Katherine Piper

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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

Experience

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

NASA Jet Propulsion Laboratory | Pasadena, California
Academic Part Time Employee October 2023 – August 2024
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
Summer Undergraduate Research Fellowship June 2022 – June 2024
Research Advisor – Vinamra Agrawal, Los Alamos National Laboratory
- Implementation of a model for ductile fracture in functionally graded additively manufactured metals

Special Aerospace Services (Now Aurex Defense) | Arvada, Colorado
Engineer In Training August 2020 – August 2021
Engineering Intern Summer 2019, Summer 2020

Patents and Technology Development

Novel Geometric Considerations for Solid and Porous Design in Loop Heat Pipe Evaporators September 2025
Katherine Piper, Scott N Roberts, Takuro Diamuro, ***Provisional Patent***
filed by California Institute of Technology Sept 2025

INV 2026-0097: Design and Manufacturing Processes for High-Volume Production of Two-Phase Loops April 2026
Katherine Piper, ***Carnegie Mellon University Technical Report***

NPO 56343: Hybrid Loop Heat Pipe Architectures September 2025
Katherine Piper, Scott N Roberts, Takuro Daimaru, ***NASA New Technology Report***

Publications

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

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

Resume Updated April 16, 2026