Dane Sabo

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Education

Ph.D. **NRC Fellow, University of Pittsburgh**, Mechanical Engineering — August 2023 - Present

- GPA: 3.896/4.0 (Unofficial Transcript)
- **Coursework:** High-Assurance Cyber-Physical Systems, Linear and Digital Control Systems, Nonlinear Dynamical Systems, Advanced Dynamics
- **Nuclear Engineering Certificate Coursework:** Fundamentals of Nuclear Engineering, Integration of Nuclear Plant Systems, Nuclear Core Dynamics, Radiation Detection & Measurement, Management Principles for Nuclear Power

BS **University of Pittsburgh**, Mechanical Engineering — August 2019 - August 2023

- GPA: 3.433, Dean's Honor List throughout
- **Coursework:** Linear Algebra for Machine Learning (Graduate), Mechatronics

Awards & Honors

Best Student Paper Award, Nuclear Plant Instrumentation and Control & Human-Machine Interface Technology (NPIC&HMIT 2025) — 2025

- Awarded for "Employing a Hardware-in-the-Loop Approach to Realize a Fully Homomorphic Encrypted Controller for a Small Modular Advanced High Temperature Reactor"

Student Representative, MEMS Department Chair Search Committee — 2025

- Selected as student representative on the search committee for the next Department Chair of Mechanical Engineering and Materials Science at the University of Pittsburgh

NRC Graduate Fellowship, U.S. Nuclear Regulatory Commission — 2023 – Present

- Competitive fellowship supporting graduate research in nuclear engineering and related fields

Publications and Presentations

First Author

Analysis of Vortex Generating Fences on a Formula Student Multi-Element Rear Wing — 2023
Published in *Ingenium – Undergraduate Research at the Swanson School of Engineering*, Pages 106–111

Major Contributor

Employing a Hardware-in-the-Loop Approach to Realize a Fully Homomorphic Encrypted Controller for a Small Modular Advanced High Temperature Reactor — 2025
Nuclear Plant Instrumentation and Control & Human-Machine Interface Technology (NPIC&HMIT 2025), Conference Paper (Second Author)
Best Student Paper Award

Demonstration of Advanced Encryption for an Instrumentation and Control System using ARCADE — 2024

National Organization of Test, Research and Training Reactors (TRTR 2024 Annual Meeting), Presentation

Skills

Programming:	C/C++ (embedded), LaTeX, MATLAB, Python (Pandas, NumPy, SciPy, SymPy, etc...), Rust
Engineering:	ANSYS Simulation Suite, FDM printing, Fusion 360, soldering, Solidworks
Business:	Customer discovery, Team management, Office Suite
Other:	Adobe Illustrator, Adobe Photoshop, Blender

Professional Experience

Graduate Student Researcher, Instrumentation and Controls Laboratory — Pittsburgh, PA
Advisor: Dr. Daniel G. Cole — August 2023 – Present

- Developing formal verification methods for autonomous hybrid control systems with application to nuclear reactor startup sequences and safety-critical cyber-physical systems
- Collaborating with Idaho National Laboratory and Sandia National Laboratory on hardware-in-the-loop control system validation and encrypted controller implementations for advanced reactor designs
- Conducting research on virtualized networks to simulate control systems with genuine network traffic for nuanced analysis of system dynamics

Independent Contractor (Mechanical Engineer), Human Motion Technologies LLC — Remote // Pittsburgh, PA
December 2022 – June 2023

- **Hip Exoskeleton EXO-004 (Dec 2022 – Jan 2023):** Provided expertise in composites and manufacturing for carbon fiber-reinforced polymer (CFRP) parts, adopting resin infusion as a standard practice.
- **Prosthetics Foot Testing TES-001A02 (Mar 2023 – Jun 2023):** Developed a testing fixture for prosthetic feet, evaluating products for fatigue and ultimate strength failure per ISO-10328 standards, designed for up to 5700 N and two million cycles.

Summer Undergraduate Research Intern, University of Pittsburgh — Pittsburgh, PA
June 2022 – August 2022

- Analyzed the effects of corotating and counterrotating pairs of vortex-generating fences, focusing on separation prevention at various yaw angles and speeds.

Mechanical Engineering Co-op, BMW Manufacturing — Spartanburg, SC
August 2021 – December 2021, January 2021 – April 2021

- **Pruefcubing (Aug 2021 – Dec 2021):** Evaluated buildability and geometric validity of supplier parts for BMW XM performance SUV, supporting metrology processes.
- **Quality Steering (Jan 2021 – Apr 2021, Aug 2021 – Dec 2021):** Monitored development series buildability on manufacturing lines and audited prototype vehicles (X3, X4, X5, X6, X7, XM). Developed data management tools to enhance workflows and database accessibility.

Teaching Experience

Content Developer and Teaching Assistant, MEMS 0071 "Intro to Fluid Mechanics" — Pittsburgh, PA
August 2022 – December 2022

- Developed curriculum incorporating fundamental CFD concepts, with a focus on postprocessing, simulation, and meshing for hydrostatic and hydrodynamic problems.
- Conducted weekly office hours to assist students in understanding course material.

Projects

Panther Racing, Formula Society of Automotive Engineers Team 2020 – 2022
Technical Director | 2021 – 2022

- Led a team of 30+ engineers and associated majors.
- Managed a six-figure budget for researching and producing an open-wheel-style racecar.
- Rehabilitated team culture and mentored younger members to develop engineering and communication skills.
- Delivered a final car that completed all events at FSAE Michigan without any failures or breakdowns.
- Improved team performance from 37th/40 (45.4 points) in 2021 to 32nd/99 (462.6 points) in 2022, achieving a 10x points increase.

Aerodynamics and Composites Subteam Lead | 2021 – 2022

- Engineered and designed the aerodynamic package for the 2022 car.
- Demonstrated expertise in carbon fiber composites manufacturing, including vacuum-bagging, wet lay-up methods, and mold preparation.
- Conducted workshops to train prospective team members in composites manufacturing techniques.