Amir Hossein Sojoodi
HPC Researcher

RESEARCH INTERESTS

High Performance Computing, Parallel Computing, Distributed Processing, GPU Computing

EDUCATIONS

2020-24 — **Ph.D. In Electrical and Computer Engineering,** *Queen's University,* Kingston, Canada
Research topic: High-performance GPU-Aware Communications; **GPA: 4.0/4.0**

2012-15 — **M. Sc. In Software Engineering,** *Shiraz University,* Shiraz, Iran.
Ranked 3rd among students with **GPA 17.66/20.00**
Thesis**:** Design & Evaluation of a Large-Scale Data Processing Framework for Modern GPUs. (Enabling Apache Tez to use GPU) *supervised by Dr. F. Khunjush*

2007-12 — **B. Sc. In Software Engineering,** *Shiraz University,* Shiraz, Iran

PUBLICATIONS

2021 — Y. H. Temucin, A. Sojoodi, P. Alizadeh, B. W. Kitor, and A. Afsahi, "Accelerating Deep Learning using Interconnect-Aware UCX Communication for MPI Collectives," IEEE Micro, 2021, pp. 1–9. "Under Review"

2021 — Y. H. Temucin, A. Sojoodi, P. Alizadeh, and A. Afsahi, "Efficient Multi-Path NVLink / PCIe-Aware UCX based Collective Communication for Deep Learning," *Proceedings of Hot Interconnects*, pp. 1–10.

2020 — A. Sojoodi, M. Salimi Beni, and F. Khunjush, "Ignite-GPU: a GPU-enabled in-memory computing architecture on clusters," Journal of Supercomputing, 2020, pp. 1–28.

2020 — M. S. Beni, A. Sojoodi and F. Khunjush, "A GPU-Enabled Extension for Apache Ignite to Facilitate Running Genetic Algorithms," *2020 (CADS)*, Rasht, Iran, 2020, pp. 1-8.

PROFESSIONAL EXPERIENCES

2020-now — **Course Design and Development Specialist**
Part-time; at *FEAS (Faculty of Engineering and Applied Science), Queen's University*

2018-19 — **R&D, XenServer and Linux administrator**
HPC group, CSE Dept, Shiraz University; supervised by Dr. F. Khunjush.
Challenges: To setup and maintain Apache Hadoop, Spark, Tez and Ignite clusters.

2016-17 — **Servers administrator, Data Visualization and Java backend developer**
Aria Hamrah Samaneh, *Shiraz Section, Software Group, Shiraz, Iran.* Challenges: Data warehouse research and develop, data visualization with Tableau, setup and maintain various development services.

2015-16 — **R&D, Business Intelligence (BI) Developer**
ICTC (Information and Communication Technology Center), Shiraz University

2013-15 — **R&D, XenServer and Linux administrator**
HPC group, CSE Dept, Shiraz University; supervised by Dr. F. Khunjush. Challenges: User management, setup and maintain various services such as, nexus repository manager, apt cacher, squid firewall, version control system, project manager (Redmine) etc.

AWARDS AND ACCOMPLISHMENTS

2020 — **Parya Scholarship,** provided by Parya Trillium Foundation Scholarship

2019 — **Best T.A** at CSE, Shiraz University. According to the students' poll, GPU Programming

2016 — **9th Place** at National IoT Hackathon, IUST, Tehran, Iran**.** Introducing *"Intelligent Outlet"*

2015 — **Silver Medal** at 7th National JavaChallenge, Sharif University, Tehran, Iran.

2010 — **5th Place** at Kashan University 2nd International Programming contest, Kashan, Iran.

Personal Info

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Languages

Persian (Native)
English (Fluent)
(TOEFL: **104**, R: 28 L: 27 S: 24 W: 25)
French (Basic)

Computer Skills

Programming Languages

C/C++, Java ●●●●●

Python, SQL, Shell ●●●●○

Platforms & Tools

CUDA, OpenMP, MPI, Pthreads ●●●●●

Apache Maven, Apache Ignite, Apache Tez ●●●●○

Apache Hadoop, Spark ●●●○○

Apache Storm, Kafka ●●○○○

Git, Vim, Tableau, Latex ●●●●●

Operating Systems

Ubuntu, Windows ●●●●●

Debian, CentOS, Xen ●●●○○

References

Dr. A. Afsahi   ahmad.afsahi@queensu.ca
Dr. F. Khunjush   fkhunjush@shirazu.ac.ir
Dr. A. Etemad   ali.etemad@queensu.ca
Dr. Dastghaibi   dastghaib@shirazu.ac.ir
Dr. S. Hashemi   s_hashemi@shirazu.ac.ir
Dr. A. Hamzeh   ali@shirazu.ac.ir

SELECTED PROJECTS

2020   **Multi-GPU Vector Reduction**, *implemented in CUDA*
In this project, I have designed, implemented, and evaluated 9 different intra-node *reduction* approaches on 4 data buffers each of which resides on a GPU of a single node. The algorithms are based on 2 common reduction algorithms: Ring and Binomial Tree; and for each of these algorithms, I implemented their pipelined and multi-channel version and compared them against one another.

2020   **OpenMP-to-CUDA-Transformation**, *implemented in TXL*
In this project we used TXL to transform simplified OpenMP C source codes to its equivalent CUDA version. The transformation takes multiple pre-assumptions into account to make the process easier, like availability of Unified Memory, and the source OpenMP code being race-free and valid. The project's complete documentation can be found at this [Link](#).

2019   **Ignite-GPU** at *Shiraz University HPC lab, implemented in Java and CUDA*
Currently Apache Ignite does not support GPUs formally, therefore, we have designed, implemented, and evaluated a platform in which Apache Ignite integrates with the GPUs smoothly and provides the developers more computing power and performance. We have ported Genetic Algorithm, as a test case, to the Ignite-GPU and achieved up to **200x speedup** compared to the CPU-only version.

2015   **Simorgh – GPU-enabled Apache Tez,** *My M.Sc. thesis*
Apache Tez provides a DAG execution programming model to users (Processing Vertices and Reader/Writer Edges). In this project, we have designed and developed a framework in which Apache Tez is integrated with Nvidia GPUs seamlessly. Our evaluations have shown that using GPUs for processing a Vertex gains **4 to 6x speedup**.

TEACHING EXPERIENCES

2020,21,22	**Digital Systems Engineering** T.A., Undergraduate; Queen's University
2020,21	**Fundamentals of Information Structure** T.A., Undergraduate; Queen's University
2016	**Introduction to OOP with Java** Course Instructor; Shiraz University
2014	**Multicore Programming** T.A., Graduate; Shiraz University
2013,15,18	**GPU Programming** T.A., Undergraduate; Shiraz University
2012,13	**Software Engineering Lab** Course Instructor, Undergraduate; Shiraz University
2012	**Microprocessors** T.A., Undergraduate; Shiraz University
2010,11,12	**Operating Systems** T.A., Undergraduate; Shiraz University
2010	**Principles of Programming (C)** T.A., Undergraduate; Shiraz University
2009,10,12	**System Programming (Assembly)** T.A., Undergraduate; Shiraz University

OTHER RELATED EDUCATION (SELECTED)

2021-08	SCINET Summer Workshop: **Debugging and Performance Tuning**
2021-08	Hot Interconnect Conference
2021-07	PUMPS+AI Conference by Barcelona Supercomputing Center
2021-06	SHARCNET HPC Summer Workshop: **Modern C++ and Parallel Programming**
2021-04	GTC Conference, by NVIDIA
2014-11	NVIDIA & Udacity Course: **Intro to Parallel Programming with GPUs**