

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 Communications in Hybrid Clusters; **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.
- 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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Web

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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

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Python, SQL, Shell

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Platforms & Tools

CUDA, OpenMP, MPI, Pthreads

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Apache Maven, Apache Ignite, Apache Tez

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Apache Hadoop, Spark

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Apache Storm, Kafka

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Git, Vim, Tableau, Latex

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Operating Systems

Ubuntu, Windows

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Debian, CentOS, Xen

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References

Dr. A. Afsahi

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Dr. F. Khunjush

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Dr. A. Etemad

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Dr. Dastghaibi

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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 around **200x speedup** compared to its Ignite-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

- 2021 **Fundamentals of Information Structure** T.A., Undergraduate; Queen's University
- 2021 **Digital Systems Engineering** T.A., Undergraduate; Queen's University
- 2020 **Fundamentals of Information Structure** T.A., Undergraduate; Queen's University
- 2020 **Digital Systems Engineering** T.A., Undergraduate; Queen's University
- 2013,15,18 **GPU Programming** T.A., Undergraduate; Shiraz University
- 2016 **Introduction to OOP with Java** Course Instructor; Shiraz University
- 2014 **Multicore Programming** T.A., Graduate; Shiraz University
- 2012,13 **Software Engineering Lab** Course Instructor, Undergraduate; Shiraz University
- 2012 **Operating Systems** T.A., Undergraduate; Shiraz University
- 2012 **System Programming (Assembly)** T.A., Undergraduate; Shiraz University
- 2012 **Microprocessors** T.A., Undergraduate; Shiraz University
- 2010,11 **Operating Systems** T.A., Undergraduate; Shiraz University
- 2010 **Principles of Programming (C)** T.A., Undergraduate; Shiraz University
- 2009,10 **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**

My Talks and 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