Damyn Chipman, Ph.D.

Postdoctoral Research Associate, Los Alamos National Laboratory

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Location	Los Alamos, NM

Education

2024 **Ph.D. in Computing**, Boise State University, Boise, ID
Emphasis: Computational Sciences and Engineering
Dissertation: *An Adaptive and Parallel Direct Solver for Elliptic Partial Differential Equations*
Advisors: Dr. Donna Calhoun (chair), Dr. Michal Kopera & Dr. Grady Wright

2019 **B.S. in Applied Physics**, Brigham Young University, Provo, UT
Emphasis: Computational Physics and Engineering
Senior Thesis: *Aerodynamics Modeling Using a Mesh-Free Approach*
Advisors: Dr. Andrew Ning & Dr. David Neilsen

Research & Professional Appointments

2024–PRESENT **Postdoctoral Research Associate**, *Los Alamos National Laboratory*

- Perform research and development for multiphysics code for inertial confinement fusion simulations
- Maintain lab-wide C++/Fortran multiphysics codebase for users, including simulation design, debugging, and fixing issues.

2022 **Defense Science and Technology Intern**, *Lawrence Livermore National Laboratory*

- Implemented material interface reconstruction algorithms into multiphysics code for inertial confinement fusion simulations.
- Presented project deliverables to laboratory directorate.

2021 **High Energy Density Physics Intern**, *Lawrence Livermore National Laboratory*

- Aligned C++ and Python nuclear data APIs for nuclear data teams.
- Presented project deliverables to laboratory directorate.

2019–2021 **Associate in Science**, *Nevada National Security Site – Mission Support and Test Services*

- Designed experiments and analyzed data for neutron and x-ray imaging systems supporting subcritical diagnostics.
- Co-authored technical reports and presentations on Site Directed Research and Development (SDRD) for portable neutron imaging system.

2018–2019 **Research Assistant**, *FLOW Lab, Brigham Young University*

- Investigated mesh-free aerodynamic modeling for aircraft and wind farm codes.

- Presented undergraduate research at the 2019 Utah Conference for Undergraduate Research.

2016–2018 **Research Assistant**, *Advanced Power Cycles Lab, Brigham Young University*

- Designed an optimized 2- and 3-stage Rankine power plant for nuclear power applications.
- Assisted in the development of thermodynamic equation of state models.

Teaching Experience

SPRING 2024 **Graduate Teaching Assistant**, *Boise State University, Mathematics Department*

- MATH565: Parallel Computing

FALL 2023 **Graduate Teaching Assistant**, *Boise State University, Mechanical Engineering Department*

- ME273: Intro to Programming for Engineers

SPRING 2022 **Adjunct Faculty**, *Boise State University, Geophysics Department*

- GEOS357/597: Computation in the Geosciences
- Developed course cirriculum, delivered remote/in-person lectures, assisted students through course

FALL 2019 **Graduate Teaching Assistant**, *Boise State University, Mathematics Department*

- MATH365: Intro to Computational Mathematics

2016–2018 **Teaching Assistant**, *Brigham Young University, Physics Department*

- Aided students during homework lab sessions for introductory to advanced physics courses
- Implemented new teaching program for 150+ student
- Oversaw sections of 20-30 students as Recitation Section Leader for undergraduate physics courses

Honors and Awards

2024 **Dean's Award** — College of Arts and Sciences, Boise State University
2023 **Semi-Finalist** — SIAM Computational Science and Engineering Hackathon
2020 **Hot Shot Award** — Nevada National Security Site
2019 **Graduate Assistant Fellow** — Boise State University
2013 **Eagle Scout** — Boy Scouts of America

Professional Development & Training

2024 **Training on AI-Driven Science on Supercomputers (20 hrs)** *Argonne National Laboratory*
2023 **Argonne Training Program for Exascale Computing (80 hrs)** *Argonne National Laboratory*
2021 **Advanced Numerical Methods for Hyperbolic PDEs (40 hrs)** *University of Trento, Italy*

Grants & Allocations

2023–2024 **Argonne Leadership Computing Facility Allocation** *(2,500 node hours)*
Scalable CPU/GPU Direct Solver for Adaptive Mesh Refinements

Publications

Peer-Reviewed Articles

4) **D. Chipman**, B. M. Haines, L. Kleedtke, L. Yin, R. Lester, K. Ma, D. Gatlin. *Impact of Coulomb Logarithm Model in Inertial Confinement Fusion Simulations.* (In Preparation). 2025.

3) **D. Chipman**, D. Calhoun, C. Burstedde. *Parallel Implementation of the Quadtree-Adaptive Hierarchical Poincaré-Steklov Method.* International Journal of High Performance Computing Applications (In Review). 2025.

2) **D. Chipman**, D. Calhoun, C. Burstedde. *A Fast Direct Solver for Elliptic PDEs on a Hierarchy of Adaptively Refined Quadtrees.* Journal of Computational Physics (In Review). 2025. Link

1) **D. Chipman**. *EllipticForest: A Direct Solver Library for Elliptic Partial Differential Equations on Adaptive Meshes.* Journal of Open Source Software, 9(96), 6339. 2024. Link

Technical Reports

1) A. Durand, R. Freeman, **D. Chipman**, B. Garcia, M. Wallace, J. Bundaard, D. Smalley, M. Raphaelian, D. Max, D. Lowe. *High-Fidelity Dynamic Neutron Imaging and Radiography for Subcritical Experiments and Other Applications.* Technical Report, Nevada National Security Site / Mission Support and Test Services. 2020. Link

Other Publications

4) **D. Chipman**. *An Adaptive and Parallel Direct Solver for Elliptic Partial Differential Equations.* Dissertation, Boise State University. 2024. Link

3) **D. Chipman**. *Overview of Solution Methods for Elliptic Partial Differential Equations on Cartesian and Hierarchical Grids.* Comprehensive Exam Paper, Boise State University. 2022. Link

2) J. Hunter, B. Hunter, **D. Chipman**, K. Jespersen, A. Imtiaz, S. Garcia, G. Cowell, and N. Price. *Forms of Energy: Kailani K. Invents All Day.* STEMTaught Education Journal. 2020. Link

1) **D. Chipman**. *Viscous Aerodynamics Modeling Using a Mesh-Free Approach.* Senior Thesis, Brigham Young University. 2019. Link

Presentations

Invited Talks

3) **D. Chipman**, B. M. Haines, L. Kleedtke, L. Yin, R. Lester, K. Ma, D. Gatlin. *Laser Modeling Methods for Indirect Drive Inertial Confinement Fusion.* Los Alamos – Arizona Days. 2025. Los Alamos, NM

2) **D. Chipman**, D. Calhoun, C. Burstedde. *A Coupled Elliptic/Hyperbolic Adaptive Finite Volume Solver for High-Performance Heterogeneous Architectures.* SIAM Pacific Northwest Conference. 2023. Bellingham, WA

1) **D. Chipman**, A. Durand, R. Freeman, M. Wallace, B. Garcia. *Image Processing and Reconstruction of Neutron and X-Ray Images.* NNSS Senior Leadership Team Presentation. 2019. Las Vegas, NV

Contributed Talks

10) **D. Chipman**, B. M. Haines, R. Lester, S. Miller, I. Gonzalez. *Conduction Solvers for Hohlraum Simulations.* American Physical Society – Division of Plasma Physics Conference. 2025. Long Beach, CA

9) **D. Chipman**. *Laser Physics and Solver Performance Enhancements for Inertial Confinement Fusion Simulations.* LANL Postdoc Research Seminar. 2025. Los Alamos, NM

8) **D. Chipman**, B. M. Haines, R. Lester, K. Ma, L. Kleedtke, L. Yin, D. Gatlin. *Improvements to Inverse Bremsstrahlung Absorption Models for Indirect Drive Inertial Confinement Fusion Simulations.* International Conference on Inertial Fusion Sciences and Applications. 2025. Tours, France

7) **D. Chipman**, D. Calhoun, C. Burstedde. *A Coupled Elliptic/Hyperbolic Adaptive Finite Volume Solver for High-Performance Heterogeneous Architectures.* SIAM Parallel Processing Conference. 2024. Baltimore, MD

6) **D. Chipman**, D. Calhoun, C. Burstedde. *A Fast, Adaptive, Matrix-Free Direct Elliptic Solver on Quadtree Meshes.* SIAM Computational Science and Engineering Conference. 2023. Amsterdam, The Netherlands

5) **D. Chipman**, B. Stephens. *A New Material Interface Reconstruction (MIR) Implementation in Kull.* LLNL SLAM. 2022. Livermore, CA

4) **D. Chipman**, G. Gert. *FUDGE and GIDI+: Aligning LLNL's Nuclear Data Codes and API.* LLNL SLAM. 2021. Livermore, CA

3) **D. Chipman**, D. Calhoun, C. Burstedde. *Progress Towards a Fast, Scalable, and Direct Elliptic PDE Solver for Adaptive Meshes.* SIAM Computational Science and Engineering Conference. 2021. Online

2) **D. Chipman**, S. Breckling. *Characterizing On-Axis X-Ray Spectra with Off-Axis Detectors.* Mission Support and Test Services Mission Directorate Presentations. 2020. Las Vegas, NV

1) **D. Chipman**, E. Alvarez, A. Ning. *Aerodynamic Modeling Using a Mesh-Free Approach.* Utah Conference for Undergraduate Research. 2019. Ogden, UT

Poster Presentations

3) **D. Chipman**, B. M. Haines, R. Lester, K. Ma, L. Kleedtke, L. Yin, D. Gatlin. *Improvements to Inverse Bremmstrahlung Absorption Models for Indirect Drive Inertial Confinement Fusion Simulations.* Anomalous Absorption Conference. 2025. Sedona, AZ

2) **D. Chipman**, D. Calhoun, C. Burstedde. *Adaptive Matrix Factorizations on Supercomputers.* Boise State University Research Computing Days. 2024. Boise, ID

1) **D. Chipman**, D. Calhoun. *Higher Order Tsunami Simulations and Novel Solution Methods.* Boise State University Graduate Student Showcase. 2021. Boise, ID