Harun Yılmaz

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Research Objective

My objective is to advance research in reliable and trustworthy software, specifically through formal methods for system verification. My experience in automata-based and quantitative formal verification at Institute of Science and Technology drives this passion. I aim to pursue a PhD in Computer Science, contributing to the field of software quality.

Education

Sabancı University — *Sept 2021 - Current*
BS in Computer Science and Engineering — *Istanbul, Turkey*

- **CGPA**: 3.84/4.0
- **Relevant Coursework:** Formal Languages and Automata Theory *(Ranked 1st)*, Programming Languages, Operating Systems, Distributed Systems, Algorithms, Logic and Digital System Design, Discrete Mathematics, Linear Algebra

Vrije Universiteit Amsterdam — *February 2024 - July 2024*
Exchange semester — *Amsterdam, Netherlands*

- **Term GPA**: 9.1/10
- **Relevant Coursework:** Computer Organization (10/10), Computer Networks (8.5/10), Applied Programming for AI (9.5/10)

Experience

Research Intern — *Klosterneuburg, Austria*
Institute of Science and Technology Austria (ISTA) — *June 2025 - Current*
Supervised by Thomas Henzinger and N. Ege Saraç

- Extended the QuAK (Quantitative Analysis Kit) [] C++ framework to support Nested Quantitative Automata (NQA) analysis.
- Designed and implemented algorithms for non-emptiness and universality decision problems of NQA.
- Explored the expressive power of NQA, an advanced automata theory, and advanced the analysis of safety and liveness properties expressible by NQAs while integrating theory into a tool for richer quantitative specifications such as average response time.

Undergraduate Assistant — *Istanbul, Turkey*
Sabancı University — *February - June 2025*

- Mentored 150+ students via weekly office hours and recitations, clarifying OS concepts (process scheduling, concurrency, memory management) and helped students complete programming assignments in C.
- Designed practice materials, quizzes, and recitation content to strengthen exam preparedness.

Projects

Extending Boogie for Concurrent Program Verification using Refinement Proofs — *2025–Current* []
Advisor: Süha Orhun Mutluergil

- Designing and implementing a transpiler that translates a high-level language into Boogie IVL to enable automated verification of concurrent programs.
- Extending Boogie's intermediate verification language (an open-source Microsoft project) to support refinement-based verification for concurrent programs.

Compiler Frontend with Static Analysis — *2024* []

- Developed Flex/Bison-based compiler frontend with symbol tables and semantic checks for a small language

Concurrent Queue with Work Stealing — *2024* []

- Implemented a concurrent queue algorithm inspired by Michael & Scott's with work-stealing for multi-core scheduling

LC-3 Virtual Memory System — *2023* []

- Extended LC-3 VM with paged memory management, address translation and process control blocks

Wearable Health Analytics *2023* [GitHub]

- Analyzed Garmin data to correlate sleep, activity, and stress metrics. Performed statistical analysis and hypothesis testing.

Honors and Awards

OeAD Scholarship for ISTernship Summer Program *June 2025* [Web]
OeAD, Austria's Agency for Education and Internationalisation

- Awarded a scholarship to participate in the highly competitive ISTernship Summer Program at the Institute of Science and Technology Austria (ISTA), conducting research for 3 months within a leading research group.

Dean's List: High Honor *2022–2025*
Sabancı University Faculty of Engineering and Natural Sciences

- Consistently recognized on the Dean's List for High Honors every semester throughout my university education (2022 - 2025), achieved by maintaining a term GPA of 3.5 or higher.

Sakıp Sabancı Outstanding Achievement Scholarship *September 2021* [Web]
Sabancı University

- Awarded a comprehensive scholarship covering full annual tuition, a monthly stipend, and dormitory fees. This scholarship is granted to top-ranking students admitted through the Full Scholarship quota.

Technical Skills

Programming Languages: C, C++, Python, Scheme, Verilog HDL, Prolog, MySQL

Development Tools: Git, LaTeX, Flex/Bison, POSIX Threads

Web Technologies: HTML, CSS, JavaScript

Volunteering and Leadership

SUDOSK (Sabancı University Outdoor Sports Club) *2023–Current*
President & Board Member

- Led as President and Board Member, organizing outdoor sports events and managing club administration to promote a healthy, active community

Civic Involvement Project (CIP), Sabancı University *2022*

- Volunteered in coastal cleanups and animal shelter work to support environmental conservation and animal welfare

Hobbies and Interests

Rock climbing, Bouldering, Drumming, Outdoor sports (mountaineering, hiking, cycling)

References

Thomas Henzinger *Institute of Science and Technology Austria*
Professor
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