

# Ben Wilfong

## 1 Basic Information

**Title:** Graduate Research Assistant

**Citizenship:** United States of America

 Georgia Institute of Technology

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 [benwilfong.com](http://benwilfong.com)

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**Research Interests:** Computational fluid dynamics, multiphase fluid dynamics, high performance computing, GPU accelerated computing, distributed computing, numerical methods for PDEs, scientific computing

## 2 Education

 Georgia Institute of Technology

(In Progress) Doctor of Philosophy, Computational Science and Engineering

*Advisor:* Dr. Spencer Bryngelson

*Relevant coursework:* High Performance Computing (S24), Turbulent Fluid Flows (S24), Iterative Methods for Systems of Equations (F23), Numerical Linear Algebra (S23), Viscous Fluid Flows (F22)

 Rose-Hulman Institute of Technology

(2022) Bachelor of Science, Mechanical Engineering and Computational Science

## 3 Experience

 Weapons and Complex Integration Intern

June 2022 – August 2022

**Institution:** Lawrence Livermore National Laboratory

**Supervisor:** Dr. Kyle Sinding

**Duties:** Perform finite element simulation using LLNL's HPC resources using ALE3D, generate case files and input data, post-process data to gather useful quantities of interest like shock wave arrival time and pressure profiles

 EERE High Performance Computing for Manufacturing Intern

June 2021 – August 2021

**Institution:** Lawrence Livermore National Laboratory in collaboration with Oak Ridge Institute for Science and Education (ORISE)

**Supervisor:** Dr. John Karnes

**Duties:** Perform molecular dynamics simulations using LLNL's HPC resources using LAMMPS, generate case files and input data, post-process data to gather useful quantities of interest like reaction rates and percent conversion

## 4 Awards

 (2025) ACM Gordon Bell Prize Finalist (*Simulating many-engine spacecraft: Exceeding 1 quadrillion degrees of freedom via information geometric regularization*)

- ❶ (2025) OLCF User Meeting Best Data Visualization Award 1<sup>st</sup> Place
- ❶ (2024) CRNCH Fellowship for Novel Computing Paradigms and Hierarchies
- ❶ (2022) Georgia Tech Presidents Fellowship
- ❶ (2018-22) Deans List, Rose-Hulman Institute of Technology

## 5 Professional activity

### 5.1 Memberships

- (2024-Present) Association for Computing Machinery (ACM), Member
- (2024-Present) American Physical Society (APS), Member

## 6 Service and Outreach

- (2025) SC25 student volunteer
- (2023-Present) Presidents undergraduate research award reviewer
- (2023-24) CSE Graduate Student Association vice-president
- (2022-23) CSE Graduate Student Association events officer

## 7 Media

The following media mentions work that I have made significant contributions to.

- (2025) Is it Rocket Science [LINK]
- (2025) Fluid Flow Simulation on Frontier earns Gordon Bell Finalist Selection [LINK]
- (2025) Shock Treatment for CFD Simulation [LINK]
- (2025) The OLCF's Problem Busters [LINK]
- (2023) Group Optimizes Fluid Dynamics Simulator on World's Fastest Supercomputer [LINK]

## 8 Publications

### 8.1 Preprints

- [PP2] B. Wilfong, A. Radhakrishnan, H. Le Berre, D. J. Vickers, T. Prathi, N. Tselepidis, B. Dorschner, R. Budiardja, B. Cornille, S. Abbott, F. \*Schäfer, and S. H. \*Bryngelson (2025). “Simulating many-engine spacecraft: Exceeding 1 quadrillion degrees of freedom via information geometric regularization”. arXiv:2505.07392, \*Equal contribution. DOI: [10.48550/arXiv.2505.07392](https://doi.org/10.48550/arXiv.2505.07392)
- [PP1] B. \*Wilfong, H. \*Le Berre, A. \*Radhakrishnan, A. Gupta, D. Vaca-Revelo, D. Adam, H. Yu, H. Lee, J. R. Chreim, M. Carcana Barbosa, Y. Zhang, E. Cisneros-Garibay, A. Gnanaskandan, M. Rodriguez Jr., R. D. Budiardja, S. Abbott, T. Colonius, and S. H. Bryngelson (2025). “MFC 5.0: An exascale many-physics flow solver”. \*Equal contribution. DOI: [10.48550/arXiv.2503.07953](https://doi.org/10.48550/arXiv.2503.07953)

## 8.2 Archival, heavily referred papers

- [P2] T. Chu, B. Wilfong, T. Koehler, R. M. McMullen, and S. H. Bryngelson (2025b). “Competing mechanisms at vibrated interfaces of density-contrast fluids”. In: *Physical Review Fluids* 10 (9), p. 093904. DOI: [10.1103/r9b3-psg4](https://doi.org/10.1103/r9b3-psg4)
- [P1] A. Radhakrishnan, H. Le Berre, B. Wilfong, J.-S. Spratt, M. Rodriguez Jr., T. Colonius, and S. H. Bryngelson (2024). “Method for portable, scalable, and performant GPU-accelerated simulation of multiphase compressible flow”. In: *Computer Physics Communications* 302, p. 109238. DOI: [10.1016/j.cpc.2024.109238](https://doi.org/10.1016/j.cpc.2024.109238)

## 8.3 Conference papers

- [C3] B. Wilfong, A. Radhakrishnan, H. A. Le Berre, T. Prathi, S. Abbott, and S. H. Bryngelson (2025). “Testing and benchmarking emerging supercomputers via the MFC flow solver”. In: *Proceedings of the SC '25 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis*. DOI: [10.48550/arXiv.2509.13575](https://doi.org/10.48550/arXiv.2509.13575)
- [C2] B. Wilfong, A. Radhakrishnan, H. A. Le Berre, S. Abbott, R. D. Budiardja, and S. H. Bryngelson (2024). “OpenACC offloading of the MFC compressible multiphase flow solver on AMD and NVIDIA GPUs”. In: *Proceedings of the SC '24 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis*. DOI: [10.1109/SCW63240.2024.00242](https://doi.org/10.1109/SCW63240.2024.00242)
- [C1] B. A. Wilfong, R. McMullen, T. Koehler, and S. H. Bryngelson (2024). “Instability of Two-Species Interfaces via Vibration”. In: *AIAA AVIATION FORUM AND ASCEND 2024*. DOI: [10.2514/6.2024-4480](https://doi.org/10.2514/6.2024-4480)

## 8.4 Conference Abstracts

- [A8] B. Wilfong, T. Chu, R. McMullen, T. Koehler, and S. H. Bryngelson (2025). “Euler–Lagrange simulations of near-surface gas transport in vibrated bubbly flows”. In: *75th Annual Meeting of the APS Division of Fluid Dynamics (APS DFD)*
- [A7] T. Chu, B. Wilfong, T. Koehler, R. McMullen, and S. H. Bryngelson (2025a). “Competing mechanisms at vibrated interfaces of density-contrast fluids”. In: *75th Annual Meeting of the APS Division of Fluid Dynamics (APS DFD)*
- [A6] S. H. Bryngelson, B. Wilfong, A. Radhakrishnan, and Schäfer F. (2025). “Simulating shock-laden and multiphase flows interface without tracking or dissipation”. In: *75th Annual Meeting of the APS Division of Fluid Dynamics (APS DFD)*
- [A5] S. H. Bryngelson, B. Wilfong, and A. Radhakrishnan (2025). “Numerics for diverse exascale platforms with application to multi-phase and species flow”. In: *18th U.S. National Congress on Computational Mechanics (USNCCM)*
- [A4] A. Radhakrisnan, H. Le Berre, B. Wilfong, R. Budiardja, S. Abbott, and S. H. Bryngelson (2025). “Compressible flow simulations on Frontier and El Capitan architectures”. In: *APS Global Physics Summit*
- [A3] S. H. Bryngelson, A. Radhakrishnan, and B. Wilfong (2025). “Solving Navier–Stokes-like problems with discontinuous features via information geometric regularization”. In: *3rd Virtual UNCG PDE Conference of 2025*
- [A2] B. Wilfong, T. Chu, R. McMullen, T. Koehler, and S. H. Bryngelson (2024). “Hydrodynamic instability and breakup of a liquid-gas interface via vibration”. In: *74th Annual Meeting of the APS Division of Fluid Dynamics (APS DFD)*

- [A1] B. Wilfong, A. Radhakrishnan, and S. H. Bryngelson (2024). “Multiphase flow numerics: Perspectives from exascale simulation”. In: *5th International Conference on Numerical Methods for Multiphase Flow (ICNMMF)*

## 9 Skills

- *Programming Languages/Paradigms:* Fortran, OpenACC, MPI, Matlab, Bash
- *Software and Tools:* Paraview, VisIt, Solidworks, SLURM, PBS, Nsys Systems, Nsight Compute, RocProf, Omniperf, fypp