

Uğur Yağmur Yavuz

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PhD Student in Computer Science

Education

- 2022–present **Ph.D. in Computer Science**, *Boston University*, Boston, MA
Advisor: Marco Gaboardi and Alley Stoughton.
Expected graduation: 2027.
- 2021–2022 **M.S. in Computer Science**, *Dartmouth College*, Hanover, NH
GPA: 4.00/4.00.
Advisor: Prasad Jayanti.
Thesis: A Machine-Verified Proof of Linearizability for a Queue Algorithm.
- 2017–2021 **A.B. in Computer Science and Mathematics**, *Dartmouth College*, Hanover, NH
GPA: 3.97/4.00.
Graduated *summa cum laude* and inducted into Phi Beta Kappa.
Awarded High Honors in Computer Science for senior thesis.
- 2012–2017 **Baccalauréat (Franco-Turkish diploma)**, *Lycée de Galatasaray*, Istanbul, Turkey
Ranked in the top 0.0001% in the nationwide high school entrance exam

Research interests

Formal verification, concurrent data structures, distributed systems, proof assistants (e.g., Coq, TLA+/TLAPS, EasyCrypt)

Publications

Submitted

Uğur Yavuz (first author), with collaborators. “Formal Machine-Verification of MemSnap: an Efficient, Far-Future Linearizable Snapshot Algorithm.” Submitted to *SPAA 2025*.

Uğur Yavuz (second author), with collaborators. “Mechanized Metatheory of Forward Reasoning for End-to-End Linearizability Proofs.” Submitted to *ITP 2025*.

Conferences

- [POPL ’24] Prasad Jayanti, Siddhartha Jayanti, **Uğur Yavuz**, Lizzie Hernandez. “A Universal, Sound, and Complete Forward Reasoning Technique for Machine-Verified Proofs of Linearizability.” *51st ACM Symposium on Principles of Programming Languages*, 2024. [PDF] [Talk] [Code]

Workshops

- [HOPC ’24] Prasad Jayanti, Siddhartha Jayanti, **Uğur Yavuz**, Lizzie Hernandez. “Meta-Configuration Tracking for Machine-Certified Correctness of Concurrent Data Structures.” *ACM Workshop on Highlights of Parallel Computing*, 2024. [DOI]

Theses

- [M.S. Thesis] **Uğur Y. Yavuz**. “A Machine-Verified Proof of Linearizability for a Queue Algorithm.” Dartmouth College, Master’s Thesis, 2022. [PDF] [Talk]
- [A.B. Thesis] **Uğur Y. Yavuz**. “Producing Easy-to-Verify Proofs of Linearizability.” Dartmouth College, Honors Thesis (awarded High Honors), 2021. [PDF]

Research experience

2022–present **Ph.D. Researcher**, *Boston University*, Boston, MA

Conducting research in concurrent algorithms and formal verification. Current projects include:

- Developing a proof technique for linearizability and strong linearizability, culminating in a POPL'24 paper.
- Implementing this technique, *meta-configuration tracking*, in the TLA⁺ Proof System (TLAPS).
- Verifiably proving linearizability of several high-performance concurrent data structure implementations, including ParlayHash, MemSnap, and the Jayanti-Tarjan union-find algorithm.
- Formalizing linearizability as a UC-style security property using EasyUC.
- Collaborating on cyclic proof frameworks for relational Hoare logic, fully mechanized in Coq.

06/2024– **Student Researcher**, *Google*, Cambridge, MA

08/2024 PhD student researcher on the Graph Mining team at Google.

- Analyzed ParlayHash, a high-performance concurrent hash table, and formally proved its strong linearizability using TLAPS, with the help of the meta-configuration tracking technique.
- The proof was contributed as a reproducible Docker artifact to the open-source ParlayHash repository.
- Received a **Platinum Healthy's Award** (Q3 2024) and a **Gold Healthy's Award** (Q1 2025) for my contributions.

2021–2022 **Graduate Researcher**, *Dartmouth College*, Hanover, NH

Conducted research under the supervision of Prasad Jayanti.

- Developed a machine-verified proof of the Herlihy-Wing queue algorithm in TLAPS.
- Work culminated in a master's thesis and laid the foundation for the proof technique later published at POPL'24.

06/2022– **Researcher**, *Microsoft*, *Remote*

08/2022 Conducted static analysis research, contracted through *WaferWire Cloud Technologies*.

- Developed a Python tool to extract bug patching metadata from open-source C# repositories, contributing to the InferFix end-to-end program repair framework.
- Extended the Infer static analysis tool using OCaml.

06/2020– **Research Intern**, *ISI @ USC*, Marina del Rey, CA (*Remote due to COVID-19*)

08/2020 Conducted NLP research under the supervision of Prof. Jon May, focusing on low-resource Mayan languages.

- Created multilingual corpora for Mixtec and Kanjobal languages using web scraping and OCR tools.
- Explored ways to improve translation pipelines for legal testimonial documents using deep learning techniques in Python, via domain adaptation.

Teaching Experience

2024 **Teaching Fellow**, *Boston University*, Boston, MA

Course: *Fundamentals of Cryptography (CS 538)*.

Led weekly discussion sections, held office hours, and graded exams and assignments. Supported students in understanding cryptographic primitives and proofs.

2019–2022 **Teaching Assistant**, *Dartmouth College*, Hanover, NH

Courses: *Algorithms*, *Concurrent Algorithms*, *Discrete Mathematics*, and *Software Design and Implementation*.

Held office hours, graded assignments and exams, and mentored students on course projects.

Honors & Awards

2025 Fellowship to attend the Oregon Programming Languages Summer School (OPLSS).

2025 **Gold Healthy's Award** (Q1), Google

For mechanized linearizability proof of ParlayHash

2024 **Platinum Healthy's Award** (Q3), Google

For the development and successful deployment of meta-configuration tracking to verify the Jayanti-Tarjan union-find algorithm

2022 **Dean's Fellowship**, Boston University.

2021 Graduated *summa cum laude* and inducted into Phi Beta Kappa.

2021 Senior thesis awarded High Honors by the Dartmouth Computer Science Department.

Service

- Artifact reviewer for PLDI 2025.
- Organizer for OPLSS 2024 at Boston University.
- Online session chair for LICS 2023.
- Mentored multiple undergraduate researchers on using TLAPS for mechanized proofs.

Technical Skills

Languages and proof assistants:

- **Advanced:** \LaTeX , Python, TLA⁺/TLAPS
- **Intermediate:** Coq, EasyCrypt, OCaml, SML
- **Familiar:** C, Java, SQL

Tools: Docker, Git, VSCode

Languages

- **Turkish:** native
- **English:** fluent (C2)
- **French:** fluent (C1)
- **Italian:** conversational