

Brent Pappas

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EDUCATION

Orlando, Florida

August 2017 - May 2021

Courses: Data Structures and Algorithms, Systems Software, Programming Languages, Discrete Structures

University of Central Florida (UCF)

Bachelor of Science - Computer Science; GPA: 3.849

Orlando, Florida

August 2021 - Present

Courses: Analysis of Algorithms, Complexity Theory, Computer Architecture, Compiler Construction

UCF

PhD - Computer Science; GPA: 3.975

SKILLS SUMMARY

Languages: Python 3, C/C++, Bash, HTML/CSS/JavaScript

Tools: Git, GitHub, LLVM/Clang

Platforms: Linux, Web, Windows

Soft Skills: Leadership, Writing, Communication, Time Management

EXPERIENCE

Remote

May 2023 - August 2023, December 2023

Trail of Bits
Intern

- **C Language Toolsmithing:** Created Macroni, a C static analysis tool that combines Trail of Bits' tools PASTA and VAST to lower C preprocessor macros down to MLIR. Macroni is available at <https://github.com/trailofbits/macroni>.
- **Peer-reviewed Development:** Leveraged GitHub to push changes to company repos, submit code for code review, and finally merge changes into mainline branches.
- **Research Discussion:** Exhibited research results and Macroni to team members and company CEO, Dan Guido, for advice and criticism.

In-person/Remote

July 2021 - Present

UCF
Graduate Research Assistant

- **Research in Programming Languages:** Stay up-to-date on the latest academic developments in programming languages.
- **Implement Ideas:** Implement research ideas in languages such as C++, e.g. a Clang plugin for transforming C preprocessor macros to C functions.
- **Run Experiments:** Write Python and Bash scripts to automate running experiments.

In-person/Remote

September 2019 - July 2021

SP+
Quality Assurance Coordinator

- **Agile Software Development:** Engaged in agile software development methods within a small team to QA test software before moving on to later phases of development.
- **Testing Automation:** Refactored and wrote Python scripts to automate testing of various online user applications.
- **Mobile Application Testing:** Tested company Android apps for compatibility with various versions of Android.

In-person

August 2018 - December 2019

Student Academic Resource Center of UCF
Peer Mentor

- **Led Tutoring Sessions:** Led Computer Science 1 and Object Oriented Programming tutoring sessions involving Socratic learning methods.
- **Faculty Collaboration:** Collaborated with UCF teaching staff to enhance tutoring session quality.
- **Tutor Mentoring:** Observed other tutors' sessions and provided feedback as to how they may improve their communication and tutoring skills.

PROJECTS

Macroni: A C static analysis tool that combines Trail of Bits' tools PASTA and VAST to lower C preprocessor macros down to MLIR. Macroni is available at <https://github.com/trailofbits/macroni>.

Maki: C++ Clang plugin that analyzes how C preprocessor macros affect the C AST. Maki provides language porting tools information they can use to port macros to target languages in a way that preserves not just macro behavior, but also macro abstractions. Maki is the tool associated with 2024 ICSE paper, *Semantic Analysis of Macro Usage for Portability*, for which I am the lead-author.

Cpp2C: C++ Clang plugin that automatically transforms eligible C preprocessor macros into C functions. This enables other static analysis tools to analyze C programs without needing to preprocess them first and lose developer abstractions.

Chip-8 Emulator: An emulator of the Chip-8 virtual machine, written in C.

PUBLICATIONS

Semantic Analysis of Macro Usage for Portability: by Brent Pappas and Paul Gazzillo. International Conference on Software Engineering (ICSE), 2024. Acceptance rate of 22% (234 / 1,051). <https://doi.org/10.1145/3597503.3623323>

Holy Macroni! A recipe for progressive language enhancement: by Brent Pappas. Blog post written while interning at Trail of Bits. Summer 2023. <https://blog.trailofbits.com/2023/09/11/holy-macroni-a-recipe-for-progressive-language-enhancement>

SugarC: Scalable Desugaring of Real-World Preprocessor Usage into Pure C: by Zach Patterson, Zenong Zhang, Brent Pappas, Shiyi Wei, and Paul Gazzillo. ICSE, 2022. Acceptance rate of 28.5% (197 / 691). <https://dl.acm.org/doi/10.1145/3510003.3512763>

PRESENTATIONS

Semantic Analysis of Macro Usage for Portability: Virtual presentation for Center of Academic Excellence in Cyber Research (CAE-R). 2023-08-31. Recording link

POSTERS

Cpp2C: Transforming C Preprocessor Macros to C Language Constructs: 2022 University of Central Florida Student Scholar Symposium.

Holy Macroni! Finding Macro Usage Errors in the Linux Kernel: 2024 International Symposium on Secure and Private Execution Environment Design.

HONORS AND AWARDS

UCF 3MT Finalist (2024): For effectively communicating my research to a non-specialist audience in a 3 minute talk.

Distinguished artifact reviewer (2024): For my attention to detail while reviewing artifacts for OOPSLA 2024. Link.

FCI Student Scholarship (2024): For my interest in interdisciplinary research, scholarship, and collaboration.

Cum laude honors (2021): For having a cumulative undergraduate GPA greater than 3.8.

Deans' list (2017-2021): For continued undergraduate scholastic achievement.

Burnnet Honors Scholar (2017): For academic talent, motivation, intellectual curiosity and creativity.

Provost Scholarship (2017): For outstanding academic performance in high school.

CERTIFICATIONS

- Level 2 College Readiness and Learning Assessment (CRLA) certified tutor.
- UCF Student Enhancement Training (SET) program certified.

VOLUNTEER EXPERIENCE

Camp Connect (at UCF) Orlando, Florida - June 2021, June 2023

- **Teaching:** Taught elementary, middle, and high school students the basics of computer programming in JavaScript.

UCF CECS Senior Design Judge Orlando, Florida - April 2022

- **Judging:** Followed a given rubric to judge the quality of capstone projects for seniors of the College of Engineering and Computer Science. Criteria included presentation quality, project design quality, and creativity.

UCF CECS Career Kickoff Alumni Mentor Orlando, Florida - October 2022

- **Mentoring:** Advised UCF freshmen on goal-setting, resume-building, and overall professionalism.
- **Job Application Prep:** Conducted mock interview with UCF freshmen and provided tips on how to effectively search for jobs in their field.

EuroSys 2023 Shadow Program Committee Member Virtual - November-December 2022

- **Paper Review:** Reviewed real paper submissions to EuroSys 2023. My Reviews were not considered by the actual program committee, but this experience gave me great insight into how conference papers are reviewed.

OOPLSA 2024 Artifact Evaluation Committee Member Virtual - January-February, July-August, 2024

- **Artifact Review:** Reviewed code artifacts associated with papers accepted to OOPLSA 2024.

NAC - NAPC Volunteer Orlando, Florida - May 2024

- **Competition Setup:** Moved computers and cables to the competition room for the 2024 North American Championship and Programming Camp (NAC-NAPC), hosted at UCF.