

# Vahab Jabrayilov

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## Education

### Columbia University

PHD IN COMPUTER SCIENCE

New York City, USA

Aug 2023 - Present

- **Advisor:** Professor Kostis Kaffes
- **Interests:** Distributed Systems, Operating Systems, Cloud Computing

### Middle East Technical University

BSC IN COMPUTER ENGINEERING

Ankara, Turkey

Sep 2019 - June 2023

CGPA 3.8/4.0, Ranking 7/305

## Work Experience

### EPFL

STUDENT RESEARCHER

Lausanne, Vaud, Switzerland

June 2023 - Aug 2023

- Conducted research on "Detecting Metastable Failures in Distributed Systems" at RS3LAB, under the supervision of Dr. Sanidhya Kashyap.
- Devised and implemented benchmarks to showcase metastable failures phenomena.
- Utilized advanced Petri Net modeling techniques for analyzing complex distributed systems.

### Google, Summer of Code

SOFTWARE DEVELOPMENT ENGINEER

Remote, Mountain View, CA, USA

May 2022 - Sep 2022

- Contributed to the *Thanos* project under the Cloud Native Computing Foundation.
- Optimized compaction/downsampling algorithm by 30% using parallel processing, and reducing disk I/O.
- Implemented a new block reader/writer interface using advanced caching mechanisms and parallel processing, leading to a 25% reduction in remote data access time and heightened system efficiency.

### Penn State: The Pennsylvania State University

STUDENT RESEARCHER

Remote, University Park, PA, USA

Oct 2021 - May 2022

- Conducted research on *consensus protocols in distributed systems* at the *Computer Systems Lab*, working under the esteemed mentorship of Dr. Abutalib Aghayev.
- Designed and implemented a high-performance key-value store with the *MultiPaxos* consensus algorithm in four major programming languages (Go, Java, C++, and Rust) to conduct a quantitative analysis of the language's impact on performance.
- Utilized benchmarks (YCSB, Google Benchmark), profiling (gprof, Valgrind, perf, flame graphs, bcc) and latency measurements to gain comprehensive insights into each language's efficiency and tuned system performance.

### Middle East Technical University

STUDENT RESEARCHER

Ankara, Turkey

Jan 2022 - June 2022

- Engaged in research at the *WINS Lab*, working under the guidance of Dr. Pelin Angin.
- Orchestrated the deployment of a Kubernetes cluster with vulnerable Docker application images, conducted realistic simulations of various cyber attacks, and contributed to a comprehensive dataset for ML training purposes.

### Middle East Technical University

STUDENT TEACHING ASSISTANT

Ankara, Turkey

Mar 2021 - July 2021

Facilitated lab sessions and conducted office hours for a cohort of 100+ students enrolled in CENG240 - Python Programming for Engineers.

### Kibrit Tech

SOFTWARE DEVELOPMENT ENGINEER

Baku, Azerbaijan

Feb 2021 - Oct 2021

- Improved the response time of the real-time monitoring service for the call center management solution by 40% leveraging caching strategies, such as data caching and query result caching.
- Integrated three different third-party chat applications into the solution, expanding its capabilities and enabling seamless communication for users.
- Acted as an on-call engineer, responding to and resolving 15+ production issues within strict SLA timelines, ensuring uninterrupted system operations and minimizing downtime.

### eiLink

STUDENT RESEARCHER

Baku, Azerbaijan

Feb 2019 - Aug 2019

- Analyzed Distributed Acoustic Sensing (DAS) data, utilizing advanced statistical techniques, regression analysis, machine learning algorithms, and anomaly detection.
- Created interactive visualizations with Python libraries like Matplotlib and Seaborn for informed decision-making.

## Publications

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An Empirical Analysis of IDS Approaches in Container Security

Yigit Sever, Goktug Ekinci, Adnan Harun Dogan, Bugra Alparslan, Abdurrahman Said Gurbuz, Vahab Jabrayilov, Pelin Angin

2022 *International Workshop on Secure and Reliable Microservices and Containers (SRMC)*, 2022

## Service

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2023 **SOSP**, Artifact Evaluation Committee

*Koblenz, Germany*

2022 **PLDI**, Student Volunteer

*San Diego, CA, USA*

## Projects

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### Replicated Store

A DISTRIBUTED KEY VALUE STORE WITH MULTI PAXOS CONSENSUS PROTOCOL IMPLEMENTATION

- Implemented the original Multi Paxos algorithm published by L.Lamport identically in Go, Java, C++ and Rust.
- Implemented support for both TCP and gRPC communication.
- Github repository at <https://github.com/psu-csl/replicated-store>.

### Satellite Data Clustering

PREPROCESSING AND CLUSTERING SATELLITE DATA OBTAINED FROM AZERSPACE

- Processed raster and vector files, and applied clustering algorithm to get regions of interest.
- Used Rasterio, Shapely and Geopanda libraries for Python.
- Hosted Jupyter notebook at [clustering\\_satellite\\_data.ipynb](#).

### Azerbaijani translation of Algorithms Unlocked

A FAMOUS ALGORITHMS TEXTBOOK WRITTEN BY T.CORMEN AND PUBLISHED BY MIT PRESS

Translated the whole textbook and wrote  $\text{\LaTeX}$  version with a group of volunteers.

## Honors & Awards

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2023 **High Honor Graduate**, Middle East Technical University

*Ankara, Turkey*

2022 **107/120**, TOEFL (R:30, L:30, S:23, W:24)

*Online*

2019 **Top 10% Foreign Student Scholarship**, Middle East Technical University

*Ankara, Turkey*

2019 **Top 5%(800/800)**, at SAT subject tests in MATH II, Physics and Chemistry

*Online*

**Honorable Mention**, at the semi final of ACM ICPC international competitive programming contest for NEERC region

*Tbilisi, Georgia*

2017 **First place (700/700)**, at then National University Entrance Exam of Azerbaijan

*Baku, Azerbaijan*

2017 **Gold Medal(High Distinction)**, awarded Gold medal by the Ministry of Education of Azerbaijan upon graduation with distinction in studies

*Baku, Azerbaijan*

2015 **Bronze Medal**, Azerbaijan National Science Olympiad (Mathematics)

*Baku, Azerbaijan*

## Skills

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### Programming Languages

C/C++, PYTHON, JAVA, GO, RUST, SQL, BASH, ASSEMBLY(x86)

### Frameworks & Libraries

SPRING, NETTY, TOKIO, ACTIX, FLASK, GTEST

### Tools

DOCKER, KUBERNETES, GIT, ZIPKIN, GRAPHANA, PROMETHEUS, THANOS, TLA+

### Languages

ENGLISH, RUSSIAN, TURKISH, AZERBAIJANI