

Sara R.J. Wilson

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Education

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|---|----------------------------|
| University of Pittsburgh Bachelor of Science in Mathematics | Pittsburgh, PA May 2026 |
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Honors & Awards

Dean's List, Edna M. Heck Scholarship, SWE Certificate of Merit in Math and Science

Publications & Preprints

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| Computational Methods in Plasma Physics S.R. Wilson | Pending |
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| An Analysis of a 2×2 Keyfitz-Kranzer Type Balance System with Varying Generalized Chaplygin Gas <i>Physics of Fluids</i> J. Frew, N. Keyser, E. Kim, G. Paddock, C. Tumbleston, S. Wilson , C. Tsikkou 10.1063/5.0231413 🔗 | Sept 2024 |
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Research Experience

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| University of Pittsburgh Numerical Analysis Researcher | Pittsburgh, PA Nov 2025 – Current |
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- Analyzing the error and stability of IMEX2 algorithm for finite elements
- Used FreeFEM++ to verify results

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| Carnegie Mellon University CMU-Pitt Mathematics Directed Reading Program | Pittsburgh, PA Sept 2025 – Dec 2025 |
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- Studied graduate-level text in computational plasma physics, investigating numerical methods, including finite difference, spectral, finite element techniques

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| Semiconductor Research Corporation Engineering Researcher | Tuscaloosa, AL Jun 2025 – Jul 2025 |
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- 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

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| West Virginia University Applied Analysis Researcher | Morgantown, WV Jun 2024 – Jul 2024 |
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- Expanded work involving a 2×2 Keyfitz-Kranzer type balance system with varying Chaplygin gas, a model for dark energy and dark matter
- Adapted implementation of the local Lax-Friedrichs scheme to account for time-dependent wave speeds and analyzing system dynamics

Relevant Coursework & Studies

Graduate: Computational Fluid Dynamics, Advanced Calculus

Undergraduate: Numerical Analysis, Numerical Linear Algebra, Real Analysis, Partial Differential Equations, Probability, Honors Physics, Chemistry, Space Flight, Algorithms & Data Structures

Independent: Numerical Methods for Astrophysics

Skills

Programming: MATLAB, Java, Python, R, MIPS, C

Software: FreeFEM++, Ansys Maxwell, L^AT_EX, Git, VS Code, Paraview

Projects

Finite Element Solvers in FreeFEM++ (*in progress*)

Implementing Poisson and Stokes problems

Professional Development

Carnegie Mellon University

CMU-Pitt DRP Presentation

Pittsburgh, PA

Dec 2025

- Talk on the culmination of my studies in computational plasma physics, with an emphasis on finite element methods for eigenvalue problems present in modeling plasma columns

Princeton University

Summer School in Fluids and Computer Assisted Proofs

Princeton, NJ

Aug 2025

- Attended lectures on numerical methods for fluid equations, neural networks, computer-assisted proofs, and career development

University of Alabama

Summer Research Symposium

Tuscaloosa, AL

Jul 2025

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

Texas A&M University

Summer School in Modeling and Simulation of PDEs

College Station, TX

May 2025

- 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

Pi Mu Epsilon Poster Session

Seattle, WA

Jan 2025

- Numerical Analysis of the Riemann Problem for a Cosmological 2×2 Balance System

West Virginia University

Summer Research Symposium

Morgantown, WV

Jul 2024

- Numerical Analysis of the Riemann Problem for a Cosmological 2×2 Balance System

Teaching Experience

University of Pittsburgh

Teaching Assistant

Pittsburgh, PA

Aug 2024 – Current

- Instructed recitation sessions to reinforce material and facilitate engagement in business calculus and algebra

University of Pittsburgh

Mathematics Tutor

Pittsburgh, PA

Jan 2023 – Current

- Held individualized sessions for students in mathematics, from college algebra through differential equations. Tutored students with extenuating circumstances remotely to optimize learning opportunities

West Virginia University

REU Mentor

Remote

Jun 2025 - Jul 2025

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