

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 2027

- Using natural language processing, machine learning, network analysis, agent-based modeling, high performance computing (HPC) resources, and ethnographic and social science methods to better understand how scientific standards of practice are motivated by reproducibility and other values

Purdue University

West Lafayette, IN

BS MATHEMATICS WITH COMPUTER SCIENCE

December 2018

- Implemented and ran the KMP string matching algorithm in parallel to create a combinatorial game theory set

Grants, Fellowships, and Awards

- 2022 **GPSA Individual Travel Award** (\$950), ASU Graduate and Professional Student Association
- 2022 **eScience Travel Grant** (\$700), National Science Foundation
- 2022 **School of Life Science Fellowship** (\$2,500), Arizona State University
- 2021 **UPSS Delegate** (\$500), Philosophy of Science Biennial Meeting
- 2020 **Young Professional of the Year** (\$500), Science Gateways Community Institute
- 2018 **Travel Grant** (\$500), XSEDE
- 2018 **Phil Andrews Award**, Practice and Experience in Advanced Research Computing Conference

Publications

- 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)*.
- 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 Presentations

- July 2021 **Leveraging Traits for Highly Interactive Computational Tools in Jupyter** ([abstract](#)) ([video](#)). *Gateways 2021*
- June 2018 **Classification of Periodicity in Subtraction Game Sequences** ([poster](#)). *PEARC18*

Professional Experience

ITaP Research Computing

Purdue University

RESEARCH SOFTWARE ENGINEER

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
- TraNational Science Foundation norm disparate data acquisition and processing scripts into modular classes to be reused for scientific workflows

Aptiv

West Lafayette, IN

SOFTWARE VERIFICATION ENGINEER

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

CENTER FOR BIOLOGY AND SOCIETY, ARIZONA STATE UNIVERSITY

Aug 2022 - Present

- Advisor: Manfred Laubichler
- Documenting and adapting code and data from prior projects for reuse.

Student Cluster Competition Team

RESEARCH COMPUTING, PURDUE UNIVERSITY

June 2018 - Dec 2018

- 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

CSOI Channels Scholar REU

CENTER FOR SCIENCE OF INFORMATION, NSF STC

Jan 2016 - June 2017

- 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

Service

Research Software Engineering Association

United States

STEERING COMMITTEE MEMBER

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. Currently developing a DEI Toolkit for members

ITaP Research Computing

Purdue University

CO-CHAIR OF WOMEN IN HIGH PERFORMANCE COMPUTING

June 2020 - May 2022

- Organized and served as the host for invited talks where members shared their work or research
- Established the Long Tales of Science podcast to continue to improve visibility of women in HPC in spite of discontinuing in-person events in the wake of the COVID-19 pandemic

Conference Activity

Nov 2022 **Reproducibility Challenge**, Committee Member.

SC22

Oct 2022 **Software Engineering Topics Relevant to eScience**, Invited Panelist.

eScience22

Oct 2021 **How to Recruit and Sustain a Diverse and Inclusive Workforce: A Case Study**, Invited Panelist. ([slides](#))

Int'l RSE Day
Workshop

Mentorship and Outreach

Mentor-Protégé Matching

SC22

MENTOR

Oct - Nov 2022

- Participated in virtual activities in the months leading up to the conference and provided career and educational advice to two mentees at the conference

Student Cluster Competition

SC19

STAFF ADVISOR

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

PEARC19

MENTOR

June 2019

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

Discover Park Undergraduate Research Internship

Purdue University

STAFF MENTOR

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

Purdue University

NEAR-PEER MENTOR

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

Science Communication and Broader Impacts

Presenter **Scientific Web Applications Template**, extitUS-RSE Community Call, Mar 2022. ([slides](#))
Host **SC22 Mini-series: Reproducibility Initiative (in progress)**, extitRSE Stories, Nov 2022. ([episode](#))
Host **Trial by Fire**, extitLong Tales of Science, May 2022. ([episode](#))
Interview-
wee **Research Software Engineering**, extitHello PhD, Apr 2022. ([episode](#))
Host **Call 1-800-HLP-DESK**, extitLong Tales of Science, Dec 2021. ([episode](#))
Host **Models and Simulations Run on the Cluster and in the Family**, extitLong Tales of Science, Oct 2020. ([episode](#))

Certifications and Training

San Diego Supercomputer Center

SDSC SUMMER INSTITUTE

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

Virtual

May 2020

Krannert Executive Education

APPLIED MANAGEMENT PRINCIPLES

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

West Lafayette, IN

July 2019

Open Source Education and Training Resources

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

Aug 2022 **Corpus Creation with Scopus (in progress)** ([binder](#))

Mar 2020 **R for Research Scientists** ([booklet](#))

Teaching Experience

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

CURRICULUM DEVELOPER

Arizona State University

Aug - Dec 2022

Object Oriented Programming

UNDERGRADUATE TEACHING ASSISTANT

Purdue University

Aug 2015 - May 2016

Extracurricular Leadership

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

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