

# 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 methods from digital humanities, complex adaptive systems science, and high performance computing to better understand reproducibility and other standards throughout the history of science

### 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 **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>

## Presentations

- Apr 2022 **Research Software Engineering** (Interviewee), Hello PhD, Podcast.  
<http://hellophd.com/2022/03/172-research-software-engineer/>
- Oct 2021 **How to Recruit and Sustain a Diverse and Inclusive Workforce: A Case Study** (Invited Panelist), International RSE Day, Virtual. <https://us-rse.org/events/2021/2021-10-intnl-rse-day>
- July 2021 **Leveraging Traits for Highly Interactive Computational Tools in Jupyter** (Video Presentation), Gateways 2021, Virtual. <https://doi.org/10.5281/zenodo.5570605>
- June 2018 **Classification of Periodicity in Subtraction Game Sequences** (Poster), PEARC18, Pittsburg, PA. \

## Professional Experience

### ITaP Research Computing

Purdue University

RESEARCH SOFTWARE ENGINEER

Feb 2019 - Present

- 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

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

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### Graduate Research Assistant

CENTER FOR BIOLOGY AND SOCIETY, ARIZONA STATE UNIVERSITY

Aug 2022 - Present

- Advisor: Manfred Laubichler

### 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

### CSol 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 upon inheritance

## Service

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### Research Software Engineering Association

United States

STEERING COMMITTEE MEMBER

Jan 2022 - Present

- Develop the organization to support RSE's, build an inclusive community, and advocate for the role of RSEs in research. Led meetings and organized events for the diversity, equity, and inclusion working group.

### ITaP Research Computing

Purdue University

CO-CHAIR OF WOMEN IN HIGH PERFORMANCE COMPUTING

June 2020 - May 2022

- 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

## Training

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### San Diego Supercomputer Center

Virtual

SDSC SUMMER INSTITUTE

May 2020

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

### Krannert Executive Education

West Lafayette, IN

APPLIED MANAGEMENT PRINCIPLES

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

## Conference Activity

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|------|---|------|
| 2022 | <b>Podcast Host</b> , "SC22 Mini-series: Reproducibility Initiative" (in progress), RSE Stories Podcast | SC22 |
| 2022 | <b>Committee Member</b> , Reproducibility Challenge   | SC22 |

## Mentorship and Outreach

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### Student Cluster Competition

SC19

STAFF ADVISOR

Aug - Nov 2019

- Advised students in preparing for the competition I had participated in a year prior

### Science Gateways Community Institute Hackathon

PEARC19

MENTOR

June 2019

- Supported students participating in the three day conference hackathon

### Mentors for Aspiring Girls in Computing

Purdue University

NEAR-PEER MENTOR

Aug 2018 - 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

## Teaching Experience

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### Object Oriented Programming

UNDERGRADUATE TEACHING ASSISTANT

*Purdue Univeristy*

*Aug 2015 - May 2016*

## Extracurricular Leadership

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

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