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

64. Baker, M., **Capecelatro, J.**, Kong, B., Fox, R. O., Desjardins, O. (2017) Modeling of cluster-induced turbulence in particle-laden channel flow, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

63. Kong, B., Patel, R., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2017) Verification of Eulerian–Eulerian and Eulerian–Lagrangian simulations for fluid–particle flows, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

62. Patel, R., Kong, B., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2017) 3-D conditional hyperbolic method of moments for high-fidelity Euler–Euler simulations of particle-laden flows, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO.

61. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2017) Transition between turbulence regimes in particle-laden channel flows, 2017 AIChE Annual Meeting, Minneapolis, MN.

60. Baker, M., Fox, R. O., Kong, B., Desjardins, O., **Capecelatro, J.** (2017) RANS modeling of cluster-induced turbulence in particle-laden channel flow, 2017 AIChE Annual Meeting, Minneapolis, MN.

59. Patel, R., Kong, B., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2017) Verification of Euler-Lagrange and Euler-Euler simulations of meso-scale gas-solid flows, 2017 AIChE Annual Meeting, Minneapolis, MN.

58. Shallcross, G., Buchta, D., **Capecelatro, J.** (2017) An Euler-Lagrange method for compressible multiphase flow with application to water sound suppression, 20th Biennial Conference of the APS Topical Group on Shock Compression of Condensed Matter, St. Louis, Missouri.

57. Buchta, D., **Capecelatro, J.**, Freund, J. B. (2017) Adjoint-based ignition sensitivity in turbulent combustion, 20th Biennial Conference of the APS Topical Group on Shock Compression of Condensed Matter, St. Louis, Missouri.

56. Patel, R., Kong, B., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2017) A comparison of quadrature-based moment methods to Eulerian-Lagrangian methods for particle-laden flows, 3rd International Conference on Numerical Methods in Multiphase Flows, Tokyo, Japan.

55. **Capecelatro, J.**, Yao, Y. (2017) Accurate particle-mesh methods for simulating electrically charged particle-laden flows, 3rd International Conference on Numerical Methods in Multiphase Flows, Tokyo, Japan.

54. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2017) Adjoint-based sensitivity of ignition in high-speed turbulent flows, 23rd AIAA Computational Fluid Dynamics Conference, Denver, CO.

53. **Capecelatro, J.**, Freund, J. B. (2017) Adjoint-based sensitivity of ignition in non-premixed turbulent flows, 2017 SIAM International Conference on Numerical Combustion, Orlando, FL.

52. **Capecelatro, J.**, Buchta, D. (2017) Direct numerical simulation of noise suppression by water injection in high-speed flows, 55th AIAA Aerospace Sciences Meeting, Grapevine, TX.

51. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2017) Adjoint-based sensitivity analysis of ignition in a turbulent reactive shear layer, 55th AIAA Aerospace Sciences Meeting, Grapevine, TX.

50. Goyal, H., **Capecelatro, J.**, Desjardins, O., Pepiot, P. (2017) Impact of clustering on heterogeneous reactions in a riser, 10th U.S. National Combustion Meeting, College Park, MD.

49. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2016) Adjoint-based sensitivity of flames to ignition parameters in non-premixed shear-flow turbulence, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.

48. Kord, A., **Capecelatro, J.** (2016) Adjoint-based approach to Enhancing Mixing in Rayleigh-Taylor Turbulence, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.

47. Shallcross, G., Buchta, D., **Capecelatro, J.** (2016) Particle-turbulence-acoustic interactions in high-speed free-shear flows, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.

46. Kong, B., Patel, R., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) A Comparative Study of Euler-Euler and Euler-Lagrange Mesoscale Simulations of Moderately Dense Cluster-induced Gas-Particle Turbulence, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.

45. Patel, R., Kong, B., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2016) A numerical study of bidisperse particles in cluster-induced turbulence, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR.

44. Fox, R. O., Ireland, P. J., Patel R., **Capecelatro, J.**, Desjardins, O. (2016) Clustering in gas-solid flows: How are clusters modified by shear?, 2016 AIChE Annual Meeting, San Francisco, CA.

43. Kong, B., Patel R., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) A comparative study of Euler-Euler and Euler-Lagrange mesoscale simulations of moderately dense gas-solid flows, 2016 AIChE Annual Meeting, San Francisco, CA.

42. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2016) Recent insights on disperse multiphase turbulence modeling, NETL 2016 Workshop on Multiphase Flow Science, Morgantown, WV.

41. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2016) Adjoint-informed ignition characterization, 24th International Conference on Theoretical and Applied Mechanics, Montreal, Canada.

40. **Capecelatro, J.**, Bodony, D. J., Freund, J. B. (2016) An adjoint-based search method for an ignition threshold, 12th World Congress on Computational Mechanics, Seoul, South Korea.

39. **Capecelatro, J.**, Vishnampet, R., Bodony, D. J., Freund, J. B. (2016) Adjoint-based sensitivity analysis of localized ignition in a non-premixed hydrogen–air mixing layer, 54th AIAA Aerospace Sciences Meeting, San Diego, CA.

38. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2016) Strongly coupled particle-laden flows in vertical channels, 9th International Conference on Multiphase Flow, Florence, Italy.

37. **Capecelatro, J.**, Zhang, W., Fontaine, R., Elliot, G. S., Bodony, D. J., Freund, J. B. (2015) Bypass transition of low-speed boundary layers using realistic sandpaper roughness, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA.

36. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2015) Strongly coupled turbulent gas-particle flows in vertical channels, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA.

35. Ireland, P. J., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2015) Correcting velocity and volume-fraction calculations in two-way-coupled, particle-laden-flow simulations, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA.

34. Kong, B., Feng, H., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2015) Euler-Euler anisotropic Gaussian mesoscale direct numerical simulation of homogeneous and wall-bounded cluster-induce gas-particle turbulence, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA.

33. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2015) Turbulent Gas-Particle Flow in Wall-Bounded Vertical Risers, 2015 AIChE Annual Meeting, Salt Lake City, UT.

32. Ireland, P. J., **Capecelatro, J.**, Fox, R. O., Kasbaoui, M. H., Desjardins, O. (2015) Numerical Simulation of Sheared, Gas-Particle, Cluster-Induced Turbulence, 2015 AIChE Annual Meeting, Salt Lake City, UT.

31. Fox, R. O., **Capecelatro**, Desjardins, O. (2015) Turbulent Gas-Particle Flow in Wall-Bounded Vertical Risers, 2015 AIChE Annual Meeting, Salt Lake City, UT.

30. Kong, B., Feng, H., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2015) Euler-Euler Anisotropic Gaussian Mesoscale Direct Numerical Simulation of Homogeneous and Wall-Bounded Cluster-Induce Gas-Particle Turbulence, 2015 AIChE Annual Meeting, Salt Lake City, UT.

29. Arolla, S., **Capecelatro, J.**, Fox, R. O., Desjardins, O. (2015) Sand Transport Modeling in Multiphase Pipelines Based on Euler-Lagrange Large Eddy Simulation Data, 2015 AIChE Annual Meeting, Salt Lake City, UT.

28. Kong, B., Feng, H., **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2015) Euler-Euler anisotropic Gaussian mesoscale direct numerical simulation of homogeneous cluster-induced gas-particle turbulence, NETL 2015 Workshop on Multiphase Flow Science, Morgantown, WV.

27. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2014) Fluid-particle characteristics in fully-developed cluster-induced turbulence, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA.

26. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2014) Multiphase turbulence in vertical wall-bounded collisional gas-particle flows, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA.

25. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2014) Turbulence modeling of collisional gas-particle flows in wall-bounded risers, 2014 AIChE Annual Meeting, Atlanta, GA.

24. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2014) The role of granular temperature in turbulent gas-particle flows, 2014 AIChE Annual Meeting, Atlanta, GA.

23. Arolla, S., **Capecelatro, J.**, Desjardins, O. (2014) Numerical prediction of critical deposition velocity for turbulent liquid-solid slurry flow through a horizontal pipe, 2014 AIChE Annual Meeting, Atlanta, GA.

22. **Capecelatro, J.**, Desjardins, O. (2014) Turbulence modulation by particle clustering in dilute and moderately dilute channel flows, Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting, Chicago, IL.

21. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2014) Investigating multiphase turbulence statistics of large-scale two-way coupled gravity-driven flows, Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting, Chicago, IL.

20. Desjardins, O., **Capecelatro, J.**, Fox, R. O. (2014) An adaptive filter strategy for extracting multiphase flow statistics from Euler-Lagrange simulations, NETL 2014 Workshop on Multiphase Flow Science, Morgantown, WV.

19. Desjardins, O., **Capecelatro, J.**, Pepiot, P. (2014) Numerical investigation and modeling of reacting gas-solid flows in the presence of clusters, NETL 2014 Workshop on Multiphase Flow Science, Morgantown, WV.

18. **Capecelatro, J.**, Arolla, O., Desjardins, O. (2014) Eulerian-Lagrangian large eddy simulations of liquid-solid slurries, 17th U.S. National Congress on Theoretical & Applied Mechanics, Michigan State University, East Lansing, MI.

17. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2014) Numerical investigation of particle dynamics in cluster-induced turbulent flows, 17th U.S. National Congress on Theoretical & Applied Mechanics, Michigan State University, East Lansing, MI.

16. **Capecelatro, J.**, Desjardins, O. (2013) A study of turbulence modulation by particle clusters in dilute and moderately-dilute channel flows using mesoscale DNS, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA.

15. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2013) Evaluating multiphase turbulence statistics using mesoscale DNS of gravity-driven particle-laden flows, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA.

14. Arolla, S., **Capecelatro, J.**, Desjardins, O. (2013) Eulerian-Lagrangian large eddy simulations of dense liquid-solid slurry flow through a horizontal pipe, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA.

13. **Capecelatro, J.**, Desjardins, O., Fox, R. O. (2013) Turbulence Modeling of Collisional Gas-Particle Flows, 2013 AIChE Annual Meeting, San Francisco, CA.

12. **Capecelatro, J.**, Desjardins, O., Pepiot, P., Jarvis, M., Foust T. (2013) Numerical Investigation of Multiphase Dynamic Effects in Catalytic Upgrading of Biomass Pyrolysis Vapor, 2013 AIChE Annual Meeting, San Francisco, CA.

11. **Capecelatro, J.**, Desjardins, O. (2013) A fully coupled multiscale approach for simulating fluid-particle flows, NETL 2013 Workshop on Multiphase Flow Science, Morgantown, WV.

10. Fox, R. O., **Capecelatro, J.**, Desjardins, O. (2013) Validation of a multiphase turbulence model using mesoscale DNS of gravity-driven gas-particle flow, NETL 2013 Workshop on Multiphase Flow Science, Morgantown, WV.

9. **Capecelatro, J.**, Jarvis, M., Desjardins, O. (2013) A numerical investigation of turbulent particle-laden flows in vertical risers, 8th International Conference on Multiphase Flow, Jeju, Korea.

8. **Capecelatro, J.**, Desjardins, O. (2012) A numerical investigation of cluster fall velocity in vertical particle-laden turbulent pipe flow, 65th Annual Meeting of the APS Division of Fluid Dynamics, San Diego, CA.

7. **Capecelatro, J.**, Desjardins, O. (2012) Detailed investigation of clustering in riser flows using an Euler-Lagrange approach, 244th ACS National Meeting & Exposition, Philadelphia, PA.

6. Malhotra, K., Pepiot, P., **Capecelatro, J.**, Desjardins, O. (2012) Impact of feed injection strategies on fluidization dynamics for biomass thermochemical conversion, 244th ACS National Meeting & Exposition, Philadelphia, PA.

5. **Capecelatro, J.**, Desjardins, O. (2012) A massively parallel Euler-Lagrange strategy for simulating fluidized bed reactors, NETL 2012 Workshop on Multiphase Flow Science, Morgantown, WV.

4. **Capecelatro, J.**, Desjardins, O., Pepiot, P. (2011) Large-scale simulations of realistic fluidized bed reactors using novel numerical methods, 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, MD.

3. Desjardins, O., **Capecelatro, J.** (2011) Large-scale Eulerian-Lagrangian simulations of turbulent particle-laden riser flows, 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, MD.

2. Pepiot, P., **Capecelatro, J.**, Desjardins, O. (2011) Effect of particle devolatilization on bed dynamics during biomass thermochemical conversion, 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, MD.

1. **Capecelatro, J.**, Pepiot, P., Desjardins, O. (2010) Eulerian-Lagrangian simulation of three-dimensional turbulent riser flows, 63rd Annual Meeting of the APS Division of Fluid Dynamics, Long Beach, CA.

Invited Talks

04/2024 "Recent advancements in modeling turbulent particle-laden flows," Civil and Environmental Engineering Seminar, University of Pittsburgh

10/2023 "Recent progress in modeling gas-particle compressible flows with applications in spacecraft landings," Aerospace and Ocean Engineering Seminar, Virginia Tech

10/2023 "Simulation and modeling of particle-laden turbulent compressible flows," Aerospace Seminar, University of Illinois Urbana-Champaign

07/2023 "Towards robust turbulence models for strongly-coupled gas-particle flows," IUTAM Symposium on turbulent structure and particles-turbulence interaction, Lanzhou, China

06/2023 "Recent progress in simulation and modeling of gas-particle flows," 11th International Fine Particle Research Institute (IFPRI) Workshop on Particle Technology, Lafayette, IN

05/2023 "New subgrid-scale models for turbulent particle-laden flows," Fluid dynamics colloquia, Eidgenössische Technische Hochschule (ETH), Zürich, Switzerland

01/2023 "Simulation and modeling of turbulent particle-laden flows," University of Waterloo Mechanical and Mechatronics Engineering Research Seminar, Virtual

11/2022 "Gas-particle dynamics in high-speed flows: insights from 18th-century cannon firings to particle-resolved simulations," International Journal of Multiphase Flow (IJMF) Spotlight seminars, Virtual

11/2022 "Turbulent disperse two-phase flows: simulations and data-driven modeling," Laboratoire des Ècoulements Gèophysiques et Industriels (LEGI) Sèminaires, Grenoble, France

10/2022 "Simulation and modeling of high-speed gas-particle flows: insights from 18th-century cannon firings to particle-resolved simulations," University of Southampton Aero/Astro Seminar, Southampton, UK

10/2022 "Turbulent disperse two-phase flows: simulations and data-driven modeling," Applied Mathematics Seminar, Imperial College London, London, UK

10/2022 "Turbulent disperse two-phase flows: simulations and data-driven modeling," Department of Applied Science and Technology (DISAT), Politecnico di Torino, Italy

09/2022 "Drag and turbulence in particle-laden compressible flows: insights from 18th-century cannon firings to particle-resolved simulations," Arizona State University Fluid Seminar, Virtual

01/2022 "Modeling particle-laden compressible flows with application to plume-surface interactions," Advanced Modeling and Simulation (AMS) Seminar Series, NASA Ames Research Center

10/2021 "Challenges and opportunities in modeling high-speed gas-particle flows," Multiphase Flows – Advances and Future Directions, Complex Systems and Dynamics Group at the Indian Institute of Technology, Madras

08/2021 "Turbulent disperse two-phase flows: simulations and data-driven modeling," Data-driven physical simulation seminar, Lawrence Livermore National Laboratory

05/2021 "Turbulence modeling of strongly-coupled gas-particle flows," Mechanical and Aerospace Engineering Fluid Mechanics, Combustion, & Engineering Physics Webinar Series, University of California San Diego

05/2021 "Addressing challenges of COVID-19 through the lens of fluid dynamics," COVID-19 Modeling Symposium organized by the Michigan Institute for Computational Discovery & Engineering (MICDE) and the School of Public Health at the University of Michigan

04/2021 "Turbulence modeling of strongly-coupled gas-particle flows," Fluid Mechanics in the Spirit of G.K. Batchelor Webinar Series, Cambridge, UK

02/2021 "Stochastic Modeling of Dense Particle Suspensions," Applied Interdisciplinary Mathematics (AIM) Seminar, University of Michigan

10/2020 "Simulation and modeling of high-speed disperse two-phase flows," Mechanical and Civil Engineering Seminar Series, Caltech

10/2020 "Simulation and modeling of high-speed disperse two-phase flows," Jack and Ann Waddey Seminar, Auburn University

09/2020 "Simulation and modeling of high-speed disperse two-phase flows," Chair's Distinguished Lecture Series, Aerospace Engineering, University of Michigan

09/2020 "Simulation and modeling of turbulent particle-laden flows: COVID19 and Mars2020," Frontiers in Mechanical Engineering and Sciences, A Multi-University Webinar Series

12/2019 "Simulation and modeling of strongly-coupled gas-particle flows," ME 100/200 Fall seminar, University of California Santa Barbara

08/2019 "Using supercomputers to understand and predict emergent structures in particle-laden flows," Division 35 Technical Seminar Series, Jet Propulsion Laboratory, Pasadena, CA

02/2019 "Towards understanding and modeling disperse multiphase flows in engineering-relevant regimes," Center for Environmental & Applied Fluid Mechanics Seminar, Johns Hopkins University

11/2018 "Towards understanding and modeling turbulent reacting particle-laden flows," Chemical and Biomolecular Engineering Seminar, Ohio State University

10/2018 "Big data challenges in understanding and modeling multiphase flows," 2018 Symposium of the Center for Network and Storage Enabled Collaborative Computational Science, University of Michigan

08/2018 "The peculiar behavior of particle-laden flows and their role in heat and momentum transfer," Mechanical engineering seminar series, Iowa State University

01/2018 "Towards Accurate and Tractable Methods of Disperse Multiphase Flows in Extreme Environments," Michigan Institute for Computational Discovery & Engineering Seminar, University of Michigan

08/2016 "Adjoint-based methods for optimization and UQ of multiphase flows," National Energy Technology Laboratory Technical Seminar

02/2016 "Particles, turbulence, and adjoint-based sensitivity: targeting energy and environmental challenges with high-performance computing," Mechanical engineering seminar series, University of New Hampshire

01/2016 "Particles, turbulence, combustion, and adjoint-based sensitivity: targeting energy challenges with high-performance computation," Mechanical engineering seminar series, University of Michigan

07/2015 "Towards predictive simulations of plasma-assisted ignition of a fuel jet in a turbulent crossflow," Turbulence seminar, Los Alamos National Lab

09/2014 "Recent progress in understanding disperse multiphase flows: a theoretical formalism and numerical study of cluster-induced turbulence," Fluid mechanics seminar, University of Illinois Urbana-Champaign

05/2014 "Methods for simulating large-scale particle-laden flows with applications in energy conversion processes," University of Illinois Urbana-Champaign

03/2014 "Using supercomputers to study biofuel production and injection," US Military Academy, West Point, NY

02/2014 "Exploring multiphase dynamics in energy conversion systems using super computers," Mechanical Engineering seminar series, Binghamton University

06/2013 "Exploring turbulent particle-laden flows using large-scale numerical simulations," È cole Centrale Paris, EM2C Laboratory, Paris, France

Teaching Experience

University of Michigan

2023 **Faculty Mentor**, *Multidisciplinary Design Program*.

2023 **Instructor**, *Advanced Fluid Mechanics II*, ME 521 (graduate).

2016–2018, 2020, 2021 **Instructor**, *Computational Fluid Dynamics*, ME 523 (graduate).

2021 **Instructor**, *Laboratory II*, ME 495 (undergraduate).

2019–2020 **Co-instructor**, *Professional Skills for Graduate Student Success*, ME 599 (graduate).

2019, 2021 **Instructor**, *Multiphase Flow*, ME 527 (graduate).

2017–2020, 2022 **Instructor**, *Introduction to Fluid Mechanics*, ME 320 (undergraduate).

University of Colorado

2010–2011 **Teaching Assistant**, *Flow Visualization*, MCEN 4151/5151 (undergraduate/graduate).

2010 **Teaching Assistant**, *Wind Energy*, MCEN 5228 (undergraduate/graduate).

2009 **Teaching Assistant**, *Fluid Mechanics*, MCEN 3021 (undergraduate).

Research Funding

2024–2027 **Integrating Data-Driven and Physics-Based Models for Plume-Surface Interaction Predictions**.
- Role: Co-PI
- Sponsor: National Aeronautics and Space Administration (NASA)
- Program: Early Stage Innovations
- Amount: $650,000

2024–2027 **Development of a multiscale modeling framework for colloidal fluids in battery electrode slurry mixing process**.
- Role: PI
- Sponsor: Ford Motor Company
- Amount: $226,992

2023–2026 **Advanced Subgrid-Scale Models for Particle Transport and Deposition in Gas Turbines**.
- Role: PI
- Sponsor: Office of Naval Research (ONR)
- Amount: $673,339

2024 **Measurement and Modeling of Detonation Through Dusty Environments**.
- Role: Co-PI
- Sponsor: CFD Research Corporation
- Program: Defense Threat Reduction Agency (DTRA) SBIR Phase I
- Amount: $55,000

2023–2024 **Particle agglomeration and needle clogging modeling (multiphase flow simulations)**.
- Role: PI
- Sponsor: Merck and Company, Inc.
- Amount: $75,000

2022–2025 **REMEDY using Systems of Advanced Burners for Reduction of Emissions (SABRE)**.
- Role: Co-PI
- Sponsor: Department of Energy (ARPA-E)
- Amount: $2,881,762

2022–2023 **Flow characterization in novel needle designs to enhance the delivery of high-viscosity large-volume therapeutics**.
- Role: Co-PI
- Sponsor: Merck and Company, Inc.
- Amount: $75,000

2021–2024 **Predictive hydrodynamics model & experimental database for circulating fluidized bed of Geldart group A particles**.
- Role: PI
- Sponsor: The Dow Chemical Company
- Amount: $1,231,671

2022–2023 **Next generation computational tools for particle-laden biological flows in subject-specific geometries**.
- Role: PI
- Sponsor: College of Engineering, University of Michigan
- Program: Seeding To Accelerate Research Themes (START)
- Amount: $30,000

2021–2022 **Next generation computational tools for particle-laden biological flows in subject-specific geometries**.
- Role: PI
- Sponsor: Michigan Institute for Computational Discovery and Engineering (MICDE)
- Program: MICDE Catalyst Grant
- Amount: $42,000

2021–2024 **Collaborative Research: Effect of Pulsatility on Expiratory Droplet-Laden Flows**.
- Role: Co-PI
- Sponsor: National Science Foundation
- Program: CBET – Fluid Dynamics
- Amount: $222,228

2021–2022 **Quantifying Risk and Uncertainty of Indoor Airborne Transmission of COVID-19**.
- Role: PI
- Sponsor: College of Engineering, University of Michigan
- Program: CoE COVID-19 Skunkworks Initiative
- Amount: $150,000

2020–2022 **Measurement and Modeling of High Speed Polydisperse Granular Flow Under Plume/Surface Interaction Conditions**.
- Role: Co-PI
- Sponsor: CFD Research Corporation
- Program: NASA SBIR Phase II
- Amount: $109,105

2020–2021 **Mathematical Model for Cascading Reactions in Cylindrical Pellets**.
- Role: PI
- Sponsor: National Renewable Energy Laboratory (NREL)
- Amount: $50,000

2020–2022 **Modeling gas-particle flows for lunar and planetary landing: A review and future perspectives**.
- Role: PI
- Sponsor: National Aeronautics and Space Administration (NASA)
- Amount: $115,000

2020–2023 **Collaborative Research: CDS&E: Advances in closure modeling for turbulent flows with finite-sized particles informed by massive simulations on heterogenous architectures**.
- Role: Co-PI
- Sponsor: National Science Foundation
- Program: Computational and Data-Enabled Science and Engineering (CDS&E)
- Amount: $205,365

2019–2024 **CAREER: Towards Understanding and Modeling Turbulent Reacting Particle-Laden Flows**.
- Role: PI
- Sponsor: National Science Foundation
- Program: CBET – Particulate & Multiphase Processes
- Amount: $505,489

2020–2022 **Multiscale Modeling to Enable Physics-Based Simulations of Plume-Surface Interactions with Quantified Uncertainty**.
- Role: PI
- Sponsor: National Aeronautics and Space Administration (NASA)
- Program: Early Stage Innovations
- Amount: $523,449

2019–2022 **High-Fidelity Modeling of Particulate Transport and Deposition in Extreme Environments**.
- Role: PI
- Sponsor: Office of Naval Research (ONR)
- Program: Young Investigator Program
- Amount: $513,081

2019–2022 **Collaborative Research: Bridging the Gap Between Particle-Scale Thermal Transport and Device-scale Predictions**.
- Role: PI
- Sponsor: National Science Foundation
- Program: CBET – Thermal Transport Processes
- Amount: $239,350

2019–2020 **Dynamic data-driven model development (DDMD) of acoustically forced shear coaxial jets**.
- Role: PI
- Sponsor: Engineering Research and Consulting
- Program: Air Force Research Laboratory subcontract
- Amount: $29,879

2019–2020 **Measurement and Modeling of High Speed Polydisperse Granular Flow Under Plume/Surface Interaction Conditions**.
- Role: Co-PI
- Sponsor: CFD Research Corporation
- Program: NASA SBIR Phase I
- Amount: $12,968

2019–2020 **Towards Validated, Accurate, & Predictive Simulations of High-Speed Particle-Laden Flows**.
- Role: Co-PI
- Sponsor: National Aeronautics and Space Administration (NASA)
- Program: Jet Propulsion Lab Center Innovation Fund (CIF)
- Amount: $136,000

2018–2019 **Computational Characterization of Link Engineering Brake System Particulate Emissions Test Facility**.
- Role: PI
- Sponsor: Link Engineering
- Amount: $18,584

2017–2021 **High Fidelity Modeling of Plume-Induced Soil Erosion During Lunar and Planetary Landing**.
- Role: PI
- Sponsor: National Aeronautics and Space Administration (NASA)
- Program: NASA Space Technology Research Fellowship (student: Gregory Shallcross)
- Amount: $298,889

2016–2019 **Center for Exascale Simulation of Plasma-Coupled Combustion**.
- Role: PI
- Sponsor: University of Illinois-Urbana-Champaign (subcontract)
- Prime Sponsor: Department of Energy – National Nuclear Security Administration
- Amount: $207,693

2017 **Advanced Multiphase Combustion Library for Modeling Liquid Fuel Sprays**.
- Role: PI
- Sponsor: Metacomp Technologies, Inc.
- Program: Naval Air Warfare Center Aircraft Division SBIR
- Amount: $54,000

Computational Grants

2020–2022 **XSEDE – CTS200008**, *Simulation and Modeling of Strongly-Coupled Particle-Laden Flows*, TACC Stampede 2, Awarded 41.480M CPU-hours (estimated value $316,596.88).

2020–2021 **NASA Advanced Supercomputing**, *Multiscale Modeling to Enable Physics-Based Simulations of Plume-Surface Interactions with Quantified Uncertainty*, Pleiades, Awarded 2.6M CPU-hours.

2019–2020 **NASA Advanced Supercomputing**, *Towards Validated, Accurate, & Predictive Simulations of High-Speed Particle-Laden Flows*, Pleiades, Awarded 6.1M CPU-hours.

2017–2018 **INCITE (DOE)**, *Demonstration of Noise Suppression by Water Injection in High-Speed Flows with Direct Numerical Simulations*, OLCF Titan, Rhea, and EOS, Awarded 0.73M CPU-hours.

Ph.D. Dissertations Supervised

Jan 2022 **Ali Kord**, *Adjoint-Based Sensitivity and Optimization of Turbulent Reacting Flows*.
First employment: Research Scientist at Corning

Aug 2021 **Gregory Shallcross**, *Modeling Particle-Laden Compressible Flows with an Application to Plume-Surface Interactions*.
First employment: Contamination Control Engineer at Jet Propulsion Laboratory

Aug 2021 **Sarah Beetham**, *Turbulence Modeling of Strongly-Coupled Particle-Laden Flows*.
First employment: Assistant Professor at Oakland University

May 2021 **Yuan Yao**, *Transport and Deposition of Fine Particulates in Turbulence: Numerical Modeling and Uncertainty Quantification*.
First employment: Senior Research Specialist at Dow Chemical

Reviewer Service

Proposal Reviewer Service.

- NSF (CBET – Fluid Dynamics, Particulate and Multiphase Processes, Thermal Transport Processes, EPSCoR)
- NASA (NASA Space Technology Research Fellowships)
- DOE (DOE Office of Fossil Energy)
- ACS (Petroleum Research Fund)

Journal Reviewer Service.

Nature Communications, Journal of Fluid Mechanics, Physical Review Fluids, Physics of Fluids, International Journal of Multiphase Flow, International Journal of Heat and Mass Transfer, Journal of Computational Physics, Computers and Fluids, Journal of Fluids Engineering, American Institute of Chemical Engineers, Chemical Engineering Science, Canadian Journal of Chemical Engineering, Powder Technology, Combustion & Flame, Energy & Fuels, PLOS One

Committee Service

Departmental

2023–2024 **Member**, *Department of Mechanical Engineering*, Advisory Committee.

2019–2023 **Member**, *Department of Mechanical Engineering*, Undergraduate Program Committee.

2018–2019 **Chair**, *Department of Mechanical Engineering*, Seminar Committee.

2017–2018 **Coordinator**, *Department of Mechanical Engineering*, Junior Faculty Mentoring Luncheon.

2016–2021 **Member**, *Department of Mechanical Engineering*, Seminar Committee.

University

2024– **Member**, *University of Michigan*, Michigan Institute of Computational Discovery and Engineering (MICDE) Management and Education Committee.

2023– **Member**, *University of Michigan*, Senate Assembly.

2023– **Member**, *University of Michigan*, Research Advisory Committee.

2020 **Member**, *University of Michigan*, Online Academic Integrity Committee.

2020 **Member**, *University of Michigan*, COVID-19 Rapid Response Steering Committee.

2017–2018 **Member**, *University of Michigan*, Advanced Research Computing Advisory Team (ARCAT).

National/International

2023–2025 **Member**, *Journal of Aerosol Science*, Editorial Advisory Board.

2023– **Member**, *American Physical Society*, Division of Fluid Dynamics Media and Science Relations Committee.

2018–2020 **Chair**, *American Physical Society*, Division of Fluid Dynamics Educational & Career Outreach Committee.

2018–2019 **Member**, *American Physical Society*, International Research Travel Award Program (IRTAP) Proposal Review Committee.

Professional Affiliations

American Institute of Aeronautics and Astronautics (AIAA)
American Institute of Chemical Engineers (AIChE)
American Physical Society (APS)
American Society of Mechanical Engineering (ASME)
US Association for Computational Mechanics (USACM)