# Adeel Ahmad

adl1995.github.io

## Work Experience

Fellow in Authentication Team, **European Organization for Nuclear Research (CERN)** **September 2020 — Present**

Developed a permanent 2FA solution for the CERN SSO and running campaign to migrate all users. *Geneva, Switzerland*
Doing Linux server administration for load balancing our cluster setup. Monitoring server logs with Kibana and Grafana. Extending and refactoring our C# and Python APIs.

Technical Student in Computer Security, **European Organization for Nuclear Research (CERN)** **September 2018 — October 2019**

Wrote a Go tool to monitor anomalous SSH login activity on the CERN campus. Wrote Puppet modules *Geneva, Switzerland*
to install and configure RPM packages. Attended conferences and met with security leaders across Switzerland.

C++ Software Developer, **Google Summer of Code 2018(Boost C++ Libraries)** **May 2018 — August 2018**

Improved the accuracy (from $cm$ to $\mu m$) of a distance algorithm used in the aerospace industry for creating *(Remote)*
flight plans. Benchmarked the new system to show performance and accuracy gain.

Python Software Developer, **Google Summer of Code 2017(Open Astronomy)** **May 2017 — August 2017**

Developed a package to visualize and run analysis on astronomical images. Used asynchronous programming *(Remote)*
to reduce fetch latency by $75\%^*$.

## Education

**Georgia Institute of Technology,** Masters of Computer Science, GPA: 4.0/4.0 **2020 — Present**

Courses taken: Artificial Intelligence for Robotics, Advanced Operating Systems, Software Analysis *(Remote)*

**National University of Computer and Emerging Sciences,** Bachelors of Computer Science, GPA: 3.01/4.0 **2014 — 2018**

Thesis: "Analysis of Structure from Motion Techniques" *Islamabad, Pakistan*

## Course Projects

**Advanced Operating Systems [C, Libvirt, OpenMP]** **September 2021**

Implemented a vCPU scheduler and a memory coordinator to dynamically manage CPU and RAM assigned to each guest machine. Created graph plots to analyze usage patterns. Implemented Barrier Synchronization algorithms in OpenMP and MPI.

**Software Analysis [C, LLVM]** **May 2021**

Wrote LLVM passes in C to perform divide-by-zero runtime checks and report code coverage. Implemented Reaching Definition and Liveness analysis to find unused variables in a program.

**Robotics: AI Techniques [Python]** **January 2021**

Implemented Kalman and Particle filters for robot location tracking. Used A* search to find the shortest distance. Improved location accuracy using SLAM. Reduced motion noise using a PID controller.

## Open-source Projects

**16 Bit Micro Processor Simulator [Assembly x86]** — x8086 graphical implementation of a 16-bit micro processor.
**GeoLib [C++, Boost]** — Distance computation algorithms implemented using C++ template specialization.
**Leaf Classification [Python]** — ML pipeline to automate the process of plant recognition using a leaf image.
**Particle Swarm Optimization [C++, mlpack]** — Algorithm for constrained optimization problems using template metaprogramming.
**Distributed Searching [Go]** — Implementation of the leader-follower architecture for distributing the search workload of a large file.
**Trip Planner [Python]** — Queries Google Maps places based on an input query and exports them to a CSV file. (*featured on HNews*)

## Trainings and Conferences

**Red Hat Linux System Administration** **December 2020**

Covered process, memory, and I/O monitoring, filesystems (BTRFS, VFS, LUKS), RAID and LVM, drive encryption, file ACLs, PAM, networking tools, firewalls, systemd, udev, bootloaders.

**Thematic CERN School of Computing** **May 2019**

Topics covered high throughput computing, vectorization, and optimization, and I/O.

**A Practical Introduction to Quantum Computing** **November 2020**

Studied the Deutsch quantum algorithm and quantum circuit model (Qubits, gates, and measures). Introduction to D-Wave Leap. Interactive exercises in Jupyter notebook.

## Featured Blog Posts

**Passwordless Logins with Yubikey** **February 2021**
**Trip Planner – A tool for planning a trip itinerary using Google Maps** **October 2019**

## Skills

C++, Python, Java, Go, Arch Linux, Systemd, Awk, sed, Puppet, MySQL, PostgreSQL, Google Cloud Platform