Spencer H. Bryngelson

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Education

- (Dec. 2017) Ph.D., Theoretical & Applied Mechanics, University of Illinois at Urbana–Champaign
- (2015) M.S., Theoretical & Applied Mechanics, University of Illinois at Urbana–Champaign
- (2013) B.S., Mechanical Engineering & Engineering Mathematics, University of Michigan–Dearborn

Research positions

- (2021–Present) Assistant Professor, School of Computational Science & Engineering, College of Computing, Georgia Institute of Technology
- (2022) Visiting Scholar, Stanford University, Center for Turbulence Research
- (2018–21) Senior Postdoctoral Scholar, California Institute of Technology
- (2019) Visiting Researcher, Massachusetts Institute of Technology
- (2017–18) Postdoctor Researcher, XPACC (PSAAP II)
- (2013–17) Graduate Research Fellow, University of Illinois at Urbana–Champaign

Awards (abbreviated)

- (2022–23) Georgia Tech Faculty Writing Scholar
- (2022–23) Class of 1969 Teaching Fellow, Georgia Institute of Technology
- (2022) Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge National Lab
- (2017) Stanley Weiss Outstanding Dissertation Award, University of Illinois at Urbana–Champaign
- (2016) Hassan Aref Award (research in fluid mechanics), University of Illinois at Urbana–Champaign
- (2015) Alumni Teaching Fellowship, University of Illinois at Urbana–Champaign

Abbreviated funding history

- (2022–26) PI: DOD ONR, "*Stochastic framework for cavitating flows*"
- (2022–23) PI: DOE ORAU Powe, "*A methodologically coherent multi-scale model for multiphase flow*"
- (2022–24) co-PI: GTRI IRAD, "*Quantum optimization for lattice Boltzmann simulation*"
- (2022–23) PI: GT Seed Grant, "*Quantum computing for next-generation engineering simulation*"
- (2022–23) PI: Georgia Tech Quantum Alliance, "*Quantum algorithms for fluid flow simulation*"
- (2021–23) PI: OLCF Allocation, "*Accelerated sub-grid multi-component flow physics*"
- (2022) PI: NVIDIA Academic Hardware Grant Program (4x BlueField-2 E-Series DPU, 2x A100-80)
- (2022) PI: Georgia Tech Tech. Fee "*ARM HPC Dev Kits for next-generation supercomputing*" (10 NVIDIA ARM HPC Dev. Kits, $240K value)
- (2022) PI: Gift: AMD MI200-series GPU Server
- (2022) PI: Stanford CTR Summer Program "*Fast macroscopic forcing for operator recovery via locality and causality with application to compressible and multiphase flow*"

Papers

[1] Elwasif, W., S. Bastrakov, S. H. Bryngelson, et al. (2022). "Early application experiences on a modern GPU-accelerated Arm-based HPC platform". arXiv: 2209.09731.

[2] Firouznia, M., S. H. Bryngelson, and D. Saintillan (2022). "A spectral boundary integral method for simulating electrohydrodynamic flows in viscous drops". arXiv: 2210.04957.

[3] Panchal, A., S. H. Bryngelson, and S. Menon (2022). "A seven-equation diffused interface method for resolved multiphase flows". arXiv: 2204.08637.

[4] Zeng, Q., S. H. Bryngelson, and F. Schäfer (2022). "Competitive physics informed networks". arXiv: 2204.11144.

[5] Bryngelson, S. H., R. O. Fox, and T. Colonius (2021). "Conditional moment methods for polydisperse cavitating flows". arXiv: 2112.14172.

[6] Charalampopoulos, A., S. H. Bryngelson, T. Colonius, et al. (2022). "Hybrid quadrature moment method for accurate and stable representation of non-Gaussian processes and their dynamics". *Philosophical Transactions of the Royal Society A* **380** 2229.

[7] Chrit, F. E., S. Kocherla, A. Adams, et al. (2022). "Quantum lattice algorithms for solving partial differential equations". *17th Conference on Theory of Quantum Computation, Communication, and Cryptography*.

[8] Bryngelson, S. H., K. Schmidmayer, V. Coralic, et al. (2021). "MFC: An open-source high-order multi-component, multi-phase, and multi-scale compressible flow solver". *Computer Physics Communications* **266**, 107396.

[9] Spratt, J.-S., M. Rodriguez, K. Schmidmayer, et al. (2021). "Characterizing viscoelastic materials via ensemble-based data assimilation of bubble collapse observations". *Journal of the Mechanics and Physics of Solids* **152**, 104455.

[10] Bryngelson, S. H., A. Charalampopoulos, T. P. Sapsis, and T. Colonius (2020). "A Gaussian moment method and its augmentation via LSTM recurrent neural networks for the statistics of cavitating bubble populations". *International Journal of Multiphase Flow* **127**, 103262.

[11] Bryngelson, S. H. and T. Colonius (2020). "Simulation of humpback whale bubble-net feeding models". *Journal of the Acoustical Society of America* **147** 2, 1126–1135.

[12] Bryngelson, S. H., T. Colonius, and R. O. Fox (2020). "QBMMlib: A library of quadrature-based moment methods". *SoftwareX* **12**, 100615.

[13] Schmidmayer, K., S. H. Bryngelson, and T. Colonius (2020). "An assessment of multicomponent flow models and interface capturing schemes for spherical bubble dynamics". *Journal of Computational Physics* **402**, 109080.

[14] Trummler, T., S. H. Bryngelson, K. Schmidmayer, et al. (2020). "Near-surface dynamics of a gas bubble collapsing above a crevice". *Journal of Fluid Mechanics* **899**, A16.

[15] Bryngelson, S. H. and J. B. Freund (2019). "Non-modal Floquet stability of a capsule in large amplitude oscillatory extension". *European Journal of Mechanics B* **77**, 171–176.

[16] Bryngelson, S. H., F. Guéniat, and J. B. Freund (2019). "Irregular dynamics of cellular blood flow in a model microvessel". *Physical Review E* **100**, 012203.

[17] Bryngelson, S. H., K. Schmidmayer, and T. Colonius (2019). "A quantitative comparison of phase-averaged models for bubbly, cavitating flows". *International Journal of Multiphase Flow* **115**, 137–143.

[18] Bryngelson, S. H. and J. B. Freund (2018). "Floquet stability analysis of capsules in viscous shear flow". *Joural of Fluid Mechanics* **852**, 663–677.

[19] Bryngelson, S. H. and J. B. Freund (2018). "Global stability of flowing red blood cell trains". *Physical Review Fluids* **3** 7, 073101.

[20] Bryngelson, S. H. and J. B. Freund (2016). "Buckling and its effect on the confined flow of a model capsule suspension". *Rheologica Acta* **55** 6, 451–464.

[21] Bryngelson, S. H. and J. B. Freund (2016). "Capsule-train stability". *Physical Review Fluids* **1** 3, 033201.