

# Adeel Ahmad

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## Work experience

*Technical Student in Computer Security* September 2018 - Present  
European Organisation for Nuclear Research (CERN) Geneva, Switzerland

- Cloud automation: Created Puppet modules to install and configure RPM software packages. The parameters were passed externally from a hostgroup using Heira and a reverse proxy was set up using Apache to expose HTTPS ports to the Internet.
- RPM package creation: Used 'rpmbuild', in conjunction with spec files to create noarch RPM packages. This process was documented in a blog post [↗](#).
- User login monitoring: A Golang tool for real-time anomaly detection of user logins to CERN machines which ingested data from a Spark cluster.
- Incident response handling: Handled user incidents including copyright infringement and account abuse cases using a Django-based web application called Fast Incident Response (FIR [↗](#)).

*C++ Software Developer* May 2018 - August 2018  
Google Summer of Code 2018 (Boost C++ Libraries) [↗](#) (Remote)

- Implemented a generalised version of geodesic algorithm using C++ template parametrisation.
- Benchmarked the accuracy and execution time against existing algorithms using Boost Chrono library.

*Python Software Developer* May 2017 - August 2017  
Google Summer of Code 2017 (Open Astronomy) [↗](#) (Remote)

- Developed a CLI package for the visualisation and analysis of astronomical images.
- Reduced the fetch latency of data by employing asynchronous programming techniques.
- Wrote parametrised test cases and used Travis CI for contiguous integration.

*Full-Stack Web Developer* January 2017 - April 2017  
Upwork (Remote)

- Developed and maintained large-scale PHP Laravel web applications and designed databases.
- Diagnosed web hosting issues and deployed applications on cloud services.

## Education

*Bachelor of Computer Science* August 2014 - June 2018  
National University of Computer and Emerging Sciences Islamabad, Pakistan

**Thesis title:** "Analysis of Structure from Motion Techniques" [↗](#)

**Abstract:** Implemented the structure from motion pipeline to reconstruct a 3D point-cloud representation from monocular images.

## Open-Source Projects

Particle Swarm Optimisation ↗ [C++, mlpack]

February 2018

Implemented the PSO algorithm for constrained optimisation problems in the mlpack machine learning library ↗ . Designed the API following a policy-based approach using template metaprogramming in C++.

Leaf Classification ↗ [Python, TensorFlow]

November 2017

Analysed plant imagery using a convolutional neural network (ConvNet) with dropout regularisation to perform multi-class classification of leaf images.

GeoLib ↗ [C++, Boost]

March 2018

Used template specialisation to implement a generalised version of distance computation algorithms and benchmarked their implementation against Boost Geometry.

MCQ Exam Checker ↗ [Python, NumPy]

December 2016

Automated the process of checking a multiple-choice question exam using template matching and 2D cross-correlation.

## Events and conferences

Thematic CERN School of Computing ↗

May 2019

An annual school based on the topic of high throughput computing which involved lectures on vectorisation, optimisation, and effective I/O for scientific applications.

Split, Croatia

Insomni'Hack ↗

March 2019

A security-based conference which involved talks on hardware and software level exploits and a capture-the-flag event.

Geneva, Switzerland

Swiss Web Security Day ↗

October 2018

A platform to bring together individuals from technology, business, politics, research, and public sector on the global topic of cyber security.

Bern, Switzerland

## Peer-reviewed journals

A. Ahmad, C. Deil, T. Boch, B. Sipocz, A. Donath; "A Python astronomy package for HiPS: Hierarchical Progressive Surveys", Journal of Open Source Software (in preparation ↗ )

## Skills

*Programming languages:* C++, Python, Go, PHP, JavaScript, Assembly (x86), Bash, L<sup>A</sup>T<sub>E</sub>X

*Cloud management:* Puppet, OpenStack, Docker, GitLab CI, Google Cloud Platform

*Machine learning:* OpenCV, TensorFlow, Scikit-learn, NumPy, Pandas

## Interests

Kayaking, Skiing, Cooking, Reading, Movies, Travelling ↗