

Gavin Pandya, Ph.D.

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🔗 Applied mathematician specializing in theoretical and computational fluid dynamics, numerical methods for flows with discontinuities, boundary integral vortex methods, and multiphase flows. Collaboratively minded, and interested in the intersection of theory, experiment, and computation.

Publications

1. **G. Pandya**, S. Shkoller, and V. Vicol, “Computational shock formation for the 2d compressible Euler equations,” *In Preparation*, 2025.
 2. K. R. Chickering, R. C. Moreno-Vasquez, and **G. Pandya**, “Asymptotically self-similar shock formation for 1d fractal Burgers’ equation,” *SIAM Journal on Mathematical Analysis*, vol. 55, no. 6, pp. 7328–7360, 2023. 🔗
 3. **G. Pandya** and S. Shkoller, “Interface models for three-dimensional Rayleigh–Taylor instability,” *Journal of Fluid Mechanics*, vol. 959, A10, 2023. 🔗
 4. S. Ding, D. Helliwell, **G. Pandya**, and A. Yae, “Further study on domains and quasihyperbolic distances,” *Journal of Inequalities and Applications*, vol. 2022, no. 1, p. 140, 2022. 🔗
 5. S. Ding, D. Helliwell, **G. Pandya**, and A. Yae, “Integral norm inequalities for various operators on differential forms,” *Frontiers in Functional Equations and Analytic Inequalities*, pp. 677–693, 2019.
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Experience

2020–2025 **Graduate Student Researcher**, Department of Mathematics, UC Davis.

1. Developed a suite of interface models for 3D Rayleigh-Taylor instability. Compared against experimental data and studied ensemble statistics of randomly initialized simulations. 🎧
2. Led a project on simulating the detailed flow structure leading up to shock formation in compressible gas dynamics. Compared against known self-similarity results. 🖥️
3. Developed hybrid Eulerian-interfacial vortex model for contact discontinuities in compressible flow, with applications to Rayleigh-Taylor and Richtmyer-Meshkov instability. 🖥️

2021/2022 **Graduate Student Intern**, Los Alamos National Laboratory.

1. Developed vortex method for rising bubbles, exhibiting 100x speedup over existing methods. Helped integrate this method into LANL’s high-performance multiphysics code FIESTA. 🎧
 2. Implemented and optimized novel moving mesh methods for flow simulation, culminating in a adaptive Lagrangian-Eulerian (ALE) code for compressible gas dynamics. 🎧
 3. Developed an immersed boundary numerical method for fluid-structure interaction in highly compressible flow, designed to model timeseries data from laboratory experiments on shock waves and acoustic waves emitted by high Mach number vibrating bodies. 🖥️
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Education

2020–2025 **Ph.D., University of California, Davis** Mathematics.

Thesis: *Efficient models for Rayleigh-Taylor and Richtmyer-Meshkov instability.* 🔗

2016-2020 **B.S., Seattle University** Mathematics.

Thesis: *Stable maps and their singularities.*