

CHRISTOPHER WAGNER

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SUMMARY

Adaptable systems engineer and researcher with 7 years of experience solving hard problems and developing object-oriented applications using Java, Python, and C++. Skilled in implementing automated testing and formal verification techniques. Proven track record of building effective solutions to complex challenges and applying design patterns to deliver robust software.

EDUCATION

- **Purdue University (Main Campus):** PhD, Computer Science, 2024/2025 (Expected)
- **Purdue University (Main Campus):** Master of Science, Computer Science, 2023
- **Utah State University:** Bachelor of Science, Computer Science, 2016

WORK EXPERIENCE

Sandia National Laboratories - *Systems/Data Science Research Intern* May 2023-Present

- Designed and implemented a custom query DSL for structured data wrangling.
- Reconciled OS discrepancies for an embedded storage control platform via digital oscilloscope.
- Architected a custom GUI for coordinating test procedures using hardware interface libraries.

Purdue University - *Graduate Teaching/Research Assistant* Aug 2018 - Present

- Implemented a Java framework for automated verification of parameterized distributed system models.
- Designed, with a team, a programming language to increase usability of secure multi-party computation.
- Graded assignments, held office hours, and designed homework problems to assess student proficiency in first-order logic, temporal logic, model checking, and abstract interpretation.

Amazon Web Services - *Applied Scientist Intern* May 2020 - August 2020

- Expanded CBMC code contracts to enable compositional reasoning proofs for functions with side effects.
- Proved functional correctness for portions of Amazon's FreeRTOS and s2n projects using CBMC.

Northrop Grumman - *Associate Software Engineer* March 2017 - July 2018

- Developed automated test infrastructure and documentation for USGS Landsat 9 satellite.
- Executed verification test plans and performed code reviews of guidance, navigation, and control software.
- Engineered error injection techniques for real-time PowerPC programs.
- Identified and reported root cause of bugs in embedded flight software.
- Participated in review and refinement of requirements in DOORS.

Micron Technology - *IT Software Engineer Intern* May 2016 - August 2016

- Repaired test automation assets using HP UFT for continuous integration in Jenkins.
- Supported a scrum agile team in stand-ups, sprint planning, and retrospectives managed in Jira.

Hewlett Packard (Enterprise) - *Software Engineer Intern* May 2015 - August 2015

- Gathered requirements from stakeholders and engineered a web app for rapid server reconfiguration.
- Patched back-end web framework issues identified in Bugzilla.

SKILLS

Languages: Java, C++, Python, C, JavaScript, HTML, CSS, C#, Bash, MySQL, PostGreSQL, PHP, Perl, PowerPC Assembly

Tools and Technologies: Linux Terminal, Git, Subversion, Jenkins, Jira, Bugzilla, LabVIEW, VxWorks, Wind River Simics, Elasticsearch, Z3, Coq, ANTLR, AWS EC2, ASP.NET Razor framework, Android SDK, Object-Oriented Programming, Concurrency, Unit Testing, Formal Verification, Program Synthesis

PUBLICATIONS

Peer-Reviewed Conferences

- [1] **C. Wagner**, N. Jaber, and R. Samanta. [Enabling Bounded Verification of Doubly-Unbounded Distributed Agreement-Based Systems via Bounded Regions](#). In *Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, 2023.
- [2] N. Jaber, **C. Wagner**, S. Jacobs, M. Kulkarni, and R. Samanta. [Synthesis of Distributed Agreement-Based Systems with Efficiently-Decidable Parameterized Verification](#). In *Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, 2023.
- [3] Y. Bao, K. Sundararajah, R. Malik, Q. Ye, **C. Wagner**, N. Jaber, F. Wang, M. Ameri, D. Lu, A. Seto, B. Delaware, R. Samanta, A. Kate, C. Garman, J. Blocki, P. Letourneau, B. Meister, J. Springer, T. Rompf, and M. Kulkarni. [HACCLE: Metaprogramming for Secure Multi-Party Computation](#). In *Generative Programming: Concepts & Experiences (GPCE)*, 2021.
- [4] N. Jaber, **C. Wagner**, S. Jacobs, M. Kulkarni, and R. Samanta. [QuickSilver: Modeling and Parameterized Verification for Distributed Agreement-Based Systems](#). In *Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, 2021.
- [5] N. Jaber, S. Jacobs, **C. Wagner**, M. Kulkarni, and R. Samanta. [Parameterized Verification of Systems with Global Synchronization and Guards](#). In *Computer Aided Verification (CAV)*, 2020.

PROJECTS

Discover[i]

- Implemented a parameterized model checking framework which combines modular reasoning and automated reduction with a counter-based model checker for a high-level protocol language.
- Leveraged formal specification and process semantics to prove layered cutoff reductions for automatic parameterized verification of distributed systems.

HACCLE

- Designed a high-level surface language, Harpoon, for secure multi-party computation (MPC) targeting a variety of backends, including garbled circuits and fully homomorphic encryption.
- Formalized decomposition of secure functions to improve performance by reducing the need for expensive cryptographic operations.

AWARDS AND SERVICE

ACM SIGPLAN PAC Professional Activities Grant	OOPSLA 2021, 2023
Student Travel Fellowship	CAV 2019
Presidential Scholarship	Utah State University (2013)
Eagle Scout	Boy Scouts of America (2011)
Purdue CSGSA Treasurer	2021-2023
CAV Adjunct Reviewer	2021
PurPL Seminar Coordinator	2018-2019
GoBoiler Intern Mentor	2019
PhD Student Visit Day Panelist	2019