Jack McKee

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Summary

Mathematician working at the intersection of differential geometry (both smooth and discrete) and numerical analysis. Research is focused on understanding connections on discrete geometric objects and their associated curvature measures, as well as designing and analyzing finite element methods for related partial differential equations. Also an experienced programmer, having expertise in high-performance computing and physics simulation.

Education

Ph.D. (Mathematics) at **University of Hawai'i at Mānoa** 2026 (GPA: 3.95/4.0)
Title: Numerical Analysis and Curvature on Discrete Spaces
Advisor: Evan Gawlik

B.A. (Mathematics) at **University of California Santa Cruz** 2020 (GPA: 3.52/4.0)

Publications

Gawlik, Evan and Jack McKee (2025). "On the Curvature of Regge Metrics". In: arXiv: 2510.25027 [math.DG]. URL: https://arxiv.org/abs/2510.25027.

Gawlik, Evan S. and Jack McKee (2024). "Intrinsic Finite Element Error Analysis on Manifolds with Regge Metrics, with Applications to Calculating Connection Forms". In: arXiv: 2410.15579 [math.NA]. URL: https://arxiv.org/abs/2410.15579.

McKee, Jack et al. (2022). "Developing a Modern CFD Framework with Parallel Algorithms and Mesh Adaption". In: *ICCFD11 Proceedings*.

Awards and Grants

George Orton and Mona Marie Elmore ARCS Award 2025

Work Experience

Teaching Assistant, UH Mānoa Jan 2025 - present

- Teaching assistant for multiple lower-division mathematics classes at U.H. Manoa, including Math 140 (precalculus) and Math 100 (algebra).
- Duties included: grading students' homeworks, quizzes, tests, and worksheets; running recitation sections of up to 40 students; holding office hours and generally helping students understand the material.

Intern, Lawrence Berkeley National Lab Jun-Jul 2024

Participated in the D.O.E. RENEW program, a one-month intensive internship partly on the Berkeley Lab campus and partly in Honolulu. Worked with the Accelerator Technology & Applied Physics division to develop a graphical tool that is used to analyze Thompson Parabola traces in a qubit manufacturing lab.

Research Assistant, UH Mānoa Aug 2021 - Jan 2025

– Research assistant for the PISALE project, an ongoing effort at the University of Hawai'i to develop a solver for multiple-material continuum mechanics supporting both structured AMR (Adaptive Mesh Refinement) and ALE (Arbitrary Lagrangian-Eulerian advection).

– Accomplishments included: re-implementation of the build system to ease portability to new supercomputer architectures; analyzed and evaluated existing surface tension models that used height functions; extended capabilities with new surface tension models; produced and ran simulations of experiments done in the Stanford X-Ray Free Election Laser.

Posters and Conferences

Workshop Presentation: Defining Curvature for Regge Metrics	GMSPD Workshop 2025, Utica, NY
Poster: Modeling Surface Tension in a Multi-material Numerical Framework	ICIAM 2023, Tokyo, Japan
Conference Presentation	ICCFD 2022, Maui, HI

Skills

Mathematics	Differential geometry, Functional analysis, Finite element methods
Computational Physics	Continuum mechanics, Hydrocodes, High-performance computing
Programming	Rust, C/C++, python, bash
Teaching	8 months of classroom experience, active learning/teaching and place-based mathematics training

Last updated: June 1, 2026