# Sara R. Wilson

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## Education

**University of Pittsburgh** — Pittsburgh, PA
Bachelor of Science in Mathematics *(GPA: 3.7)* — Expected May 2026

## Honors & Awards

**Dean's List**
**Edna M. Heck Scholarship**
**SWE Scholarship & Certificate of Merit in Math and Science**
**Greater Pittsburgh Police FCU Scholarship**

## Publications

**An Analysis of a 2×2 Keyfitz-Kranzer Type Balance System with Varying Generalized Chaplygin Gas** — Sept 2024

J. Frew, N. Keyser, E. Kim, G. Paddock, C. Toumbleston, **S. Wilson**, C. Tsikkou
10.1063/5.0231413

## Research Experience

**Semiconductor Research Corporation** — Tuscaloosa, AL
Engineering Researcher — Jun 2025 – Jul 2025

- Analyzed mutual and self-inductance, resonant transfer, and electromagnetic far-field behavior in one and two coil wireless power transfer systems contained in a metal enclosure
- Evaluated design modifications to optimize power via simulation, computation, and analysis

**West Virginia University** — Morgantown, WV
Applied Analysis Researcher — Jun 2024 – Jul 2024

- Expanded work involving a $2 \times 2$ Keyfitz-Kranzer type balance system with varying Chaplygin gas, a model for dark energy and dark matter
- Utilized numerical methods, particularly the local Lax-Friedrich scheme, adapting the implementation for time-dependent wave speeds and analyzing system dynamics, verifying delta-shocks and regional changes over time

## Relevant Coursework

**Graduate**
Advanced Scientific Computing I: Finite Element Computational Fluid Dynamics, Advanced Calculus

**Undergraduate**
Numerical Analysis, Numerical Linear Algebra, Real Analysis, Partial Differential Equations, Ordinary Differential Equations, Linear Algebra Abstract Algebra, Logic, Model Theory, Graph Theory, Honors Physics, Space Flight, Algorithms & Data Structures

## Skills

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|---|---|
| **Programming:** | Python, MATLAB, Java |
| **Scientific Computing:** | Finite Difference Methods, Finite Element Methods, Neural Networks |
| **Software:** | Ansys Maxwell, LaTeX, Git, VS Code, Paraview |
| **Other:** | Technical Writing, Data Visualization, Education |

## Professional Development

**Princeton University** — Princeton, NJ
Summer School in Fluids and Computer Assisted Proofs — Aug 2025

- Attended a series of lectures about the Euler and Navier-Stokes equations, numerical methods for fluid equations, neural networks, computer-assisted proofs, and mathematical career development

**University of Alabama** — Tuscaloosa, AL
Summer Research Symposium — Jul 2025

- Wireless Power Transfer for Monolithic and Heterogenous Integration of 3D Integrated Devices

**Texas A&M University** — College Station, TX
Summer School in Modeling and Simulation of PDEs — May 2025

- Attended a series of lectures and labs covering theory, modeling, finite difference methods, and finite element methods for partial differential equations
- Developed a 2D FDTD solver for Maxwell's equations on a graphene sheet with both a Uniform PML and Split PML as an absorbing boundary layer

**Joint Mathematics Meetings** — Seattle, WA
Pi Mu Epsilon Poster Session — Jan 2025

- Numerical Analysis of the Riemann Problem for a Cosmological $2 \times 2$ Balance System

**West Virginia University** — Morgantown, WV
Summer Research Symposium — Jul 2024

- Numerical Analysis of the Riemann Problem for a Cosmological $2 \times 2$ Balance System

## Teaching Experience

**University of Pittsburgh** — Pittsburgh, PA
Teaching Assistant — Aug 2024 – Current

- Instructed weekly recitation sessions and held office hours to reinforce lecture material and facilitate active student engagement in business calclus and algebra

**University of Pittsburgh** — Pittsburgh, PA
Mathematics Tutor — Jan 2023 – Current

- Provided direction and guidance via individualized sessions to students struggling in mathematics, from college algebra through differential equations

**West Virginia University** — Remote
REU Mentor — Jun 2025 - Jul 2025

- Supported new REU cohort through mentorship in numerical analysis of system of balance laws and MATLAB programming