
Katherine Piper

kbpiper@andrew.cmu.edu | kbpiper.phd@gmail.com | kbpiperphd.github.io | +1 (720) 839 5404

Education

Carnegie Mellon University | Pittsburgh, Pennsylvania August 2024 – Present
Doctor of Philosophy | Computational Mechanics Est. April 2029
Master of Science | Computational Mechanics Awarded December 2025

California Institute of Technology | Pasadena, California September 2019 – June 2024
Bachelor of Science | Mechanical Engineering

Research Experience

Carnegie Mellon University | Pittsburgh, Pennsylvania August 2024 – Present
Graduate Researcher
- Constrained optimization machine learning methods for physics and engineering problems

NASA Jet Propulsion Laboratory | Pasadena, California October 2023 – August 2024
Academic Part Time Employee
Year Round Intern May 2023 – September 2023

- **Primary Lab:** Additive Manufacturing Center (AMC)
- **Secondary Lab:** Two-Phase Thermal Technology Laboratory
- Additively manufactured heat pipe design
- Supervised testing of additively manufactured thermal control systems
- Methods lead to 100 times cost reduction and 50% performance improvement over state-of-the-art
- Two NASA New Technology Reports and US Patent submitted

California Institute of Technology | Pasadena, California June 2022 – June 2024
Summer Undergraduate Research Fellowship
Research Advisor – Vinamra Agrawal, Los Alamos National Laboratory

- Implementation of a model for ductile fracture in functionally graded additively manufactured metals

Awards

Grand Prize: Sustainable Impact Award: March 2026
Gresham Smith Innovation Hackathon

Graduate Fellowship: May 2024
Carnegie Mellon University College of Engineering

Research Grants

ACCESS – EXPLORE – National Science Foundation September 2024 – Present

Publications

Ductile Fracture in Functionally Graded Materials: Insight into Crack Behavior within a Gradient Interface November 2024
Katherine Piper, Vinamra Agrawal, *arXiv: Materials Science*
arXiv:2411.18642 *Currently responding to reviewer feedback from Engineering Fracture Mechanics (Elsevier)*

Nonlinear Optimization of a Whitney Form Basis for Projection-Based Reduced Order Methods Spring 2026
Katherine Piper et al, *Preprint Available at math.cmu.edu/cna/Publications*

Geometric Considerations in Loop Heat Pipe Evaporator Design Spring 2026
Katherine Piper et al, *In Preparation*

Patents and Technology Development

| | |
|---|----------------|
| Novel Geometric Considerations for Solid and Porous Design in Loop Heat Pipe Evaporators Katherine Piper, Scott N Roberts, Takuro Diamuro, <i>Provisional Patent</i> filed by California Institute of Technology Sept 2025 | September 2025 |
| INV 2026-0097: Design and Manufacturing Processes for High-Volume Production of Two-Phase Loops Katherine Piper, <i>Carnegie Mellon University Technical Report</i> | April 2026 |
| NPO 56342: Novel Geometric Considerations for Solid and Porous Design in Loop Heat Pipe Evaporators Katherine Piper, Scott N Roberts, <i>NASA New Technology Report</i> | September 2025 |
| NPO 56343: Hybrid Loop Heat Pipe Architectures Katherine Piper, Scott N Roberts, Takuro Daimaru, <i>NASA New Technology Report</i> | September 2025 |

Selected Presentations

| | |
|---|--------------|
| Constrained Optimization Methods in Design for Additive Manufacturing Katherine Piper, <i>Materials Science and Technology, 2026</i> , Conference Oral Presentation | October 2026 |
| Multiscale Architected Wick Geometries in Additively Manufactured Loop Heat Pipes Katherine Piper, <i>Materials Science and Technology, 2026</i> , Conference Oral Presentation | October 2026 |
| Fracture in Ductile Functionally Graded Materials Katherine Piper, <i>Materials Science and Technology, 2024</i> , Conference Oral Presentation | October 2024 |
| Space Technology, on Earth: A study of two-phase cooling in datacenters Claire Bielski, Katherine Piper, et al, <i>Carnegie Mellon University Energy Week</i> , Poster Presentation | March 2026 |
| Two-Phase Cooling: Meeting AI Thermal Demands with Space Technology Katherine Piper, <i>Civil and Environmental Engineering Industry Day</i> , Poster Presentation | March 2026 |

Teaching

| | |
|--|---|
| Carnegie Mellon University Pittsburgh, Pennsylvania Teaching Assistant, Numerical Methods in Engineering Eberly Center Future Faculty Program | Fall 2024, Fall 2025 Spring 2026-Present |
| California Institute of Technology Pasadena, California Teaching Assistant, Introduction to Mechanics of Materials Teaching Assistant, Design and Fabrication Teaching Assistant, Mechanical Prototyping | Fall 2022, Winter 2023 Spring 2023, Spring 2024 Summer 2023 |

Other Professional Experience

| | |
|--|---|
| Special Aerospace Services (Now Aurex Defense) Arvada, Colorado Engineer In Training Engineering Intern | August 2020 – August 2021 Summer 2019, Summer 2020 |
| Colorado Space Business Roundtable Denver, Colorado Summer Fellowship Program | Summer 2018 |