Nicole **Brewer**

Research Software Engineer | Graduate Research Assistant

Arizona State University, Tempe, AZ

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Education

Arizona State University — *Tempe, AZ*

PhD Computational History and Philosophy of Science — *Expected May 2026*

Purdue Univeristy — *West Lafayette, IN*

BS Mathematics with Computer Science — *December 2018*

Professional Employment

Graduate Research Fellow — *OSPO UC Santa Cruz*

Summer of Reproducibility — *May 2024 - Aug 2024*

- Advisors: Tanu Malik
- Conducting an **emperical reproducibility study** testing the portability Jupyter Notebooks using Flinc

Graduate Research Assistant — *Arizona State University*

Complex Adaptive Systems — *Aug 2022 - Present*

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

Research Software Engineer — *Purdue University*

ITaP Research Computing — *Feb 2019 - Apr 2022*

- 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

Software Engineer — *West Lafayette, IN*

Aptiv — *Nov 2017 – Nov 2018*

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

CSoI Channels Scholar REU — *West Lafayette, IN*

Center for Science of Information, NSF STC — *Jan 2016 - June 2017*

- 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 managment system in Python** to prevent human error and enhance the usability of codebase

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** (virual presenter) (abstract)	*Gateways*
June 2018	**Classification of Periodicity in Subtraction Game Sequences** (presenter)	*PEARC*

Talks and Panels

Nov 2023	**Putting the "R" in the Undergraduate RSE Internship** (presenter)	*Supercomputing*
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

International

Council Member

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

United States

Steering Committee Member

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

Purdue University

Co-Chair

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 umberella orgainzation

Reviewing

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

Conference Activity

Oct 2024	**Co-Chair**, Notebook Submission Subcommittee, US-RSE Conference
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

Research Software Training

SDSC Summer Institute *Virtual*

San Diego Supercomputer Center *May 2020*

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

Student Cluster Competition, Reproducibility Challenge *SC23*

Research Computing, Purdue University *June 2018 - Dec 2018*

- Advisors: Betsy Hillery
- Built a small cluster and applied optimization techniques in a non-stop, 48-hour challenge at the SC18 conference
- Compiled a scienfitic 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

Education

Teaching Experience

Lead Instructor *SciPy24, Tacoma, WA*

Building Complex Web Apps with Jupyter Widgets *July 2024*

Lead Instructor *SciPy23, Austin, TX*

How the Little Jupyter Notebook Became a Web App *July 2023*

Undergraduate Teaching Assistant *Purdue Univeristy*

Object-Oriented Programming *Aug 2015 - May 2016*

Educational Training and Certification

June 2024 **Quick Take: How to Plan a Single Class Session**, CIRTL Workshop

June 2023 **Carpentries Instructor Training**, The Carpentries

Fall 2023 **Curriculum Development Course**, K - 12 STEM Education and Outreach, ASU GPSE

Open Education Materials

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 *Arizona State University*

Two Full-Time Research Software Developer Internship *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 *Purdue University*

Krannert Executive Education *July 2019*

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

Staff Mentor *Purdue University*

Discover Park Undergraduate Research Internship *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 encoutered

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*. (epidode)
Oct 2020 **Host**, Models and Simulations Run on the Cluster and in the Family, *Long Tales of Science*. (episode)

Press

Mar 2023 **ASU graduate student awarded fellowship to improve scientific web applications**, ASU News
Jan 2022 **New WHPC Podcast Series**, RCAC at Purdue
June 2020 **Who is Women in HPC: Panel Discussion**, RCAC at Purdue
Nov 2019 **Purdue team chosen to compete in international supercomputing competition**, RCAC at Purdue
Oct 2018 **Purdue WHPC October Meeting Announcement**, RCAC at Purdue
Sept 2018 **Purdue Women in HPC member wins award at national research computing conference**, RCAC at Purdue

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