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Mahbod Afarin

PhD Candidate, Computer Sciecne, University of California Riverside

Research Interests

- Graph Processing Algorithms & Accelerators
- GPU Architecture & Programming
- Compiler Optimizations
- Computer Architecture

Skills

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

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 (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%**)*
- [***Submitted to PPOPP'25***] **M. Afarin** et al., "UVVs: Identifying Unchanged Vertex Values in Evolving Graphs via Intersection-Union Analysis," *Proceedings of the 30th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming.*
- [***Submitted to ASPLOS'25***] C. Gao, **M. Afarin**, X. Yin, N. Abu-Ghazaleh, R. Gupta, "Sagas: Temporally Consistent Sampling of Evolving Graphs," *2025 58th Annual IEEE/ACM International Symposium on Microarchitecture* (Contributed Equally with the First Author).

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.

Research Experience

- **Research Intern**: Conducting research in the Inter-procedural Identical Basic Block Folding as part of the GCC compiler optimization team under the supervision of Dr. Sriraman Tallam at Google (*Sep' 24 - Present*).
- **Graduate Research Assistant**: Member of the GRaph Analytics with Scalibility & Performance (GRASP) research group (*Jan' 20 - Present*).
- **Graduate Research Assistant**: Member of the RIverside Programming Language & Software Engineering (RIPLE) research group (*Jan' 20 - Present*).
- **Graduate Research Assistant**: Member of Very Large Scale Integration Laboratory (VLSI-Lab) under supervision of Prof. Shaahin Hessabi (*Dec' 15 - Jan' 18*).

Education

- **Doctor of Philosophy** (Ph.D.), Computer Science, University of California Riverside, California, USA. *Jan' 20 - Present*
  - **Thesis**: *"Hardware-Software Approaches 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)
- **Bachelor of Science** (B.Sc.), Computer Engineering (Computer System Architecture), Shahed University, Tehran, Iran. *Sep' 11 - Jun' 15*
  - **Advisors**: Professor Naser Mohammadzadeh
  - **GPA**: **3.63**/4 (**17.53**/20) (Ranked **1st** among all Computer Engineering students)

Reviewing for Conferences & Journals

- **Conferences**: BigData'25, CGO'25, MICRO'25, ISPASS'24, PPOPP'24, MICRO'23, ICDCS'23, ACM ICS'23, ISPASS'23, ICDCS'22, ISPASS'22, CGO'20, MICRO'20, PACT'20.
- **Journals**: CAL'23, TACO'23, IEEE Transaction on Computers'23, Parallel Computing'23.

Professional Services

- **Audio/Video Chair** of the ASPLOS'24 Conference.
- **Artifact Evaluation Committee:** ASPLOS'25, ASPLOS'24, ISCA'24.

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.
- Teaching Assistant, **VLSI Design** (Fall'19) **Computer Architecture** (Spring'19/Fall'19) **Digital Electronic** (Spring'19) **Logic Design Lab** (Spring'19) **Digital System Design Lab** (Spring'19), Shahed University, CE Department, Prof. Naser Mohammadzadeh.

References

- Professor Rajiv Gupta (My Ph.D. Supervisor – Email | Homepage)
- Professor Nael Abu-Ghazaleh (My Ph.D. Supervisor – Email | Homepage)
- Professor Shaahin Hessabi (My M.Sc. Supervisor – Email | Homepage)