

Vahab Jabrayilov

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Education

Columbia University

New York City, USA

PHD IN COMPUTER SCIENCE

Aug 2023 - May 2028

- **Advisor:** Professor Kostis Kaffes
- **Interests:** Distributed Systems, Operating Systems, Cloud Computing
- **Project:** Optimizing the networking stack of Virtual Machines

Middle East Technical University

Ankara, Turkey

BSC IN COMPUTER ENGINEERING

Sep 2019 - June 2023

CGPA 3.8/4.0, Ranking 7/305

Work Experience

EPFL

Lausanne, Vaud, Switzerland

STUDENT RESEARCHER

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

Remote, Mountain View, CA, USA

SOFTWARE DEVELOPMENT ENGINEER

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

Remote, State College, PA, USA

STUDENT RESEARCHER

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

Ankara, Turkey

STUDENT RESEARCHER

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

Ankara, Turkey

STUDENT TEACHING ASSISTANT

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

Baku, Azerbaijan

SOFTWARE DEVELOPMENT ENGINEER

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

Baku, Azerbaijan

STUDENT RESEARCHER

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

The Cost of Garbage Collection for State Machine Replication

Zhiying Liang, Vahab Jabrayilov, Aleksey Charapko, Aghayev Abutalib

Under Review, 2023

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

2024	HPCA , Artifact Evaluation Committee	<i>Edinburgh, Scotland</i>
2024	EuroSys , Artifact Evaluation Committee	<i>Athens, Greece</i>
2023	Sigcomm , Student Volunteer	<i>New York City, NY, USA</i>
2023	SOSP , Artifact Evaluation Committee	<i>Koblenz, Germany</i>
2022	PLDI , Student Volunteer	<i>San Diego, CA, USA</i>

Projects

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](#).

Honors & Awards

2023	High Honor Graduate , Middle East Technical University	<i>Ankara, Turkey</i>
2019	Top 10% Foreign Student Scholarship , Middle East Technical University	<i>Ankara, Turkey</i>
2019	Top 5%(800/800) , at SAT subject tests in MATH II, Physics, and Chemistry	<i>Online</i>
2018	Honorable Mention , at the semi-final of ACM ICPC international competitive programming contest for NEERC region	<i>Tbilisi, Georgia</i>
2017	First place (700/700) , at the National University Entrance Exam of Azerbaijan	<i>Baku, Azerbaijan</i>
2017	Gold Medal(High Distinction) , awarded Gold medal by the Ministry of Education of Azerbaijan upon graduation with distinction in studies	<i>Baku, Azerbaijan</i>
2015	Bronze Medal , Azerbaijan National Science Olympiad (Mathematics)	<i>Baku, Azerbaijan</i>

Skills

Programming Languages

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

Frameworks & Libraries

SPRING, NETTY, TOKIO, ACTIX, FLASK, GTEST, GBENCH, BOOST, ABSEIL, DDPK

Tools

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

Languages

ENGLISH, RUSSIAN, TURKISH, AZERBAIJANI