Nicole **Brewer**

Research Software Engineer | Graduate Researcher

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*

Purdue Univeristy — *West Lafayette, IN*

BS Mathematics with Computer Science — *December 2018*

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
- Designed a dynamic Solr schema to index and query layered geospacial and user-defined metadata
- Implemented interactions with this database in a web application in PHP and JavaScript
- Mentored students participating in semester-long internships

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

Training

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

Research Experience

Purdue's Student Cluster Competition Team

Supercomputing 2018 — *June 2018 - Dec 2018*

- Built a small cluster and applied optimization techniques in a non-stop, 48-hour challenge at the SC 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.

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 managment system in Python to prevent human error and enhance the usability of codebase upon inheritance.
- Created a data visualization to illuminate patterns and relationships among 5-dimensions for future work.

Publications

1. 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

UPSS Delegate *Baltimore, MD*

Travel support for early career scholars who are considering pursuing philosophy of science *PSA Biennial Meeting 2021*

Young Professional of the Year *Virtual*

Honorarium awarded for notable achievement in the advancement of science gateways *Gateways 2020*

XSEDE Student Travel Grant *XSEDE*

Travel support to attend PEARC18 and participate in the student program *PEARC2018*

Phil Andrews Award *Pittsburgh, PA*

Awarded for poster presentation of "Classification of Periodicity in Subtraction Game Sequences" *PEARC2018*

Conference Activity

Committee Member *Dallas, TX*

Reproducibility Challenge *SC 2022*

Conference Presentation

Leveraging Traits for Highly Interactive Computational Tools in Jupyter (Video Presentation), Gateways 2021, Virtual. https://doi.org/10.5281/zenodo.5570605

Classification of Periodicity in Subtraction Game Sequences (Poster), PEARC 2018, Pittsburg, PA.

Invited Talks

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

Service

Research Software Engineering Association *United States*

Steering Committee Member *Jan 2022 - Present*

- Develop the organization to support RSE's, build an inclusive community 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 - Present*

- Started a podcast to continute to improve visibility of women in spite of discontinuing in-person events in the wake of the COVID-19 pandemic

Teaching Experience

Object Oriented Programming *Purdue Univeristy*

Undergraduate Teaching Assistant *Aug 2015 - May 2016*

Mentorship and Outreach

Student Cluster Competition *SC 2019*

Staff Advisor *Aug - Nov 2019*

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

Science Gateways Community Institute Hackathon *PEARC 2019*

Mentor *June 2019*

- Supported students participating in the three day 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

Extracurricular Leadership

Purdue Triathlon Club *Purdue University*

Vice President *Aug 2016 - Aug 2017*

- Led and organized callouts, executive board meetings, social media campaigns, and clothing orders.