MADISON SHERIDAN

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SUMMARY

Ph.D. in Mathematics with strong expertise in computational physics, high-performance computing, and the design of robust finite element algorithms for Lagrangian hydrodynamics. Adept at implementing and optimizing large-scale simulation codes in C++ and Python for multiphysics applications. Experienced collaborator and communicator with a background in teaching, mentoring, and delivering technical presentations. Open to full-time opportunities beginning January 2026.

EXPERIENCE

Graduate Teaching/Research Assistant Aug 2019 - Dec 2025
Texas A&M University *College Station, TX*
Advisor: Jean-Luc Guermond

- Developed a finite element method for the equations of Lagrangian hydrodynamics that achieves high-order accuracy while preserving essential physical invariants, ensuring robustness in challenging flow regimes.
- Collaborated across mathematics, physics, and engineering teams; presented findings at SIAM CSE, USNCCM, and other national conferences.
- Served as Instructor of Record for Math 140, independently leading classroom instruction, developing assignments and exams, and evaluating student performance.

Graduate Student Intern May 2022 - Sep 2023
Lawrence Livermore National Laboratory *Livermore, CA*
Mentor: Vladimir Tomov

- Augmented high-order Lagrangian hydrodynamics codes in C++/MFEM with an invariant-domain preserving Lagrangian finite element method, ensuring physics-consistent robustness validated with benchmark tests.
- Extended an existing discontinuous Galerkin advection solver to support continuous finite element discretizations, enhancing code capabilities and enabling broader benchmarking.

Graduate Student Intern May 2019 - Apr 2022
Nevada National Security Site *North Las Vegas, NV*
Mentors: Cleat Zeiler, Marylesa Howard, Daniel Champion

- Developed and trained deep learning models in Python/TensorFlow to reconstruct clipped seismic waveforms, improving signal fidelity and enabling more accurate seismic event detection.
- Designed a Python-based multilateration algorithm using geophone array data to geolocate seismic signal sources with improved accuracy, supporting rapid deployment for field missions.

EDUCATION

PhD, Mathematics, Texas A&M University, College Station, TX Aug 2019 - Dec 2025
Thesis: A Robust Lagrangian Framework for Compressible Flow & Hyperelasticity
Emphasis: Finite Element Methods, Computation Fluid Dynamics, Partial Differential Equations

Bachelor of Science, Mathematics (Computer Science minor), Jan 2015 - Apr 2019
Brigham Young University - Idaho, Rexburg, ID

SKILLS

Programming & Tools: Python, C++, MATLAB, Git, CMake, MPI/OpenMP, Linux/Unix, Docker, LaTeX
Modeling & Simulation: High-Performance Computing (HPC), Finite Element Methods (FEM), Partial Differential Equations (PDE), Numerical Linear Algebra, Compressible Fluid Dynamics, Algorithm Development, Scientific Computing, Validation & Verification, Fusion 360 (CAD)
Data & Analysis: Statistical Analysis, Modeling, ParaView, GLVis, Excel
Communication: Technical Writing, Teaching, Public Speaking, PowerPoint, Word

OUTREACH & SERVICE

Undergraduate Research Advisor
Texas A&M University *College Station, TX*

- Guided an undergraduate research project on nonlinear elasticity for the Modeling and Simulation with PDEs summer school, supporting problem formulation, implementation, and presentation of results. (2024)
- Supervised an undergraduate research project on chemotaxis for the Directed Reading Program, providing one-on-one instruction, feedback, and research direction, culminating in an end of the semester presentation. (2022)

Volunteer

- Mathematics and Statistics Fair, Texas A&M University Jan 2023
- **GED Prep Instructor**, B/CS Community Education Center, Bryan, TX 2021-2022
- **Proctor**, High School Math Contest, Texas A&M University Oct 2019

Eagle Scout Apr 2012

LEADERSHIP

Organizer Jul 2023
Mini-symposium on "Invariant-Domain Preserving Hydrodynamics: From Euler to Navier-Stokes"
17th U.S. National Congress on Computational Mechanics, Albuquerque, NM, USA
Organizer Nov 2022
Mini-symposium on "High Order Methods for Computational Hydrodynamics"
5th Annual Meeting of the SIAM Texas-Louisiana Section, Houston, TX, USA
President, Vice President, Treasurer 2019 – 2024
Society for Industrial and Applied Mathematics (SIAM) Graduate Student Chapter, Texas A&M University

LANGUAGES

English Native Language
Portuguese Intermediate Listener, Intermediate Speaker, Advanced Reader, Novice Writer