

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 2027

Purdue University

BS MATHEMATICS WITH COMPUTER SCIENCE

West Lafayette, IN

December 2018

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>

Honors and Awards

- 2022 **Outstanding Mentorship Award** (\$750), ASU Graduate and Professional Student Association
- 2022 **GPSA Individual Travel Award** (\$950), ASU Graduate and Professional Student Association
- 2021 **UPSS Delegate** (\$500), Philosophy of Science Biennial Meeting
- 2020 **Young Professional of the Year Award** (\$500), Science Gateways Community Institute
- 2018 **Phil Andrews Award**, Practice and Experience in Advanced Research Computing Conference

Grants and Fellowships

- Jan 2023 **Better Scientific Software Fellowship** (\$25,000), Exascale Computing Project (DOE/NSF), Awardee.
- Aug 2022 **School of Life Science Fellowship** (\$2,500), Arizona State University, Awardee.

Posters and Abstracts

- June 2023 **Recommended Libraries for Cyberinfrastructure Users Developing Jupyter Notebooks** ([poster](#)) RMACC HPC Sym.
- Mar 2022 **Standalone Web Application Template** ([presenter](#)) Mini Gateways
- July 2021 **Leveraging Traits for Highly Interactive Computational Tools in Jupyter** ([abstract](#)) ([video](#)) Gateways
- June 2018 **Classification of Periodicity in Subtraction Game Sequences** ([poster](#)) PEARC

Professional Experience

ITaP Research Computing

RESEARCH SOFTWARE ENGINEER

Purdue University

Feb 2019 - Apr 2022

- Implemented a highly interactive, Jupyter-based, GUI wrapper for power analysis 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

Aptiv

SOFTWARE VERIFICATION ENGINEER

West Lafayette, IN

Nov 2017 - Nov 2018

- Developed comprehensive Unit Test projects that utilized CAN bus protocol communications to verify automotive controller hardware

Research Experience

Graduate Research Assistant

COMPLEX ADAPTIVE SYSTEMS, ARIZONA STATE UNIVERSITY

Aug 2022 - Present

- Advisor: Manfred Laubichler
- Using natural language processing, machine learning, network analysis, high performance computing, and mixed social science methods to model the evolution of scientific standards through time
- Documenting and adapting code and data from prior projects for reuse

Student Cluster Competition, Reproducibility Challenge

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 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

CSol Channels Scholar REU

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 management system in Python to prevent human error and enhance the usability of codebase

Talks and Panels

Mar 2023	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

Conference Activity

- 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.

Professional Service

Council Member

INTERNATIONAL COUNCIL OF RSE ASSOCIATION

International

Jan 2022 - Present

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

Steering Committee Member

RESEARCH SOFTWARE ENGINEERING ASSOCIATION

United States

Jan 2022 - Present

- 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.

Co-Chair

WOMEN IN HIGH PERFORMANCE COMPUTING

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

Teaching Experience

Object-Oriented Programming

UNDERGRADUATE TEACHING ASSISTANT

Purdue University

Aug 2015 - May 2016

TUTORIALS

July 2023 **How the Little Jupyter Notebook Became a Web App: Managing Increasing Complexity with nbdev** (4 hours), SciPy, Austin, TX

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

OPEN SOURCE EDUCATION AND TRAINING MATERIALS

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

Mar 2020 **R for Research Scientists** (booklet)

Science Communication and Broader Impacts

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)

Mentorship and Outreach

Mentor-Protégé Matching

MENTOR

SC22

Oct - Nov 2022

- Provided career and educational advice and helped extend the professional network of an undergraduate mentee at the Supercomputing conference

Student Cluster Competition

STAFF ADVISOR

SC19

Aug - Nov 2019

- Mentored students taking a weekly, two credit hour course in preparation for a competition that I had participated in the year prior

Science Gateways Community Institute Hackathon

MENTOR

PEARC19

June 2019

- Answered students code-related questions over the course of an intensive, three day conference hackathon

Discover Park Undergraduate Research Internship

STAFF MENTOR

Purdue University

Aug 2018 - May 2019

- Defined the scope of a small project related to our ongoing research projects and met with each student bi-weekly during the course of the semester to help them set achievable short-term goals and guide them through roadblocks they encountered

Mentors for Aspiring Girls in Computing

NEAR-PEER MENTOR

Purdue University

Aug - Dec 2018

- Led hands-on activities to teach computer science concepts to local middle and high school students in order to improve the recruitment and retention of young women in technology careers

Certifications and Training

SDSC Summer Institute

SAN DIEGO SUPERCOMPUTER CENTER

Virtual

May 2020

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

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 research project management

Extracurricular Leadership

Aug 2016 **Vice President**, Purdue University Triathlon Club

Aug 2015 **Social Media Manager**, Purdue University Triathlon Club

Extracurricular Activity

Music Theory and Piano Lessons

Jan 2023 - May 2023

PRIVATE LESSONS FROM ASU FACULTY ASSOCIATE CATHY BATES

Vocalist and Keyboardist

Aug 2022 - Dec 2022

ASU PSYCHEDELIC ROCK BAND, RUQE

MAJOR ENDURANCE SPORT EVENTS

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