

Ishaan Gandhi

ishaangandhi@gmail.com | github.com/ishaangandhi | [US Citizen]

EDUCATION

Harvey Mudd College

Claremont, CA

Bachelor of Science in Computer Science & Mathematics

2017 – 2021

Graduated with departmental honors and a 3.9 GPA as a *Harvey S. Mudd scholar*. Selected coursework: Computer Systems, Databases, Operating Systems, Programming Languages, Software Verification, Advanced Algorithms, Algorithmic Game Theory, Model Theory.

EXPERIENCE

Citadel Securities

Aug. 2021 - Present

Software Engineering - Developer Infrastructure

New York, NY

- Working on build tools and continuous integration software. Added support for Python code coverage reports in Bazel, and integrated code coverage reports into code review tooling.

Facebook

Summer 2019

Software Engineering Intern - Place Visit Detection

New York, NY

- Implemented 2-pass scoring in Facebook's machine learning model for place visit detection, increasing model AUC by 0.74pp. Worked on prediction service and training workflow in C++ and Python respectively.

Facebook

Summer 2018

Software Engineering Intern - Real time Infrastructure

Seattle, WA

- Worked on Facebook's pub-sub system (C++ and Java) on the real-time infrastructure team. Improved the security of infrastructure by using cryptographic authentication tokens to authenticate subscribe requests to certain topics.

Capital One

Summer 2017

Software Engineering Intern - Commercial Bank

Tysons Corner, VA

- Full stack development for an IOT sensor network. Built a real-time dashboard and wrote a REST API.

OPEN SOURCE CONTRIBUTIONS

- Wrote, tested, and submitted an implementation of RFC 5837 (Extending ICMP for Interface and Next-Hop Identification) for **Linux 5.12**.
- Enhanced the **tracpath** and **traceroute6** applications in the widely used iputils package to identify arrival and next-hop interfaces when such information is present in ICMP replies.
- Added support for the IPv6 compact routing header (CRH), and IPv6 tunnel payload forwarding (TPF) in **Wireshark**. Also fixed six bugs related to ICMP extensions.
- Added a new dissector for the RFC 5837 protocol in **TCPDump**.
- Fixed bugs and added interactive parsing mode to the POSIX compliant shell parsing libraries **Morbig** and **Morsmall**.

PUBLICATIONS

- Ishaan Gandhi**, Anshula Gandhi. Lightening the Cognitive Load of Shell Programming. 11th Annual Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU 2020.)

RESEARCH

ETH Zürich | *Advanced Software Technology Lab*

Spring 2020

- Used a coverage-guided fuzzer (AFL) to find bugs in the SMT solvers CVC4 and Z3. Profiled the symbolic executor KLEE using C++ and Python.

Harvey Mudd College | *Parallel Symbolic Execution Research*

Spring 2021

- Analyzing novel matrix-based approach to symbolic execution. Wrote tool to generate control-flow-graphs for a proprietary language and convert these CFGs into matrices.

Pomona College | *Formalization of the POSIX shell standard*

Fall 2020

- Worked on integrating the Morbig parser to the SMOOSH shell in OCaml.
- Found and fixed bugs in the **Morbig** and **Morsmall** parser libraries, and extended them to support interactive parsing.

NASA | *Stellar Astrophysics*

Jun 2016 – Jun 2017

- Wrote Monte Carlo simulator to study the performance of various data compression algorithms on space telescopes.
- Sped up image data processing for my research group 600x from Hubble Space Telescope using scripts.

PROJECTS

TCP/IP Stack | *C++*

- Wrote an implementation of a networking stack in using modern C++ (C++17). Included the transmission control protocol (TCP), address resolution protocol (ARP), and IP router.
- Profiled with Gprof and improved throughput of implementation 0.05 Gbit/s to 0.78 Gbit/s.
- Used this stack to talk to real internet servers in a command line application similar to cURL.

LLVM Interpolation Pass | *C++*

- Wrote a compiler optimization for LLVM to make arrays easier to understand for software verification tools.
- The optimization converted lookups into arrays whose contents were known at compile time into function calls that could be more easily understood by verification tools.

Shell Notebook | *Node.js, React*

- Built a full-featured terminal replacement for Mac, Linux, and Windows based on the notebook computing paradigm. Includes native SSH support and native file navigation.
- Sold to paying users, and ranked #2 on Product Hunt the day of its release. Check it out at shellnotebook.com

TECHNICAL SKILLS

C, C++ (up to standards in C++17), OCaml, Coq, Haskell, Java, Go, Swift, SQL, Bash, Git, Flask, JS, React, AWS, Kafka, Mongo

TEST SCORES

ACT: (99.9 percentile)

Math:	36/36
English:	36/36
Reading:	36/36
Science:	36/36