MADISON SHERIDAN

✉ madison.sheridan94@gmail.com   in linkedin.com/in/madison-sheridan   📞 1.916.790.7806

October 29, 2025

COMPANY

Dear Hiring Manager,

I am writing to express my interest in **COMPANY** where I can apply my expertise in computational modeling, numerical analysis, and algorithm development to advance mission-critical systems in support of national security.

My Ph.D. research has focused on the design, implementation, and validation of high-fidelity numerical methods for solving complex physical systems. I have extensive experience developing and testing simulation tools to model nonlinear fluid dynamics, radiation transport, and multi-physics interactions. My work required rigorous error, stability, and convergence analysis—skills directly applicable to system requirements validation, performance prediction, and mission analysis in complex engineering domains.

In addition to numerical methods, I bring hands-on coding and technical computing experience. My implementation of fluid dynamics models has been done in C++ within the MFEM finite element library, where I designed and tested invariant-domain preserving methods for compressible flows. I also regularly use Python for algorithm prototyping, data analysis, and batch processing on HPC systems, and have project experience in MATLAB for model development and simulation. I am comfortable in Linux-based environments and have collaborated in team-driven software projects using version control and structured testing practices. These experiences align with the emphasis at **COMPANY** on disciplined software engineering and innovative development practices.

My technical contributions include developing and validating invariant-domain preserving methods for Lagrangian hydrodynamics, implementing them in the MFEM finite element library, and running large-scale HPC simulations. This work has resulted in peer-reviewed publications, technical presentations, and ongoing dissertation research. These experiences demonstrate not only my ability to produce rigorous, validated computational models but also my commitment to advancing scientific software that supports national security applications.

Equally important, I have a proven record of working in collaborative, interdisciplinary environments—mentoring undergraduates, coordinating across applied mathematics and nuclear engineering groups, and presenting technical results to diverse audiences. I value the mission-driven culture of **COMPANY** and its commitment to purposeful innovation, and I am excited by the opportunity to contribute my skills to projects that directly support national defense and technological advancement.

I am a U.S. citizen eligible for a government security clearance and am prepared to work onsite at **COMPANY** facilities. I would welcome the opportunity to bring my technical background, problem-solving skills, and collaborative mindset to your team.

Thank you for your time and consideration. I look forward to the possibility of discussing how my skills and experience align with the mission and needs of **COMPANY**.

Kind Regards,

Madison Sheridan
Applicant