

# THOMAS HOGANCAMP

Quantum algorithms | Scientific computing | Mathematics PhD  
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## Experience

### U.S. Naval Research Laboratory, Monterey

June 2024 – Present

*ASEE Postdoctoral Research Fellow*

- Designed and analyzed quantum algorithms for linear and nonlinear partial differential equations, with applications in physics and fluid dynamics.
- Developed and analyzed quantum circuit constructions for near-term (NISQ) and fault-tolerant frameworks.
- Collaborated with meteorologists, applied mathematicians, and physicists on interdisciplinary research.

### Outlier AI

January 2024 – June 2024

*AI Mathematics Specialist (contractor)*

- Created original mathematics problems to evaluate AI models' multistep reasoning; assessed responses for correctness, rigor, and clarity and provided corrective guidance.
- Reviewed other specialists' problems, solutions, and feedback for accuracy and consistency.

### University of Missouri–Columbia

August 2019 – May 2023

*Dissertation Research*

- Developed theoretical tools in bifurcation theory for quasilinear degenerate elliptic PDEs, with applications in nonlinear elasticity and gas dynamics.

## Technical Skills

- **Quantum computing:** Algorithm design, resource estimation, linear combination of unitaries (LCU), Carleman linearization, block encoding, variational quantum linear solvers (VQLS).
- **Programming:** Python; Qiskit (exploratory LCU work for the Laplacian); basic PyTorch. C++ (undergraduate coursework); basic MATLAB; Julia (self-directed exploration).
- **Mathematics:** Ordinary and partial differential equations, linear algebra, probability, variational methods, finite difference and finite element methods.

## Selected Publications

- **T. Hogancamp**, R. Demirdjian, and D. Gunlycke. Linear-combination-of-unitaries decomposition for the Laplace operator. *Physical Review A* **114**, 012455 (2026).
- R. Demirdjian, **T. Hogancamp**, and D. Gunlycke. Efficient decomposition of the Carleman linearized Burgers' equation. *Physical Review A* **113**, 032408 (2026).
- R. Demirdjian, **T. Hogancamp**, A. Gnanasekaran, A. Surana, and D. Gunlycke. Quantum data loading for Carleman linearized systems: Application to the lattice-Boltzmann equation. arXiv:2605.00302 (2026), preprint.
- **T. Hogancamp**. Broadening global families of anti-plane shear equilibria. *SIAM Journal on Mathematical Analysis* **53**, 5853–5879 (2021).

## Selected Presentations

- **Tutorial co-organizer and presenter (upcoming):** Linear Combination of Non-Unitaries: Theory, Computation and Applications. *IEEE Quantum Week 2026*, Toronto, Canada, September 18, 2026.
- **Poster:** A Linear Combination of Unitaries Decomposition for the Laplace Operator. *US CLIVAR Quantum Computing and Sensing for Weather and Climate Applications Workshop*, Boulder, Colorado, August 2026.

## Education

**PhD, Mathematics**, University of Missouri–Columbia

May 2023

**BS, Mathematics**, University of Missouri–St. Louis

May 2017