Amir Taherin

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Last Updated: February 12, 2025

"The best way to predict the future is to invent it." – Alan Kay

Education

Ph.D.

2020–Present **Computer Engineering**, *Northeastern University*, Boston, MA.
Department of Electrical and Computer Engineering
– NUCAR Laboratory

Advisor Prof. David Kaeli

Co-advisor Prof. Yanzhi Wang

Coursework

- Advanced Computer Architecture
- High Performance Computing
- Introduction to Machine Learning and Pattern Recognition
- Simulation and Performance Evaluation
- PhD Career Management

Events

- IBM Global Summer School 2022: **Quantum Simulation**
- IBM Global Summer School 2021: **Quantum Machine Learning**
- Google Systems Innovation Summit 2021

M.Sc.

2018–2020 **Computer Science**, *University of Rochester*, Rochester, NY.
Department of Computer Science
– Computer Systems Group

Coursework

- Operating Systems
- Mobile Systems Architecture
- Introduction to Artificial Intelligence
- Parallel and Distributed Computing
- Computer's Models and Limitations
- Data Mining

M.Sc.

2014–2016 **Computer Systems Architecture**, *Sharif University of Technology*, Tehran, Iran.
Department of Computer Engineering
– Computer Architecture Group
– Embedded Systems Research Laboratory (ESRLab)

Master's Thesis

Title **"Energy Management in Fault-Tolerant Mixed-Criticality Systems"**

Advisor Prof. Alireza Ejlali

Coursework

- Advanced Computer Architecture
- Advanced VLSI Design
- Embedded Systems Design

- Low Power Digital Systems Design
- System on Chip Design
- Fault-Tolerant Systems Design
- Advanced Design of Dependable Systems

B.Sc.

2006–2011 **Computer Engineering – Hardware Major**, *K. N. Toosi University of Technology*, Tehran, Iran.
Department of Computer Engineering
– Computer Hardware Group

Final Project

Title **"Survey on VoIP Vulnerabilities, Threats and Countermeasures in order to Optimize Countermeasures Against a Well Known Threat"**

Selected Course Works

- Computer Architecture
- Digital Design
- Linear Control Systems
- Data Transmission
- Microprocessor
- Operating Systems
- Internet Engineering
- Multimedia
- VLSI Design
- Digital Electronics
- Signals and Systems
- Data Structure and Algorithm
- Computer Networks
- Voice over Internet Protocol
- Artificial Intelligence
- Project Management

Research Interests

- Computer Architecture, SoC, and GPU Design
- Parallel, Heterogeneous, and Real-Time Systems
- Energy-Efficient and High-Performance Computing
- AI Acceleration, Edge Computing, and Efficient Inference
- Neural Network Optimization and Deployment
- Fault Tolerance and Reliable System Design

Publications

Journal Papers:

TSUSC-2018 **"Reliability-Aware Energy Management in Mixed-Criticality Systems"**, *Amir Taherin, Mohammad Salehi, Alireza Ejlali, IEEE Transactions on Sustainable Computing*, vol. 3, no. 3, pp. 195-208, 2018.

Conference Papers:

DSN-2021 **"Examining Failures and Repairs on Supercomputers with Multi-GPU Compute Nodes."**, *Amir Taherin, Tirthak Patel, Giorgis Georgakoudis, Ignacio Laguna, and Devesh Tiwari*, In The 51st Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN '20)., Taipei, Taiwan.

FPGA-2020 **"Energy-Efficient 360-Degree Video Rendering on FPGA via Algorithm-Architecture Co-Design."**, *Qiuyue Sun, Amir Taherin, Yawo Siatitse, and Yuhao Zhu*, In The 2020 ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA '20). Association for Computing Machinery, New York, NY, USA.

RTEST-2015 **"Stretch: Exploiting Service Level Degradation for Energy Management in Mixed-Criticality Systems"**, *Amir Taherin, Mohammad Salehi, Alireza Ejlali*, The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST), Tehran, Iran.

Technical Skills

Quantum Computing	IBM Qiskit
Operating Systems	Windows, Linux, Android
Programming Languages	C/C++ (*OpenMP, MPI, pthread*), Python, TCL/OTcl, StateFlow, MATLAB, Assembly languages of X86, and ARM
HDLs	Verilog

CAD Tools	Synopsys (*Design Compiler, HSPICE, PrimePower, Platform Architect*), Cadence (*Virtuoso, SoC Encounter*), Mentor Graphics (*ModelSim*), Xilinx (*ISE Design Suite, Vivado HLS, SDSoC*), MATLAB, Simulink
Dev. Boards	NVIDIA Jetson AGX Orin Developer Kit, Zynq UltraScale+ MPSoC ZCU104 Evaluation Kit
ML tools	Weka
CMSs	Joomla, Drupal, Plone, OwnCloud
Typesetting	LaTeX, TeX, Microsoft Office

Teaching Experience

Fall 2022 **High Performance Computing**, *Teaching Assistant*, Northeastern University, Boston, MA.
Under Supervision of Prof. David Kaeli

Spring 2020 **Parallel and Distributed Computing**, *Teaching Assistant*, University of Rochester, Rochester, NY.
Under Supervision of Prof. Sandhya Dwarkadas

Fall 2019 **Programming Languages Design and Implementation**, *Teaching Assistant*, University of Rochester, Rochester, NY.
Under Supervision of Prof. Michael L. Scott

Spring 2019 **Computer Organization**, *Teaching Assistant*, University of Rochester, Rochester, NY.
Under Supervision of Prof. Yuhao Zhu

Spring 2016 **Embedded Systems Design**, *Teaching Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Alireza Ejlali

Spring 2016 **Logic Design**, *Teaching Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Shaahin Hessabi

Spring 2015 **Advanced Logic Design**, *Teaching Assistant*, Sharif University of Technology, Tehran, Iran.
Under Supervision of Prof. Alireza Ejlali

Honors and Awards

2022 **Quantum Excellence** in Quantum Simulation from IBM Qiskit Global Summer School

2021 **Quantum Excellence** in Quantum Machine Learning from IBM Qiskit Global Summer School

2016 **Ranked 3rd** in cumulative GPA among all students of computer architecture (41 students), Sharif University of Technology, Tehran, Iran.

2015 **National Talent Award** for exceptional GPA from Sharif University of Technology, Tehran, Iran.

2014 **Rank Obtained 21** in the nationwide university entrance exam of graduate studies in Computer Science and Engineering among 8,998 participants. Tehran, Iran.

2006 **Rank Obtained 1525** in the nationwide university entrance exam in undergraduate studies, Physics and Mathematics Track, among 1,345,000 participants. Tehran, Iran.

Academic Services

TETCSI-2018 **Reviewer**, *IEEE Transactions on Emerging Topics in Computing.*

RTEST-2017 **Reviewer**, *The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST).*

RTEST-2015 **Reviewer**, *The CSI Symposium on Real-Time and Embedded Systems and Technologies (RTEST).*

Standard Test Scores

TOEFL **115/120**: Reading: 28/30, Listening: 29/30, Speaking: 29/30, Writing: 29/30

Selected Projects

2021 – present **Implementation, Testing, and Enhancement of Visual Inference on NVIDIA Jetson AGX Orin**, *Utilized YOLOv5 and YOLOv8 models with PyTorch and TensorRT; monitored system performance using Tegrastats, developed in Python*, Northeastern University, Boston, MA.
NUCAR Research Project

2019 **Implementation and Testing of Basic and Advanced Spin Locks for Shared Memory Systems**, *Implemented C++ mutex, TAS lock, ticket lock, MCS lock, K42 MCS lock, CLH lock, and K42 CLH lock with various backoff strategies*, University of Rochester, Rochester, NY.
Parallel and Distributed Computing – Course Project

2019 **Implementation of Drinking Philosophers Problem for Shared Memory Systems**, *Based on TOPLAS '89, developed in C++*, University of Rochester, Rochester, NY.
Parallel and Distributed Computing – Course Project

2019 **Frequent Item-Set Mining on ISCA Papers**, *Performed data mining on titles, abstracts, references, citations, etc., using Python*, University of Rochester, Rochester, NY.
Data Mining – Course Project

2018 **Estimation of Power and Energy Consumption in Mobile Computing Accelerators**, *Used LIKWID Performance Monitoring and Benchmarking Suite for baseline estimation*, University of Rochester, Rochester, NY.
Problem Seminar – Course Project

2018 **Implementation of Basic Learning Algorithms**, *Implemented Decision Tree and Multi-Layer Feed-Forward Neural Network in Python*, University of Rochester, Rochester, NY.
Artificial Intelligence – Course Project

2018 **Implementation of a Game Engine for Super and Qubic TTT**, *Developed using Depth-Limited H-MINMAX and Alpha-Beta Pruning algorithms in Python*, University of Rochester, Rochester, NY.
Artificial Intelligence – Course Project

2018 **Survey on Scheduling of Fast Computational Accelerators**, *Explored scheduling techniques based on GPU architecture*, University of Rochester, Rochester, NY.
Operating Systems – Course Project

2018 **Implementation of Kernel-Level Counter-Based Clock Page Replacement Algorithm for Memory Management**, *Applied to Active and Inactive Lists, Developed in C*, University of Rochester, Rochester, NY.
Operating Systems – Course Project

2018 **Implementation of Kernel-Level Synchronization Primitives**, *Implemented RB-Tree and Spinlocks from Linux kernel data structures in C*, University of Rochester, Rochester, NY.
Operating Systems – Course Project

2016 **Design and Implementation of Low-Power On-Chip Interconnect in 90nm CMOS Technology**, *Designed using Bus-Inverting and Reduced Voltage Swing techniques in HSPICE*, Sharif University of Technology, Tehran, Iran.
Low Power Digital Systems Design – Course Project

2016 **Layout Design of Basic Gates in 90nm CMOS Technology**, *Designed layout for basic gates using Static CMOS, Pseudo-nMOS, DCVSL, and Dual-Rail Domino in Virtuoso Layout Editor*, Sharif University of Technology, Tehran, Iran.
Advanced VLSI – Course Project

2015 **Reliability Model of TMR-Configured Multicore Processors Based on DVFS and AVF**, *Developed a reliability model in MATLAB for TMR-configured multicore processors using DVFS and AVF*, Sharif University of Technology, Tehran, Iran.
Advanced Design of Dependable Systems – Course Project

2015 **Design and Implementation of Incubator Temperature Control**, *Designed and implemented temperature control using two methods: (1) Differential Equations (PI and PID Controllers) in MATLAB/Simulink, and (2) Automata-Based Programming (CFSM) in MATLAB/Simulink StateFlow*, Sharif University of Technology, Tehran, Iran.
Embedded Systems Design – Course Project

2015 **Implementation of ER-EDF and EDF-VD Mixed-Criticality Scheduling Algorithms**, *Implemented ER-EDF (DATE 2013) and EDF-VD (ECRTS 2012) scheduling algorithms in MATLAB*, Sharif University of Technology, Tehran, Iran.
Embedded Systems Design – Course Project

2015 **Design and Implementation of a Complex Multiplication ASIC (Hard) IP-Core in 0.18μm CMOS Technology**, *Completed full ASIC design flow in Verilog, synthesized in Synopsys Design Vision, placed and routed in SoC Encounter, and verified with post-layout simulation in HSIM*, Sharif University of Technology, Tehran, Iran.
System on Chip Design – Course Project

2015 **Design and Implementation of a Complex Multiplication IP-Core on FPGA**, *Developed using Xilinx ISE Design Suite for Spartan-6, Spartan-4, Virtex-4, Virtex-5, Virtex-6, and Virtex-7 families*, Sharif University of Technology, Tehran, Iran.
System on Chip Design – Course Project

2014 **Survey on Limitations and Challenges of Multicore Processors in Safety-Critical Systems**, *Investigated challenges and limitations in the context of mixed-criticality systems*, Sharif University of Technology, Tehran, Iran.
Fault-Tolerant Systems Design – Course Project

2014 **Reliability Evaluation and Assessment of Fault-Tolerant Systems**, *Evaluated and assessed reliability of systems including TMR, 5MR, TMR with Error Recovery, RAID5, RAID6, and Standby-Sparing using Relex tools*, Sharif University of Technology, Tehran, Iran.
Fault-Tolerant Systems Design – Course Project

2014 **Design and Implementation of a Cache Prefetcher**, *Developed a cache prefetcher in C++ implementing algorithms such as Next-Line Prefetcher, Stride Prefetcher, and Temporal Streaming of Shared Memory (TMS) Prefetcher (ISCA 2005)*, Sharif University of Technology, Tehran, Iran.
Advanced Computer Architecture – Course Project

2014 **Design and Implementation of a Cache Simulator**, *Developed a cache simulator in C++ implementing various replacement policies: LRU, LFU, MRU, Pseudo LRU, Belady's optimal, and Shepherd Cache (MICRO 2007)*, Sharif University of Technology, Tehran, Iran.
Advanced Computer Architecture – Course Project

2009 **Design and Implementation of a Multi-Threaded Web Server**, *Developed a multi-threaded web server in C++, focusing on concurrency, resource management, and performance optimization*, K. N. Toosi University of Technology, Tehran, Iran.
Operating Systems – Course Project

2008 **Design and Implementation of a Pipelined MIPS Processor**, *Developed a pipelined MIPS processor using Quartus, focusing on performance optimization and efficient instruction execution*, K. N. Toosi University of Technology, Tehran, Iran.
Computer Architecture – Course Project

2007 **Design and Implementation of a Chess Engine**, *Developed a chess engine in C++ focusing on algorithm optimization*, K. N. Toosi University of Technology, Tehran, Iran.
Advanced Programming – Course Project

Professional Positions

2021 – now **Graduate Research Assistant**, *NUCAR Laboratory*, Department of Electrical and Computer Engineering, Northeastern University, Boston, MA.

2020 – 2021 **Graduate Research Assistant**, *GoodWill Laboratory*, Department of Electrical and Computer Engineering, Northeastern University, Boston, MA.

2018 – 2020 **Graduate Research and Teaching Assistant**, Department of Computer Science, University of Rochester, Rochester, NY.

2014 – 2017 **Graduate Research Assistant**, *Embedded Systems Research Laboratory (ESRLab)*, Department of Computer Engineering, Sharif University of Technology, Tehran, Iran.

Languages

Persian Mother tongue

English Full professional proficiency *TOEFL iBT: 115/120*

References

Available on request.