Brent Pappas

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Education

University of Central Florida (UCF) — Orlando, Florida
Bachelor of Science - Computer Science; GPA: 3.849 — August 2017 - May 2021
Courses: *Data Structures and Algorithms, Systems Software, Programming Languages, Discrete Structures*

UCF — Orlando, Florida
PhD - Computer Science; GPA: 4.000 — August 2021 - Present
Courses: *Analysis of Algorithms, Complexity Theory, Computer Architecture, Compiler Construction*

Skills Summary

Languages:	Python 3, C/C++, Bash, HTML/CSS/JavaScript, Go, Haskell, Coq, SQL
Tools:	Git, GitHub, LLVM/Clang
Platforms:	Linux, Web, Windows
Soft Skills:	Leadership, Writing, Communication, Time Management

Experience

Trail of Bits — Remote
Summer Associate — May 2023 - August 2023

- **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.

UCF — In-person/Remote
Graduate Research Assistant — July 2021 - Present

- **Research in Progamming Languages**: Stay up-to-date on the latest academic developments in programming languages.
- **Formal Methods**: Formulate theorems about programming languages and try to prove them using the Coq Proof Assistant.
- **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.

SP+ — In-person/Remote
Quality Assurance Coordinator — September 2019 - July 2021

- **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.

Student Academic Resource Center of UCF — In-person
Peer Mentor — August 2018 - December 2019

- **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.

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.

Pokemon Trading Card Game to Tabletop Simulator: NodeJS web application written in the Express framework. Interfaces with another API to allow users to create a virtual deck of cards from the Pokemon Trading Card Game. Users can then export those cards to the computer game Tabletop Simulator and actually play with other users. User decks were saved as grids of images and uploaded on the backend to a private AWS bucket. A user authentication and password reset system were in place to enable users to access their decks from any device.

Cardfight Vanguard API: Wrote a Python script to collect card on thousands of card from the Cardfight Vanguard wiki. Uploaded images found to a private AWS bucket, then wrote a web API in Go to enable others to easily access data and images in a programmatic way.

Publications

Semantic Analysis of Macro Usage for Portability: Brent Pappas and Paul Gazzillo. ICSE 2024 (to appear).

SugarC: Scalable Desugaring of Real-World Preprocessor Usage into Pure C.: Zach Patterson, Zenong Zhang, Brent Pappas, Shiyi Wei, and Paul Gazzillo. ICSE 2022.

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: Presented a poster on transforming C preprocessor macros to C functions at the UCF 2022 Student Scholar Symposium.

Honors and Awards

- Provost Scholarship from UCF.
- Member of the Burnett Honors College at UCF.
- On the Dean's List at UCF for all of undergraduate degree.
- Received Bachelor's degree with cum laude honors from UCF.
- College Readiness and Learning Assessment (CRLA) Level 1 certified tutor.
- CRLA Level 2 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.