

Justin Cooke | Curriculum Vitae

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Research Interests

- **Fluid Dynamics:** Computational Fluid Dynamics, Turbulent Flow, Solid-Fluid Boundary Interactions
- **Computational Science and Engineering:** Reduced Order Modeling, Multi-fidelity Modeling, High Performance Computing, Machine Learning

Education

- **University of Pittsburgh** **Pittsburgh, PA**
B.S. Mechanical Engineering, GPA: 3.58 *2014–2018*

Research Experience

- **University of Pittsburgh** **Pittsburgh, PA**
Dr. Babaee's Research Lab *May 2017–December 2018*

Vertical Ellipse Correlation: Worked in a team investigating the possibility of a correlation between Reynolds Number, Re , and Rayleigh Number, Ra , for a vertical ellipse. It is known that an existing correlation exists for a cylinder, so investigation into similar geometries was conducted. I ran high fidelity simulations, accessing remotely high performance computers through a Linux based software. Data was extracted from the simulations and then used to visualize these high fidelity simulations, and create a relationship between Re and Ra . Findings were presented to the rest of the team.

Heat Sink Optimization: Worked in a team to conduct a proof of concept study on multi-fidelity modeling in design optimization. I worked with another student and created a simplified low fidelity model for a heat sink, idealizing the geometry into a thermal resistance network. An objective function was created such that it could be used for high volume, quick data points.

- **University of Pittsburgh, Summer Research Internship** **Pittsburgh, PA**
Nettleship Lab *May–July 2015*

Improving Efficacy of Low-Cost Ceramic Water Filters: I looked into increasing the efficacy of low-cost ceramic water filters. This was done investigating the effects of heat treatment on filters that were coated with silver and copper nanoparticles. Learned how to conduct research in an academic lab setting and gained experience with effectively communicating findings through writing and presentation. Work findings were summarized in a presentation to peers at the end of the research internship.

Work Experience

- **Eaton Corporation** **Moon Township, PA**
Mechanical Engineering Co-op *May–August 2017*
Circuit Protection Division, Molded Case Circuit Breakers: I worked alongside lead project engineers, assisting in new product development of industrial circuit breakers. I conducted root cause analysis on design issues, leading to implemented changes to alleviate the problems. I also learned and utilized Design for Six Sigma tools to validate design decisions.
- **Eaton Corporation** **Greenwood, SC**
Mechanical Engineering Co-op *September–December 2016*
Power Distribution, Low Voltage Busway: In a team, conducted root cause analysis on end-of-line test failures on low voltage busway. Determining a set of possible solutions, a controlled study was conducted and a solution was determined. Using this knowledge, a new work procedure was created; to assist in teaching manufacturing line workers, an instructional video was produced, visual aids were provided, and work procedure sheets were updated.
- **Eaton Corporation** **Moon Township, PA**
Mechanical Engineering Co-op *January–April 2016*
Circuit Protection Division, Air Circuit Breakers: I assisted lead project engineers on preparing industrial circuit breakers for standards testings and other projects. I also designed, developed, and created a prototype safety accessory, based on a customer need.

Projects

- **University of Pittsburgh** **Pittsburgh, PA**
Thermal FEA Study on Eaton Busway in Extreme Ambient Conditions *August–December 2018*
Senior Design Capstone Project: Worked in a team to conduct a thermal finite element analysis study on Eaton's busway product line to determine de-rate factors. De-rate factors dictate the allowed current, and ultimately power, that can be relayed through busway. I developed a function for internal heat generation that related it to current, resistivity of material, and the cross sectional area of the current path. The team used this information to conduct the study using ANSYS Workbench software. De-rate factors were determined and findings were summarized in a poster presentation at the University's Design Expo.

Leadership

- **B.R.O.T.H.E.R.H.O.O.D.** **Pittsburgh, PA**
Co-Captain and Webmaster *May 2016–December 2018*
Co-Captain: Led alongside the Captain of the current executive board, known as the foundation. I coordinated all planning meetings for the foundation, and assisted in creating personal development workshops for historically underrepresented men in engineering. I led workshops alongside other members of the foundation, directing open and honest conversation, and communicating personal lessons learned.
Webmaster: I formatted, organized, and updated the organization's website. I implemented all necessary changes and communicated the organization's goals and mission.

- **Society of Hispanic Professional Engineers**

Pittsburgh, PA

- *President*

May 2016–May 2017

President: I coordinated and executed planning meetings with the executive board, general body meetings, and community outreach events. Effectively led many successful industry sponsored events. Coordinated and delivered to SHPE National the reporting program, resulting in the chapter winning Small Chapter of the Year Award at the 2017 National Convention.

Other Roles: I served as Freshman Chair and Secretary with the chapter. I acted as a liaison to the freshman class and the executive board to aid in recruitment and retention of freshman students. I recorded meeting minutes, communicated events and updates in emails to the general body, and coordinated the calendar in conjunction with other student organizations on campus to avoid scheduling conflicts.

Honors and Awards

- **National GEM Consortium: GEM Full Fellow** 2019
- **Swanson School of Engineering Dean's Honors List:** Fall 2015, Summer 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018
- **National Science Foundation Global Engineering Preparedness Scholarship** Fall 2014

Skills

- **Language:** Spanish: Reading and Writing (Intermediate), Speaking (Basic)
- **Programming Languages:** C++ (Intermediate), MATLAB (Advanced), LaTeX (Advanced), HTML (Intermediate), CSS (Intermediate)
- **Software:** SolidWorks (Intermediate), Creo Parametric (Advanced), Matlab (Advanced), Ansys (Intermediate), Minitab (Intermediate)