

# MAHBOD AFARIN

Rooms 2132, CSE Department, UC San Diego, CA

📞 951-512-3542 ✉️ [mafarin@ucsd.edu](mailto:mafarin@ucsd.edu) [in linkedin.com](https://www.linkedin.com/in/mahbodafarin) [mahbod-afarin.github.io](https://mahbod-afarin.github.io)

## Professional Summery

---

**Postdoctoral Scholar** at UC San Diego with over 5 years of experience in hardware accelerators, compiler design, and graph analytics, working across architecture, runtime, and MLIR-based compiler stacks. Demonstrated ability to deliver high-impact research results, with successful technology deployment at Google and publications in top-tier conferences.

## Technical Skills

---

**Languages:** C/C++, Python, CUDA, OpenMP, OpenCL, SQL

**Compiler Design:** LLVM, MLIR, LLVM-BOLT, LLVM Machine Outliner

**Hardware Design:** VHDL, Verilog HDL, SystemC, Xilinx ISE, Altera Quartus, Synopsys Design Compiler

**Simulation & Modeling:** Multi2Sim, GPGPU-Sim, Mentor Graphics Modelsim, HSPICE, PSPICE, IC Encounter, HSIM, Cadence SoC Encounter, Structural Simulation Toolkit

## Education

---

### University of California Riverside

Jan. 2020 – June 2025

Doctor of Philosophy (Ph.D.) in Computer Science

Riverside, California

- Thesis: "*Redundancy Removal for Accelerating Graph Processing Workloads*"
- Advisors: Professor *Rajiv Gupta* & Professor *Nael Abu-Ghazaleh*
- GPA: **3.86**/4

### Sharif University of Technology

Sep. 2015 – Jan. 2018

Master of Science (M.Sc.) in Computer Engineering

Tehran, Iran

- Thesis: "*Improving Life Cycle of SIMT Processors for Approximate Computing*" (Thesis Grade: *Excellent*)
- Advisors: Professor *Shaahin Hessabi*
- GPA: **4**/4 (**19.03**/20) (*ranked 7th among 83 computer engineering students*)

## Research Experience

---

### University of California San Diego

Jun. 2025 – Present

Postdoctoral Scholar

San Diego, California

- Member of the *System Energy Efficiency (SEE) Lab* and the *Processing with Intelligence Storage & Memory (PRISM)* Research Center at UC San Diego, under the supervision of Professor *Tajana Rosing*.
- Developing MLIR-based compiler support targeting *Dynamic Programming Processing in Memory Hardware Accelerators*.

### Google

Sep. 2024 – Dec. 2024

Student Researcher

Sunnyvale, California

- Member of the *Compiler Optimization* team at *Google* working on *Inter-procedural Identical Basic Block Folding*.
- Developed scalable post-link and inter-procedural identical basic block folding techniques to eliminate redundant basic blocks, reduce binary code size, and maintain performance using profiling-guided analysis.

### University of California Riverside

Jan. 2020 – Jun. 2025

Graduate Research Assistant

Riverside, California

- Member of the *Graph Analytics with Scalability and Performance (GRASP)* and the *RIverside Programming Language & Software Engineering (RIPLE)* centers, supervised by Professor *Rajiv Gupta* & Professor *Nael Abu-Ghazaleh*.
- Developed HW/SW approaches to accelerate dynamic graph workloads, along with designing hardware accelerators.

### Sharif University of Technology

Dec. 2015 – Jan 2018

Graduate Research Assistant

Tehran, Iran

- Member of the Very Large Scale Integration Laboratory (VLSI-Lab), supervised by Professor *Shaahin Hessabi*.
- Improved SIMT processor life cycle for approximate computing through techniques that extend hardware longevity.

## Publications

---

- [*EuroSys'24*] X. Jiang, M. Afarin, Z. Zhao, N. Abu-Ghazaleh, R. Gupta, “[Core Graph: Exploiting Edge Centrality to Speedup the Evaluation of Iterative Graph Queries](#),” *2024 Proceedings of the Nineteen European Conference on Computer Systems* (*Acceptance Rate: 15.99%*) (Contributed Equally with the First Author).
- [*MICRO'23*] C. Gao, M. Afarin, S. Rahman, N. Abu-Ghazaleh, R. Gupta, “[MEGA Evolving Graph Accelerator](#),” *2023 56th Annual IEEE/ACM International Symposium on Microarchitecture* (*Acceptance Rate: 22%*) (Contributed Equally with the First Author).
- [*ASPLOS'23*] M. Afarin, C. Gao, S. Rahman, N. Abu-Ghazaleh, R. Gupta, “[CommonGraph: Graph Analytics on Evolving Data](#),” *International Conference on Architectural Support for Programming Languages and Operating Systems*. (*Acceptance Rate: 26.66%*)
- [*MICRO'21*] S. Rahman, M. Afarin, N. Abu-Ghazaleh, R. Gupta, “[JetStream: Graph Analytics on Streaming Data with Event-Driven Hardware Accelerator](#),” *2021 54th Annual IEEE/ACM International Symposium on Microarchitecture*. (*Acceptance Rate: 21.74%*)
- [*HOPC'23*] M. Afarin et al., “[CommonGraph: Graph Analytics on Evolving Data \(Abstract\)](#),” *In Proceedings of the 2023 ACM Workshop on Highlights of Parallel Computing*.
- [*BigData'23*] A. Mazloui, M. Afarin, R. Gupta, “[Expressway: Prioritizing Edges for Distributed Evaluation of Graph Queries](#),” *2023 IEEE International Conference on Big Data*.
- [*Under Review*] C. Mamatha, M. Afarin, R. Gupta, S. Tallam, H. Shen, and X. D. Li., “[DeduBB: Binary Code Size Reduction via Post-Link Basic Block De-duplication](#),” *ACM SIGPLAN 2026 International Conference on Compiler Construction*.
- [*Under Review*] M. Afarin et al., “[UVVs: Identifying Unchanged Vertex Values in Evolving Graphs via Intersection-Union Analysis](#),” *40th IEEE International Parallel & Distributed Processing Symposium (IPDPS 2026)*.
- [*Under Review*] C. Gao, M. Afarin, X. Yin, N. Abu-Ghazaleh, R. Gupta, “[Sagas: Temporally Consistent Sampling of Evolving Graphs](#),” *IEEE International Conference on Big Data*.
- [*Under Review*] C. Gao, X. Yin, M. Afarin, N. Abu-Ghazaleh, R. Gupta, “[Indexing Evolving Graphs via Query Evolution Prediction](#),” *ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP 2026)*.

## Awards & Achievements

---

- Won *UCR Dissertation Completion Fellowship Award* at UC Riverside, 2024.
- Received the *Excellent Service* badge in all three cycles of ASPLOS'24 Artifact Evaluation, 2024 ([Certificate](#)).
- Won *UCR GSA Travel Grant Award* at University of California, Riverside, 2023.
- Won *Dean's Distinguished Fellowship Award* at University of California, Riverside, 2019.
- *Ranked 7th* among 83 Computer Engineering students at Sharif University of Technology (*Top 8%*), 2018.
- Admitted as an *Exceptional Talent* at Sharif University of Technology for M.Sc, 2015.
- *1st Rank*, highest B.Sc GPA among all Computer Engineering graduates at Shahed University, 2015.

## Teaching Experience

---

- Teaching Assistant, *Compiler Design* (Summer'21/22/23 and Spring'21/22), University of California, Riverside, Department of Computer Science & Engineering, Prof. Rajiv Gupta.
- Teaching Assistant, *System on Chip* (Spring'18) *Testability* (Fall'17) *Advanced VLSI* (Spring'17) *VLSI* (Fall'16), Sharif University of Technology, CE Dep., Prof. Shaahin Hessabi.
- Lab Instructor, *Logic Design Lab*, Sharif University of Technology, Department of Computer Engineering, Summer 2017.
- Lab Instructor, *Digital System Design Lab*, Sharif University of Technology, Department of Computer Engineering, Summer 2016, Prof. Maziar Goudarzi.

## Professional Services

---

**Audio/Video Chair:** ASPLOS'24 Conference

**Reviewer:** CAL'23, TACO'23, IEEE Transaction on Computers'23, Parallel Computing'23 & 25

**Talks:** HOPC'23, Society of Women Engineers (UCR, Winter'24), Tulane Uni. (Winter'25), & Binghamton Uni. (Spring'25)

**Artifact Evaluation Committee:** ASPLOS'25, ASPLOS'24, ISCA'24

## References

---

Professor Tajana Rosing, My Postdoc Supervisor – ([Email](#) | [Homepage](#))

Professor Rajiv Gupta, My Ph.D. Supervisor – ([Email](#) | [Homepage](#))

Professor Nael Abu-Ghazaleh, My Ph.D. Supervisor – ([Email](#) | [Homepage](#))