Mahdi Soltan Mohammadi   *Résumé*

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Education

Since 2015	**PhD, Computer Science, University of Arizona**
Exp. Jul 2020	Research: Automatic transformation of irregular codes
2014	**Master, Computer Science, Yazd University, Iran**
	Thesis Title: Designing and Implementing a Distributed framework for SIFT Algorithm
2011	**B.Sc., Information Technology, IASBS University, Iran**
	Project Title: Using Image Processing Methods in Quality Control of Metal Plate Production

Peer Reviewed Publications:

2019	**M. S. Mohammadi**, K. Cheshmi, E. C. Davis, M. Hall, M. M. Dehnavi, P. Nandy, C. RM. Olschanowsky, A. Venkat, T. Yuki, and M. M. Strout, "Sparse Computation Data Dependence Simplification for Efficient Compiler-Generated Inspectors," in the 40th ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI19**), 2019.
2018	**M. S. Mohammadi**, K. Cheshmi, M. M. Dehnavi, A. Venkat, T. Yuki, and M. M. Strout, "Extending index-array properties for data dependence analysis," in Proceedings of The 31st International Workshop on Languages and Compilers for Parallel Computing (LCPC18), 2018.
2018	P. Nandy, M. Hall, E. Davis, C. Olschanowsky, **M. S. Mohammadi**, W. He, M. M. Strout, "Generalizing Inspector Generation and Composition for Sparse Computations," in 8th International Workshop on Polyhedral Compilation Techniques, IMPACT 2018.
2016	A. Venkat, **M. S. Mohammadi**, H. Rong, R. Barik, J. Park, M. M. Strout and M. Hall, "Automating Wavefront Parallelization for Sparse Matrix Computations," in Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC16**), Salt Lack City, Utah, 2016. [**Best Paper Finalist**]
2014	**M. S. Mohammadi** and M. Rezaeian, "Towards Affordable Computing: SiftCU a Simple but Elegant GPU-based Implementation of SIFT," International Journal of Computer Applications, vol. 90, no. 7, pp. 30-37, 2014.
2013	**M. S. Mohammadi** and M. Rezaeian, "SiftD: A CPU & GPU Distributed Hybrid System For SIFT," in Seventh International Symposium on Telecommunication, ITRC, Tehran, 2014.
2013	**M. S. Mohammadi**, M. Rezaeian, "SiftCU: An Accelerated CUDA Based Implementation of SIFT," in Symposium on Computer Sci. and Software Eng., Sharif University, Tehran, 2013.

Non-Peer Reviewed Publications:

2017	B. Gaska, N. Jothi, **M. S. Mohammadi**, K. Volk, M. M. Strout, "Handling Nested Parallelism and Extreme Load Imbalance in an Orbital Analysis Code," arXiv preprint arXiv:1707.09668, 2017.
2014	**M. S. Mohammadi** and M. Rezaeian, "Exhausting Resources with CPU/GPU Hybrid Distributed Systems: SiftD a Specialized Distributed System for SIFT," Technical report.

Awards and Honors

2017	Graduate Fellowship, Computer Science Department, University of Arizona
2009	Second Prize in UCM Programming Contest, IASBS University
2008-2011	Torkamans Award for Distinguished Students, IASBS University

Professional and Volunteer Experience

2018	Student Volunteer for POPL 2018
2018	Artifact Evaluation Committee Member for PPoPP 2018

Projects and Work Experience

2015 - Current **Graduate Research Assistant**, Computer Science Department, University of Arizona
Advisor: Professor Michelle Mills Strout

- I have been working on automatic DOALL and wavefront parallelization of sparse computations based on simplifying data dependence relations used in inspector/executor strategy. Sparse data structures are commonly used in real world application to save on memory and storage, and improve sequential execution performance. Nonetheless, compilers have difficulty analyzing and optimizing sparse codes due to indirect memory accesses, such as Val[index[i]]. I work on extending data dependence analysis of sparse computation with domain knowledge about the computation, to enable automatic full and wavefront parallelization in these type of codes.

Aug- Dec 2019 **Compiler Intern**, PGI Group, NVIDIA Corporation
Reported to: Annemarie Southwell

- I am helping with the development of PGI OpenACC compilers, one of the world's premier optimizing compilers. Working with Compiler Engineers on compilers for HPC, I am helping to drive future implementations of C, C++, OpenMP, and OpenACC.

2013 - 2014 **Master Thesis**, Computer Science Department, Yazd University
Supervisor: Professor Mehdi Rezaeian

- Implemented SIFT image feature extraction algorithm for GPUs using CUDA framework and for multi-core processors using Pthreads.
- I implemented a distributed version of SIFT algorithm by distributing work over network of computers. I used Berkeley sockets and other POSIX libraries for implementation. All available resources in each system including multi-core CPUs and GPUs are utilized.

Teaching Experience

Fall 2010 **Teaching Assistant**, IASBS University
Course Title: Machines and Languages Theory I

Spring 2009 **Teaching Assistant**, IASBS University
Spring 2010 Course Title: Data Structures I

Winter 2009 **Teaching Assistant**, IASBS University
Winter 2010 Course Title: Advanced Programming I

Fall 2009 **Teaching Assistant**, IASBS University
Fall 2008 Course Title: Fundamentals of Computer and Programming

- Held regular public Q & A classes
- Designed and evaluated exercises & Graded mid-terms and finals

Professional Memberships

Since 2014   IEEE Student Member
Since 2018   The Association for Computing Machinery (ACM) Member
Since 2018   The ACM Special Interest Group on Programming Languages (SIGPLAN) Member

Professional Skills

- Professional **C/C++** Programming, UNIX System and Network Programming (**POSIX**)
- Program Analysis and Logic (**Z3**, **Datalog**, **ISL**)
- GPU Programming (**CUDA**) and Parallel Programming (**Pthreads**, **OpenMP**)
- Distributed Programming (**MPI**, **Hadoop**)
- **Linux** System and Network **Administration**, **Java** and **Python** Programming