M.Sc. Arya Mazaheri

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Born 21 June 1989

EDUCATION

Aug 2015 – Present

PhD Candidate in Computer Science

Technische Universität Darmstadt

- Thesis: Auto-Tuning Framework for Accelerating Deep Learning Applications

Sept 2012 – Jan 2015

Master's degree in Computer Architecture

Isfahan University of Technology (IUT), collaborated with RWTH Aachen University

- Thesis: Detecting parallel patterns in shared-memory applications
- GPA: 18.11/20
- Passed with distinction

Sept 2008 – Sept 2012

Bachelor's degree in Software Engineering

Isfahan University of Technology (IUT)

- Thesis: Implementing web-based visualization platform for huge datasets
- GPA: 16.96/20
- Passed with distinction

SELECTED PUBLICATIONS

- ***Arya Mazaheri***, Felix Wolf, Ali Jannesari "Unveiling Thread Communication Bottlenecks Using Hardware-Independent Metrics", ICPP 2018 (Submitted)
- ***Arya Mazaheri***, Ali Jannesari, Abdolreza Mirzaei, Felix Wolf "Characterizing Loop-level Communication Patterns in Shared Memory Applications", 44th International Conference on Parallel Processing, ICPP '15
- E. Haghshenas, ***A. Mazaheri***, A. Gholipour and M. Tavakoli, "An Intelligent Method For Customizable Adaptive Learning Content Generation", International Journal of Information & Communication Technology (IJICT), 2011
- ***Arya Mazaheri***, Nima Rafiee, Pejman Khadivi, "Location Based Targeted Advertising Using Bayesian Network And Fuzzy TOPSIS", International Symposium of Communications, IST'2010, 2010

WORK EXPERIENCE

Aug 2015 – Present

Research Associate

Technische Universität Darmstadt, Germany

- Automatic code generation and tuning framework for deep learning applications
- Accelerating CNN networks by more efficient convolution operations. i.e. Winograd
- Providing performance portability for CNNs on various GPU devices
- Experienced: C/C++, Python, Keras, Tensorflow, Caffe

Jan 2016 – Oct 2016

Software Engineer

Exabyte.io, San Francisco, USA

- Responsible for developing a job orchestration framework
- Developing a modular framework for extracting high level characteristics of materials
- Experienced: Python, Saltstack, Vagrant, Docker, Meteor.js, Atlassian JIRA

Mar 2014 – Aug 2015

Co-Founder

Persian High Performance Computing, Isfahan, Iran

- Providing HPC platform based on Amazon AWS cloud computing

Sept 2010 – Mar 2014 **Research Assistant**

SheikhBahayi NHPCC, Isfahan, Iran

- Configuring the Infiniband network, Lustre storage server and GPU Cluster
- Provisioning high performance data visualization on the cluster with remote online access

2011 – 2013 **Software Engineer Intern**

SarvNet Telecommunications, Isfahan, Iran

- Extending NetFPGA kernel source code
- Contributing in designing a production site switch and router

TEACHING & SUPERVISION EXPERIENCE

Teaching Assistant

Spring 2018 ***Multi-threading in C++; Lecture***, Prof. Dr. F. Wolf, Informatik, TU Darmstadt

Winter 2017 ***Parallel Programming Technology; Lab***, Prof. Dr. F. Wolf, Informatik, TU Darmstadt

Winter 2016 ***Software Engineering for Parallel Programs; Seminar***, Prof. Dr. F. Wolf, Informatik, TU Darmstadt

Winter 2015 ***Software Engineering for Multicore Systems; Lecture***, Dr. A. Jannesari, Informatik, TU Darmstadt

Thesis Supervision

Spring 2018 ***B.Sc. Thesis***, Johannes Schulte, "Achieving Efficiency and Portability in Convolutional Neural Networks Using Vulkan API"

Spring 2018 ***B.Sc. Thesis***, Tim Beringer, "Decreasing the Computational Complexity of Convolutional Neural Networks with Winograd Convolution"

Winter 2017 ***B.Sc. Thesis***, Mohammad Braei, "Pattern-Oriented Computational Unit Visualization for DiscoPoP"

Summer 2017 ***B.Sc. Thesis***, Dinh Van-Vo, "Developing an Auto-Tuner for Convolutional Neural Network Applications"

Summer 2016 ***B.Sc. Thesis***, Nicholas Morew, "Comprehensive Visualization of Computational Unit Graphs for DiscoPoP"

AWARDS & HONORS

Apr 2015 Won the TEDxKish prize for high-tech innovative entrepreneurship startup

Feb 2012 Ranked 2nd in the 4th entrepreneurship business plan festival

Nov 2009 Ranked 9th at the ACM-ICPC regional contest in west Asia, Tehran site, Iran

SELECTED RESEARCH PROJECTS

Since Feb 2017 ***Boda-RTC***, Portable and efficient code generation framework for CNN inference
I am actively involved in extending this project (available in Github). I am adding more operations and back-end along with equipping this framework with auto-tuning support and a new domain specific language.

Since Jan 2018 ***Software-Factory 4.0***, Funded by Hessian LOEWE Initiative
I am developing methods for detecting parallel patterns in sequential applications that can later be used for (semi)automatic parallelization. I am currently trying to apply ML, CNN, and GAN networks for detecting patterns in dependency graphs.

Sept 2015 – Mar 2018 ***DiscoPoP***, Discovery of Potential Parallelism
I extended DiscoPoP LLVM pass to profile multi-threaded applications. I also introduced a new data structure for fast and memory efficient profiling. I then used the pass for detecting parallel patterns based on communication pattern analysis. Furthermore, I introduced a visualizer for visualization of DiscoPoP dependency graphs.

ATTENDED ACADEMIC EVENTS

2018
- ACASES Summer School (organized by HiPEAC) - 14th International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems, Fiuggi, Italy

2017
- PUMPS Summer School - 8th International Summer School on Programming and Tuning Massively Parallel Systems, Barcelona, Spain
- GPU Technology Conference (GTC Europe), Munich, Germany

2015
- ICPP Conference, 44th International Conference on Parallel Processing, Beijing, China

REVIEWER

2016 – 2018 I have been active as an external reviewer in the following conferences and workshops:
- Super Computing (SC'17, SC'18)
- ISC High Performance (ISC'18)
- International Workshop on Parallel Software Tools and Tool Infrastructures (PSTI'17)
- Workshop on Extreme-Scale Programming Tools (ESPT'16, ESPT'18)

SKILLS

Programming
C/C++, Python, Julia
OpenMP, OpenACC, OpenCL, CUDA

Compile Tools
LLVM, Intel Pin, DiscoPoP, Valgrind

Other Tools & Frameworks
TensorFlow, Keras, Caffe, Git

LANGUAGES

English – Fluent
German – Limited working proficiency (B1)
Persian – Native speaker

REFERENCES

Prof. Dr. Felix Wolf
Parallel Programming Laboratory
Technische Universität Darmstadt
✉ wolf@cs.tu-darmstadt.de

Dr.-Ing Ali Jannesari
Computer Science Department
Iowa State University
& Technische Universität Darmstadt
✉ jannesar@iastate.edu