

## Education

- August 2022 – Present **Ph.D. Aerospace Engineering**, *University of Maryland*, College Park, MD.
- August 2018 – April 2022 **B.S. Mechanical Engineering**, *University of Pittsburgh*, Pittsburgh, PA.

## Research Experience

- August 2022 – Present **Graduate Research Assistant**, *University of Maryland*, College Park, MD.
- Contributed to AI and Autonomy for Multi-Agent Systems cooperative agreement between the Army Research Lab and the University of Maryland under the project "Cooperative Re-Planning via Sensor Inference and Geospatial Data Integration."
  - Developed a sensor placement and inference algorithm for increased environment awareness of a partially known environment using object-oriented programming methods.
- February 2022 – April 2022 **JVSRP Intern**, *NASA Jet Propulsion Laboratory*, Pasadena, CA.
- Contributed to a collaborative effort between NASA's Jet Propulsion Laboratory (JPL), Massachusetts Institute of Technology, University of Washington, and Stone Aerospace with a focus of validating existing experimental data via a high-fidelity numeric model of an ice probe descending through cryogenic ice via a radioisotope-powered system, including the surrounding water annulus.
  - Conducted studies using three-dimensional advecting ice models constructed in ANSYS CFX to determine discrepancies between two-dimensional axis-symmetric models and experimental predictions at low melting efficiencies.
  - Responsible for implementing and running models on the University of Pittsburgh's Center for Research Computing (CRC) supercomputer, processing data and preparing manuscripts. Results published in one peer-reviewed journal manuscript.
- August 2020 – April 2022 **Undergraduate Research Assistant**, *University of Pittsburgh*, Pittsburgh, PA.
- Developed multi-physics models (analytical via MATLAB and numerical via ANSYS CFX) for non-segmented and segmented thermoelectric generators for the design and analysis of Next-Gen and MMRTGs in conjunction with the Thermal Energy Conversion Technologies group at NASA JPL.
  - Models included provisions for decaying radioisotope heat sources, time-dependent thermal and electrical contact resistances, temperature-dependent material properties, implicit evolution of electrical properties, and methods of optimization to meet mission objectives.
  - Responsible for model validation, literature review and manuscript preparation.

## Professional Experience

- June 2023 – August 2023 **Mechanical Engineering Intern - Dynamics and Structures Group**, *NASA Jet Propulsion Laboratory*, Pasadena, CA.
- Conducted structural analysis on Sample Retrieval Lander (SRL) payloads for the Mars Sample Return Mission.
  - Performed nonlinear structural analysis in Simcenter Nastran to simulate friction effects at interfaces between Mars Ascent Vehicle (MAV) and Mars Lander Vehicle to address risk of excessive radial forces on body of MAV due to friction.
  - Computed thermal-elastic behavior of SRL's Sample Transfer Arm in a faulted state over Mars diurnal cycle.
- May 2022 – August 2022 **Mechanical Engineering Intern - Technology Infusion Group**, *NASA Jet Propulsion Laboratory*, Pasadena, CA.
- Prepared thermal vacuum chamber and conducted physical testing of mission-critical hardware for Mars Sample Return Mission. Testing included remote joining of hardware components, determining heat transfer coefficients across relevant flight interfaces, and identifying diffusive tendencies of relevant materials.
  - Created a MATLAB script to rapidly analyze large quantities of data including load cell forces, power supply current and voltage, and temperature data used to perform rapid thermal analysis of the system.
- August 2019 – April 2022 **Undergraduate Teaching Assistant**, *University of Pittsburgh*, Pittsburgh, PA.
- Served as an Undergraduate Teaching Assistant for Introduction to Engineering Computing (four terms), Introduction to Thermodynamics (three terms), and Introduction to Electrical Circuits (two terms).
  - Responsible for content creation (worksheets, homework, quizzes, exams, and accompanying solutions), as well as grading assignments. Assisted students during class and office hours.

## Awards and Fellowships

- NSF GRFP Recipient (2024)
- Maryland Robotics Center GRA Recipient (2024)
- Marion Alice Nye "Buzz" Barry Scholarship Recipient (2022)
- National Center for Women and Information Technology (NCWIT) Aspirations in Computing (AiC) Collegiate Award Recipient (2022)
- Naugle Fellowship in Mechanical Engineering (2020)

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## Publications

1. *Experimental Validation of Cryobot Thermal Models for the Exploration of Ocean Worlds*, P. do Vale Pereira, M. Durka, B. Hogan, K. Richmond, M. Smith, D. Winebrenner, W. Elam, B. Hockman, A. Lopez, N. Tanner, J. Moor, J. Ralston, M. Alexander, W. Zimmermann, N. Flannery, W. Kuhl, **Sarah E. Wielgosz**, K. Cahoy, T. Cwik, and W. Stone. *The Planetary Science Journal* 4.5 (2023): 81.
2. *Fully-coupled Thermal-electric Modeling of Thermoelectric Generators*, **Sarah E. Wielgosz**, Corey E. Clifford, Kevin Yu and Matthew M. Barry. *Energy* 266 (2023): 126324.
3. *A Novel High-Performance Mission-Enabling Multi-Purpose Radioisotope Heat Source*, Michael J. Durka, Jean-Pierre Fleurial, **Sarah E. Wielgosz**, Shane P. Riley, Matthew M. Barry, David F. Woerner, Brian Barstow, Fivos Drymiotis and Bill J. Nemsith. In 2022 IEEE Aerospace Conference, Big Sky, Montana, USA, March 5-12, 2022.
4. *Mathematical Modeling of a Thermoelectric Generator Unicouple*, **Sarah E. Wielgosz**, Shane P. Riley, Kevin Yu, Michael J. Durka, Bill J. Nesmith, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. American Society of Thermal and Fluid Engineers 7<sup>th</sup> Thermal and Fluids Engineering Conference, Las Vegas, NV, USA, May 16-18, 2022. In ASTFE Digital Library, Begel House Inc., 2022.
5. *Optimization Methods for Segmented Thermoelectric Generators*, Shane P. Riley, **Sarah E. Wielgosz**, Kevin Yu, Michael J. Durka, Bill J. Nesmith, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. American Society of Thermal and Fluid Engineers 7<sup>th</sup> Thermal and Fluids Engineering Conference, Las Vegas, NV, USA, May 16-18, 2022. In ASTFE Digital Library, Begel House Inc., 2022.
6. *Optimization of Variable Cross-Sectional Area Thermoelectric Elements Through Multi-Method Thermal-Electric Coupled Modeling*, Arsha K. Mamoozadeh, **Sarah E. Wielgosz**, Kevin Yu, Fivos Drymiotis and Matthew M. Barry. American Society of Thermal and Fluid Engineers 5-6<sup>th</sup> Thermal and Fluids Engineering Conference, New Orleans, LA, USA, May 23-26, 2021. In ASTFE Digital Library, Begel House Inc., 2021.

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## Conference Presentations

1. *Mathematical Modeling of a Thermoelectric Generator Unicouple*, **Sarah E. Wielgosz**, Shane P. Riley, Kevin Yu, Michael J. Durka, Bill J. Nesmith, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. 7<sup>th</sup> Thermal and Fluids Engineering Conference, May 16-18, 2022.
2. *Optimization Methods for Segmented Thermoelectric Generators*, Shane P. Riley, **Sarah E. Wielgosz**, Kevin Yu, Michael J. Durka, Bill J. Nesmith, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. American Society of Thermal and Fluid Engineers 7<sup>th</sup> Thermal and Fluids Engineering Conference, May 16-18, 2022.
3. *A Novel High-Performance Mission-Enabling Multi-Purpose Radioisotope Heat Source*, Michael Durka, Fivos Drymiotis, Jean-Pierre Fleurial, **Sarah Wielgosz**, Shane Riley, Matthew Barry, David Woerner, Sam Howell, Brian Bairstow, Miles Smith, William Nesmith, and Benjamin Hockman. 2022 IEEE Aerospace Conference, March 5-12, 2022.
4. *Modeling of Next-generation Thermoelectric Generators*, **Sarah E. Wielgosz**, Kevin Yu, Shane P. Riley, Michael J. Durka, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. Virtual Conference on Thermoelectrics, July 20-22, 2021.
5. *Parametric Modeling of Next-generation Thermoelectric Generators Considering Contact Resistances*, Shane P. Riley, Kevin Yu, **Sarah E. Wielgosz**, Michael J. Durka, Fivos Drymiotis, Jean-Pierre Fleurial and Matthew M. Barry. Virtual Conference on Thermoelectrics, July 20-22, 2021.
6. *Optimization of Variable Cross-Sectional Area Thermoelectric Elements Through Multi-method Thermal-Electric Coupled Modeling*, Arsha K. Mamoozadeh, **Sarah E. Wielgosz**, Kevin Yu, Fivos Drymiotis and Matthew M. Barry. American Society of Thermal and Fluid Engineers 5-6<sup>th</sup> Thermal and Fluids Engineering Conference, May 23-26, 2021.

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## Skills

### Proficient:

- MATLAB
- SolidWorks
- LaTeX
- Adobe Illustrator
- Microsoft Office

### Intermediate:

- ANSYS ICEM
- ANSYS CFX
- ANSYS Fluent
- ANSYS CFD-Post
- Python
- C++
- ROS
- Simcenter Nastran
- Autodesk Inventor
- Supercomputing