

Nicole Brewer

RESEARCH SOFTWARE ENGINEER | GRADUATE RESEARCH ASSISTANT

Arizona State University, Tempe, AZ

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Education

Arizona State University

PHD COMPUTATIONAL HISTORY AND PHILOSOPHY OF SCIENCE

Tempe, AZ

Expected May 2026

Purdue University

BS MATHEMATICS WITH COMPUTER SCIENCE

West Lafayette, IN

December 2018

Professional Employment

Graduate Research Assistant

COMPLEX ADAPTIVE SYSTEMS

- Advisors: Manfred Laubichler and Jane Maienschein
- Templating a literate and **computationally reproducible dissertation** or thesis using Quarto

Arizona State University

Aug 2022 - Present

Research Software Engineer

ITAP RESEARCH COMPUTING

- Implemented a highly interactive, Jupyter-based user interface for lab software in order to expand the audience and ease of use of a rich set of computational functions via a user-friendly interface
- Facilitated software design, the implementation of best practices, and internal tool development, and **lab documentation** to improve the overall sustainability of lab software
- Transform disparate data acquisition and processing scripts into modular classes to be reused for scientific workflows

Purdue University

Feb 2019 - Apr 2022

Software Engineer

APTIV

- Developed comprehensive Unit Test projects to verify newline automotive controller hardware

West Lafayette, IN

Nov 2017 - Nov 2018

CSol Channels Scholar REU

CENTER FOR SCIENCE OF INFORMATION, NSF STC

- Advisor: Mark Daniel Ward
- **Utilized HPC clusters** to efficiently create large data sets pertaining to combinatorial game theory
- Analyzed batching strategies of parallel computation to efficiently detect an unknown length of repeating sequences in long strings
- Developed a **command line interface and file management system in Python** to prevent human error and enhance the usability of codebase

West Lafayette, IN

Jan 2016 - June 2017

Grants

Jan 2023 **Special Projects Grant** (\$2,600) Computer Science Education Special Interest Group (SIGCSE).

Jan 2023 **Better Scientific Software Fellowship** (\$25,000) Exascale Computing Project (DOE/NSF), Internal PI.

Awards

Oct 2023 **Best Student Poster Award** United States Research Software Engineering Association, 2nd Author.

Dec 2022 **Outstanding Mentorship Award** (\$750) ASU Graduate and Professional Student Association.

July 2020 **Young Professional of the Year Award** (\$500) Science Gateways Community Institute.

June 2018 **Phil Andrews Award** Practice and Experience in Advanced Research Computing Conference.

Fellowships

Dec 2023 **Graduate College University Grant** (\$5,000) Arizona State University.

Aug 2022 **School of Life Science Fellowship** (\$2,500) Arizona State University.

Publications

1. Brewer, N., Campbell, R., Kalyanam, R., Luk, K. I., Song, C. X., & Zhao, L. (2022). Benefits and limitations of jupyter-based scientific web applications. *2022 IEEE 18th International Conference on eScience (eScience)*. <https://doi.org/10.1109/eScience55777.2022.00094>
2. Brewer, N., Kim, H., Li, C., Anderson, H., Lanum, J., Cheoh, J., Hillery, B., & Overmyer, T. (2019). Student cluster competition 2018, team ada six of purdue university: Reproducing extreme scale multi-physics simulations of tsunamigenic 2004 sumatra megathrust earthquake on intel skylake architecture. *Parallel Computing*, 90, 102565. <https://doi.org/10.1016/j.parco.2019.102565>

Posters and Abstracts

Oct 2023	Building Web Applications with Jupyter Notebooks among researchers and RSEs (2nd author)	US-RSE
Oct 2023	JupyterIDE: Promoting JupyterLab features and extensions that facilitate collaboration (2nd author)	US-RSE
June 2023	Recommended Libraries for Cyberinfrastructure Users Developing Jupyter Notebooks (presenter)	RMACC HPC Sym.
Mar 2022	Standalone Web Application Template (presenter)	Mini Gateways
July 2021	Leveraging Traits for Highly Interactive Computational Tools in Jupyter (virtual presenter) (abstract)	Gateways
June 2018	Classification of Periodicity in Subtraction Game Sequences (presenter)	PEARC

Talks and Panels

Mar 2023	Computational Notebooks as Scholarly Objects (host)	US-RSE Comm. Call
Oct 2022	Software Engineering Topics Relevant to eScience (invited panelist)	eScience22
Mar 2022	Scientific Web Applications with Jupyter Notebooks (presenter)	US-RSE Comm. Call
Oct 2021	How to Recruit and Sustain a Diverse and Inclusive Workforce (invited panelist)	Int'l RSE Day

Professional Service

International Council of RSE Association

COUNCIL MEMBER

International

Jan 2022 - Present

- Chaired and organized council meetings
- Participated in coordinated efforts, such as conferences, workshops, and podcast episodes, that fostered international collaboration

Research Software Engineering Association

STEERING COMMITTEE MEMBER

United States

Jan 2022 - Present

- Initiated the organization's inaugural awards program and contributed to the search for an executive director as the organization as it enters a new era with the receipt of three years of funding from the Sloan Foundation
- Committed at least five hours per week to steering committee and other meetings including the Diversity, Equity, and Inclusion (DEI), Outreach, and Code of Conduct and Moderation working groups
- Established the DEI Speaker Series and DEI Media Meetings.

Women in High Performance Computing

CO-CHAIR

Purdue University

Jan 2020 - May 2022

- Organized and served as the host for invited talks where members shared their work or research
- Created and maintained a formal newsletter featuring opportunities and events for members
- Submitted annual reports and participated in conference events for the international umbrella organization

REVIEWING

- 2023 **US-RSE**, Notebook Submissions
- 2023 **SciPy**, Tutorials and Digital Humanities
- 2022 **SC**, Student Cluster Competition, Reproducibility Paper

CONFERENCE ACTIVITY

- Oct 2023 **Co-Chair**, Notebooks as Scholarly Objects Birds of a Feather (BoF), US-RSE Conference
- Oct 2023 **Chair**, Notebook Submission Subcommittee, US-RSE Conference
- Oct 2023 **Co-Chair**, Student Program Committee, US-RSE Conference
- Nov 2022 **Committee Member**, Reproducibility Challenge, SC22

Training

SDSC Summer Institute

SAN DIEGO SUPERCOMPUTER CENTER

- Machine learning in R, big data with Spark, parallel programming with Python, and scientific visualization

Virtual

May 2020

Student Cluster Competition, Reproducibility Challenge

RESEARCH COMPUTING, PURDUE UNIVERSITY

- Advisors: Betsy Hillery
- Built a small cluster and applied optimization techniques in a non-stop, 48-hour challenge at the SC18 conference
- Compiled a scientific application from an accepted paper from the prior year's Technical Program and interacted directly with the paper's authors to reproduce specific results and conclusions from the paper

SC23

June 2018 - Dec 2018

Teaching

Carpentries Instructor Training

TRAINEE

The Carpentries

June 2023

Graduate Partners in Science Education: K - 12 STEM Education & Outreach

CURRICULUM DEVELOPER

Arizona State University

Aug 2022 - Dec 2022

Object-Oriented Programming

UNDERGRADUATE TEACHING ASSISTANT

Purdue University

Aug 2015 - May 2016

TUTORIALS

July 2023 **How the Little Jupyter Notebook Became a Web App** (4 hours), SciPy, Austin, TX

Apr 2023 **Notebook Submission Tutorial** (1.5 hours), US-RSE, Virtual

OPEN SOURCE EDUCATION

Sep 2022 **HPC Unplugged: A lesson plan for teaching parallel and distributed computing** (booklet)

Mentorship and Outreach

Fall 2022 **Mentor**, Mentor–Protégé Matching, SC22

Fall 2019 **Staff Advisor**, Student Cluster Competition, SC19

June 2019 **Mentor**, Science Gateways Community Institute Hackathon, PEARC19

Fall 2018 **Near-Peer Mentor**, Mentors for Aspiring Girls in Computing, Purdue University

MANAGERIAL EXPERIENCE

Program Developer and Manager

TWO FULL-TIME RESEARCH SOFTWARE DEVELOPER INTERNSHIP

Arizona State University

Summer/Fall 2023

- Led trainings, career sessions, code reviews, pair programming, and other sessions intended to prioritize student learning
- Advertized for research software developer positions, evaluated about 250 applications, interviewed graduate and undergraduates, and hired two full-time students
- Developed an 8-week internship program using the Agile framework to keep students both accountable to their original goals but adaptable to roadblocks frequently encountered in original research projects
- These two full-time summer and part-time fall positions were funded by the Better Scientific Software Fellowship listed above

Applied Management Principles

KRANNERT EXECUTIVE EDUCATION

Purdue University

July 2019

- Purdue's "mini-MBA" covering accounting, finance, strategy, marketing, negotiations & problem solving, and entrepreneurial skills essential to effective laboratory and grant management

Staff Mentor

DISCOVER PARK UNDERGRADUATE RESEARCH INTERNSHIP

Purdue University

Fall/Spring 2018

- Defined the scope of a small research software project related to our ongoing research projects and met with each student to help them set achievable short-term goals and support them through challenges they encountered

Science Communication

May 2023 **Host**, Reproducibility Initiative at SC22, *Long Tales of Science*. ([episode](#))
May 2022 **Host**, Trial by Fire, *Long Tales of Science*. ([episode](#))
Apr 2022 **Interviewee**, Research Software Engineering, *Hello PhD*. ([episode](#))
Feb 2022 **Co-Author**, A kind-of brief shared early history of US-RSE, *US-RSE*. ([post](#))
Dec 2021 **Host**, Call 1-800-HLP-DESK, *Long Tales of Science*. ([episode](#))
Oct 2020 **Host**, Models and Simulations Run on the Cluster and in the Family, *Long Tales of Science*. ([episode](#))

Travel Awards

2023 **CSSN Community Engagement Program** (\$2,500), Computational Science Support Network
2022 **GPSA Individual Travel Award** (\$950), ASU Graduate and Professional Student Association
2022 **eScience Travel Grant** (\$700), National Science Foundation
2021 **UPSS Delegate** (\$500), Philosophy of Science Biennial Meeting
2018 **Travel Grant** (\$500), XSEDE

Extracurricular Leadership

Aug 2016 **Vice President**, Purdue University Triathlon Club
Aug 2015 **Social Media Manager**, Purdue University Triathlon Club

Extracurricular Activity

Apr 2019 **USA Triathlon Collegiate Club National Championships**, Tempe, AZ
Oct 2018 **Chicago Marathon**, Chicago, IL
Aug 2018 **Ironman 70.3 Steelhead Triathlon**, Benton Harbor, MI
Aug 2017 **Ironman 70.3 Steelhead Triathlon**, Benton Harbor, MI
Apr 2017 **USA Triathlon Collegiate Club National Championships**, Tuscaloosa, AL
Nov 2016 **Monumental Marathon**, Indianapolis, IN
Aug 2016 **Ironman 70.3 Steelhead Triathlon**, Benton Harbor, MI
Apr 2016 **USA Triathlon Collegiate Club National Championships**, Clemson, SC
Jan 2016 **Disney World Marathon**, Orlando, FL