

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

- 2022

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*, 2022, pp. 68–76.
- 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*, 2021, 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

- 2020-22

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

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Dr. F. Khunjush

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Dr. A. Etemad

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Dr. S. Hashemi

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Dr. A. Hamzeh

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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)

- 2022-03 GTC Conference, by NVIDIA
- 2021-11 Super Computing (SC) Conference
- 2021-11 GTC fall Conference, by NVIDIA
- 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**

Delivered Talks & Seminars

- 2019, **Start a Good Career** at CSE Dept Shiraz University
- 2018, **Illusion of Decision** at 12th *Break Time in University Conference*, Shiraz University
- 2016, **Work during College** at CSE Dept Shiraz University
- 2016, **Software Engineering** at CSE Dept Shiraz University
- 2014, **Time Management** as Keynote Speaker at 8th *Break Time in University Conference*
- 2014, **Future Education** as Keynote Speaker at 1st *Entekhab-e-Bartar Conference*
- 2013, **Climate Crisis** as Keynote Speaker at 7th *Break Time in University Conference*
- 2011, **Art of Googling** at CSE Dept Shiraz University
- 2011, **Compilers & Interpreters** at CSE Dept Shiraz University

Volunteer Activities

- 2021, **Podcast Host** at [International Voices](#) at Queen's Podcast, produced by [QUIC](#) and [SASS](#)
- 2017-2019, **Photo & Video Editor** at Chashnak Bakery ([Instagram](#)) as photographer & image/video editor
- 2009-2019, **Staff Committee** at Break Time in University ([BTIU](#)) which is a 3-day conference held by undergraduate and graduate students annually since 2006 for high school students.
- 2012-2016, **Co-founder and member** of Tolu group in which we held seminars and talks about psychology, psychoanalysis, philosophy, history, and sociology
- 2011-2014, **President of Students' Scientific Group**, CSE Dept, Shiraz University, in 2011 and its active member during 2009-2012 and 2014