769 Shady Drive East
Apartment 303
Pittsburgh, PA 15228

November 5, 2025

Idaho National Laboratory
1955 Freemont Ave
Idaho Falls, ID 83415

Dear Hiring Manager,

I am writing to express my interest in an internship position at Idaho National Laboratory, specifically within your automatic reactor control, microgrid and distributed energy, and provable nuclear cybersecurity research areas. As an NRC Graduate Fellow and Ph.D. student in Mechanical Engineering at the University of Pittsburgh, my research directly aligns with INL's mission to advance nuclear energy systems through innovative control methodologies and cybersecurity solutions. My planned dissertation focuses on developing formal synthesis methods for hybrid controllers in nuclear power applications, combining reactive synthesis with control theory to create autonomous systems with provable safety guarantees.

My technical background and planned dissertation work position me well to contribute to INL's research thrusts. My dissertation will develop methods for translating operating procedures into temporal logic specifications, synthesizing provably correct discrete control logic, and verifying continuous control behavior across mode transitions. I have experience with hardware-in-the-loop validation on industry platforms like the Emerson Ovation system and work on virtualized networks for control system simulation. My coursework in advanced dynamics and nonlinear systems, combined with practical experience in embedded C/C++ and Python, provides a foundation for tackling problems in automatic reactor control, cybersecurity, and distributed energy systems.

An internship at INL would provide an opportunity to advance my research while contributing to the laboratory's work in nuclear energy innovation. I am particularly excited about applying formal methods expertise to real-world reactor control challenges and collaborating with INL researchers to develop next-generation autonomous control systems.

Thank you for your consideration of my application.

Best regards,

Dane Sabo