System Energy Efficiency Lab, Rooms 2132
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Mahbod Afarin

Postdoctoral Scholar, Computer Science, UC San Diego

Professional Summery

Postdoctoral Scholar at UC San Diego with over 5 years of experience in Hardware Accelerators, Compiler Design, and Graph Analytics. Demonstrated record of driving high-impact systems research, leading to real-world deployments at Google and publications in top-tier venues.

Skills

- ***Programming Languages:*** C/C++, Python, CUDA, OpenMP, OpenCL.
- ***Compiler Frameworks:*** LLVM, MLIR, LLVM-BOLT, LLVM Machine Outliner.
- ***Hardware Design & EDA Tools:*** VHDL, Verilog HDL, SystemC, Xilinx ISE, Altera Quartus, Celoxica Agility Compiler, Synopsys Design Compiler.
- ***Simulation & Modeling:*** Multi2Sim, GPGPU-Sim, Mentor Graphics Modelsim, HSPICE, PSPICE, IC Encounter, HSIM, Cadence SoC Encounter, The Structural Simulation Toolkit.

Research Experience

- ***Postdoctoral Scholar:*** Postdoctoral Researcher at 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 (*Jun' 25 - Present*).
- ***Graduate Research Assistant:*** Graduate Research Assistant at the Graph Analytics with Scalability and Performance (GRASP) Center at **UC Riverside**, working under the supervision of Professor Rajiv Gupta & Professor Nael Abu-Ghazaleh (*Jan' 20 - Jun' 25*).
- ***Graduate Research Assistant:*** Graduate Research Assistant at the RIverside Programming Language & Software Engineering (RIPLE) Center at **UC Riverside**, working under the supervision of Professor Rajiv Gupta & Professor Nael Abu-Ghazaleh (*Jan' 20 - Jun' 25*).
- ***Research Intern:*** Developing and evaluating Inter-procedural Identical Basic Block Folding techniques as part of the GCC compiler optimization team at Google (*Sep' 24 - Jan' 25*).
- ***Graduate Research Assistant***: Graduate Research Assistant at the Very Large Scale Integration Laboratory (VLSI-Lab) at **Sharif University of Technology**, working under the supervision of Professor Shaahin Hessabi (*Dec' 15 - Jan' 18*).

Education

- ***Doctor of Philosophy*** (Ph.D.), Computer Science, University of California Riverside, California, USA. *Jan' 20 - Jun' 25*
  - **Thesis**: *"Redundancy Removal for Accelerating Graph Processing Workloads"*
  - **Advisors**: Professor Rajiv Gupta & Professor Nael Abu-Ghazaleh (GPA: **3.86**/4)
- ***Master of Science*** (M.Sc.), Computer Engineering (Computer System Architecture), Sharif University of Technology, Tehran, Iran. *Sep' 15 - Jan' 18*
  - **Thesis**: *"Improving Manufacturing Yield and Life Cycle of Special Purpose SIMT Processors for Inexact Computing"* (**Thesis Grade**: Excellent)
  - **Advisors**: Professor Shaahin Hessabi
  - **GPA**: **4**/4 (**19.03**/20) (Ranked **7th** among 83 Computer Engineering students)

Publications

- [***PRISM'25***] **M. Afarin**, Y. Chen, T. Rosing, "Compiler Support for Dynamic Programming Hardware Accelerators," *2025 Processing with Intelligent Storage and Memory Annual Review.*
- [***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 (Aacceptance 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 (Aacceptance 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. (Aacceptance Rate: **26.66%**)*

- [***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. Mazloumi, **M. Afarin**, R. Gupta, "Expressway: Prioritizing Edges for Distributed Evaluation of Graph Queries," *2023 IEEE International Conference on Big Data.*
- [***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. (Aacceptance Rate: **21.74%**)*
- [***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," *IEEE/ACM International Symposium on Code Generation and Optimization (CGO 2026).*
- [***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 at ACM International Conference on Architectural Support for Programming Languages and Operating Systems, San Diego, 2024 (Certificate of Appreciation).
- 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*** in terms of total GPA among 83 Computer Engineering students in Sharif University of Technology (***Top 8%***), 2018.
- Admitted as an ***Exceptional Talent*** at Sharif University of Technology for M.Sc, 2015.
- ***1st Rank***, Achievement of the highest GPA in B.Sc among all Computer Engineering graduated students in 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, Prof. Siavash Bayat-Sarmadi.
- Lab Instructor, ***Digital System Design Lab***, Sharif University of Technology, Department of Computer Engineering, Summer 2016, Prof. Maziar Goudarzi.

Professional Services

- ***Audio/Video Chair*** of the ASPLOS'24 Conference.
- ***Reviewing for Conferences & Journals:*** CAL'23, TACO'23, IEEE Transaction on Computers'23, Parallel Comput.'23 & 25.
- ***Talks:*** HOPC'23 Conference, Society of Women Engineers (UC Riverside, Winter'24), Tulane University (Winter'25), and Binghamton University (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)