Olivia Appleton-Crocker

Chicago, IL | +1-906-361-9876 | oliviaappleton.com | liv@oliviaappleton.com | github.com/LivInTheLookingGlass

Education

Michigan State University, Master's in Computer Science & Engineering — Jan. 2020 - Dec. 2022

- GPA: 3.85/4.0
- **Coursework:** Discrete Logic, Distributed Systems, Foundations of Computing, Machine Learning, Algorithmic Graph Theory, Parallel Computing

Northern Michigan University, BS in Computer Science — Sep. 2013 - Dec. 2018

- GPA: 3.84/4.0 (Magna cum laude)
- **Coursework:** Data Structures, Microcomputer Architecture, Networking, Object-Oriented Design, Operating Systems, Principles of Programming Languages, Algorithm Design & Analysis

Experience

Data Science Fellow, TMW Center for Early Learning + Public Health – Chicago, IL — May 2024 – Present

- Raising backend code (∼19k lines) coverage by 25+ percentage points
- Wrote code in C#, TypeScript, JavaScript, and Python
- Triaged communications problems between custom hardware and the app/servers that maintained them
- Assisted in integrating two programming teams

Teaching and Research Assistant, Michigan State University – East Lansing, MI — Jan. 2020 - Feb. 2023

- Published 2 papers, where the relevant code was written in Python
- Assisted teaching classes, including one where we implemented SQLite from scratch in Python 3
- Provided numerous tutoring sessions in both math and programming
- Consistent high reviews from students

Product Development Engineer (Various Titles), Intel (NSG) – Folsom, CA — Jan. 2018 - Dec. 2019
May 2015 - Sep. 2016

- Coordinated a small team of programmers (3-5 people at any given time)
- Helped design a testing protocol for NVMe's Power Loss Notification
- Influenced changes to the NVMe specification
- Rewrote internal tools to streamline and comply with Python 3
- Built software models of various pre-market products

Publications

Achieving Causality with Physical Clocks — Jan. 2022

Sandeep S Kulkarni, ***Olivia Appleton-Crocker***, Duong Nguyen

10.1145/3491003.3491009

This paper presented a novel way to encode causality information in the least-significant bits of a timestamp. Computers that recognize this encoding can use it to order events more certainly, while computers that do not can safely treat it as a standard NTP timestamp.

Efficient Two-Layered Monitor for Partially Synchronous Distributed Systems — July 2020

Vidhya Tekken Valapil, Sandeep S Kulkarni, Eric Torng, ***Olivia Appleton-Crocker***

10.48550/arXiv.2007.13030

This paper presents a novel way to monitor distributed systems with much lower cost than the previous standard of using vector clocks. Two layers are used: one which is cheap but imprecise, and one that is precise but more costly. In tandem they reduce monitoring costs by at least 85%.

(More on next page)

Projects

CPython github.com/python/cpython

- Added support for the UDPLite network protocol
- Tools Used: C, Python, Sphinx, UnitTest

Showcase: Project Euler Solutions euler.oliviaappleton.com

- Solutions in 9 different languages to various math programming puzzles, including extensive prime number toolkit
- Tools Used: C, C++, C#, CI/CD, Fortran, Java, JavaScript, Lua, Makefile, Python, Rust, Sphinx, WebAssembly

Overpassify github.com/LivInTheLookingGlass/overpassify

- A transpiler that turns Python code into OpenStreetMap's OverpassQL query language
- This is useful because OverpassQL is often difficult to read
- Tools Used: Makefile, OpenStreetMap, OverpassQL, Python

Undergrad Dissertatation Project github.com/p2p-today/p2p-project

- A multi-language, interoperable, peer-to-peer network framework
- Implemented several network types, including a mesh network & two types of distributed hash table
- Full implementation was done in Python, JavaScript. Message serialization demonstrated in C, C++, Java, & SmallTalk
- Tools Used: Makefile, Python, PyTest, JavaScript, Babel, Mocha, WebPack, Node.JS, C, C++, Java, SmallTalk

Research Job Splitter github.com/LivInTheLookingGlass/job-splitter

- This tool would programmatically split the simulation tasks I needed to run across many nodes
- The nodes did not need to communicate with each other
- Packaged the tasks into a single executable
- Tools Used: Python, Makefile, PyInstaller, Multiprocessing

ManifoldMarketManager github.com/LivInTheLookingGlass/ManifoldMarketManager

- Manifold Markets is a play-money betting site about real-world events
- Before they deployed a new API, this bot would make and manage markets
- It implemented a large suite of rules, including logical combinations of other rules, or artificially leveraged odds
- It could also query a human administrator for a resolution over Telegram
- Required me to implement hooks for all of the relevant API calls
- Tools Used: Python, REST API, Telegram, SQLite, PyTest

OpenStreetMap Contributions openstreetmap.org/LivInTheLookingGlass

- OpenStreetMap is an open geographic database, like Wikipedia for maps
- It is used frequently by emergency services in disasters
- I organized two public map-a-thons to work in the aftermath of two such global disasters

Technologies

Languages: Python, C/C++, C#, Rust, JavaScript, SQL, Java, Bash, Fortran, Lua, SmallTalk
Technologies: CI/CD, Cypress, Github Actions, Makefile, Mocha, Moq, .NET, PyTest, UnitTest