

Carson Woods

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EXPERIENCE

UNIVERSITY OF TENNESSEE AT CHATTANOOGA |

ASSOCIATE RESEARCHER

May 2022 – Aug 2023 | Chattanooga, TN

- I conducted modeling and benchmarking of message-passing interface (MPI) communication patterns to characterize performance and behaviors of irregularly-communicating HPC applications to inform future optimization efforts.
- I collaborated with Sandia National Laboratories on the continued development and evaluation of shared software environments across multiple HPC platforms, supporting long-term maintainability, portability, performance, and ease-of-use.
- Both of these projects were direct extensions of my work as an undergraduate researcher and a summer intern.

UNIVERSITY OF TENNESSEE AT CHATTANOOGA |

UNDERGRADUATE RESEARCHER

October 2017 – May 2022 | Chattanooga, TN

- I implemented and evaluated HPC system software, including shared software environments and management utilities, with a focus on usability, portability, and performance on production systems.
- I profiled and analyzed complex MPI applications to study communication library behavior under irregular halo exchange patterns, identifying performance bottlenecks and informing optimization strategies.
- My work secured sustained research funding through repeated, annual contracts with Sandia National Laboratories beginning in 2019 (following my summer internship), supporting continued development of HPC software environments and systems research.

SANDIA NATIONAL LABORATORIES | SUMMER INTERN

May 2019 – August 2019; May 2021 – August 2021 | Albuquerque, NM

- I served as a summer intern across multiple summers and was responsible for building, validating, and maintaining a shared software stack deployed across multiple HPC platforms.
- I simplified and standardized the installation process for the shared software environment, reducing setup complexity and improving maintainability for future environment iterations.
- I contributed upstream enhancements to the Spack package manager enabling native support for shared software installations, benefiting both internal users and the broader open-source community.

EDUCATION

EMORY UNIVERSITY

DOCTORATE IN COMPUTER SCIENCE

Ongoing | Atlanta, GA

UNIVERSITY OF TENNESSEE AT CHATTANOOGA

BACHELORS OF SCIENCE IN COMPUTER SCIENCE

May 2022 | Chattanooga, TN

UNIVERSITY OF TENNESSEE AT CHATTANOOGA

BACHELORS OF SCIENCE IN MATHEMATICS

May 2022 | Chattanooga, TN

SKILLS

PROGRAMMING LANGUAGES

C, Rust, Python, HTML/CSS

TECHNOLOGY

Git, Linux/UNIX, SQL, Make, MPI, Spack, Performance Profiling

LINKS

Website:// carsonwoods.io

GitHub:// [carsonwoods](https://github.com/carsonwoods)

LinkedIn:// [carson-woods](https://www.linkedin.com/company/carson-woods)

PUBLICATIONS

- [1] C. Woods and M. L. Curry. Verification and Performance Testing of the Advanced Tri-Lab Software Environment. *Computer Science Research Institute Summer Proceedings*, 2021.
- [2] C. Woods, M. L. Curry, and A. Skjellum. Implementing a Common HPC Environment in a Multi-User Spack Instance. In *HPCSYSPROS19*, page 7, Denver, CO, 2019.
- [3] C. Woods, D. Schafer, P. G. Bridges, and A. Skjellum. Quantifying and Modeling Irregular MPI Communication. In *2024 IEEE 24th International Symposium on Cluster, Cloud and Internet Computing (CCGrid)*, page 525–533, May 2024.