Arash Pourhabibi-Zarandi

Computer Science PhD Candidate
Swiss Federal Institute of Technology in Lausanne (EPFL)

Contact Info

Address: EPFL IC IINFCOM PARSA, INJ 238, Station 14, 1015 Lausanne, Switzerland
Phone: +41 21 693 13 79
Email: arash.pourhabibi@epfl.ch
Website: http://arash.pourhabibi.info

Interests

I am broadly interested in the field of computer systems and interdisciplinary systems-level problems found in modern, large-scale datacenters, from cloud services to data stores and all the way down to server systems. By characterizing modern datacenter applications, I look for maximizing the compute density of server systems and minimizing their energy footprint through specialization of various system components and better system integration. My current focus is on the evasion of the RPC tax in datacenters through hardware-software co-design.

Education

2015-2021 | Ph.D. in Computer & Communication Sciences
Swiss Federal Institute of Technology in Lausanne (EPFL), Lausanne, Switzerland
Doctoral Research Assistant at PARSA under supervision of Prof. Babak Falsafi
Thesis: Hardware-software Co-design to Evade the RPC Tax in Datacenters
Related Courses: Advanced Multiprocessor Architecture, Topics on Datacenter Design, Understanding Datacenter Software Dynamics

2013-2015 | M.Sc. in Computer Engineering (Software Engineering)
Shiraz University, Shiraz, Iran
Thesis: Design & Implementation of a Scheme for Big Data Processing on GPU
Advisor: Dr. Farshad Khunjush
Ranked First: Achieving the highest course GPA (19.84/20) among all M.Sc. students
Related Courses: Advanced OS, Advanced Computer Architecture, Multicore Programming, Parallel Algorithms, Grid Computing, Software Architecture, Text Mining

2009-2013 | B.Sc. in Computer Engineering (Software Engineering)
Shiraz University, Shiraz, Iran
Ranked First: Achieved the highest GPA in CS courses (18.88/20) among all B.Sc. students

Work Experience

Current
Sep. 2015 | Doctoral Research Assistant
PARSA Lab, EPFL, Lausanne, Switzerland
Contributed to several research projects focused on hardware and software co-design for future generations of datacenter servers. Supervised junior students and summer interns. Member of the CloudSuite team, and part of the core team responsible for its 3rd release. Member of the Flexus simulator maintenance team, and part of the core team working on its new incarnation branded as QFlex.

2010-2013 | Member of the IT Task Force
CS Department, Shiraz University, Iran
In charge of the maintenance of department's network infrastructure and IT services. Proposed and implemented new services for the department such as a CMS.

2011-2013 | Freelance Java and iOS Developer
Involved in development of a payment switch system (in Java). Co-founded the Mobile Programming group at Shiraz University and developed a bill payment app for iPhone.

2010-2011 | Intern at Shiraz University's CERT Center *(ShirazAPA)*
Involved in research and development of several security-related projects such a secure update manager.

Technical Skills

Programming: Python, C/C++, Java, PThreads, OpenMP, CUDA, MPI
Operating Systems: macOS, Linux, Windows
Miscellaneous: Git, Docker, LaTeX, Shell Scripting, Agile Development
Basic Familiarity: Objective-C, Ruby, PHP, HTML, JavaScript

Publications & Patents

1. **Cerebros: Evading the RPC Tax in Datacenters.** A. Pourhabibi, M. Sutherland, A. Daglis, B. Falsafi. *In Proceedings of the 54th IEEE/ACM International Symposium on Microarchitecture, MICRO'21*, Athens, Greece, October 2021.
2. **Equinox: Training (for Free) on a Custom Inference Accelerator.** M. Drumond, L. Coulon, A. Pourhabibi, A. Yüzügüler, B. Falsafi, M. Jaggi. *In Proceedings of the 54th IEEE/ACM International Symposium on Microarchitecture, MICRO'21*, Athens, Greece, October 2021.
3. **Data Transformer Apparatus.** A. Pourhabibi, S. Gupta, H. Kassir, M. Sutherland, Z. Tian, M. Drumond, B. Falsafi, C. Koch. *Patent (Pending)*, March 2021.
4. **Optimus Prime: Accelerating Data Transformation in Servers.** A. Pourhabibi, S. Gupta, H. Kassir, M. Sutherland, Z. Tian, M. Drumond, B. Falsafi, C. Koch. *In Proceedings of the 25th ACM International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS'20*, Lausanne, Switzerland, March 2020.
5. **Towards near-threshold server processors.** A. Pahlevan, J. Picorel, A. P. Zarandi, D. Rossi, M. Zapater, A. Bartolini, P. G. Del Valle, D. Atienza,L. Benini, and B. Falsafi. *In Proceedings of the 2016 Conference on Design, Automation & Test in Europe (DATE)*, Dresden, Germany, March 2016.
6. The official Persian translation of "Engineering SaaS: An Agile Approach Using Cloud Computing" written by Armando Fox and David Patterson. *Currently under preparation.*

Awards & Honors

Dec. 2018 | Awarded the **Teaching Assistant Award** for teaching excellence
School of Computer & Communication Sciences (IC), EPFL, Lausanne, Switzerland

Summer 2014 | Ranked **2nd** at the first Iran Programming Skill Challenge (Java section)
Held by Sharif University of Technology and Tehran University's Faculty of Entrepreneurship, Iran

Sep. 2013 | Honorary admission to the M.Sc. program without university entrance exam
Shiraz University, Shiraz, Iran

June 2013 | Awarded as the **Best Undergraduate Student** in Computer Engineering
Shiraz University, Shiraz, Iran

Feb. 2012 | Nominated for the **Best Mobile Application** for SAHA (payment app for iPhone)
The First Iran Mobile Innovation Awards, held by Sharif University of Technology, Tehran, Iran

Professional & Extracurricular Services

ASPLOS 2020 | Artifact Evaluation Committee Member

Dec. 2014 | Co-organizer of an Hour of Code Event
Organized a one-day workshop, participating in the Hour of Code program, for tens of high-school and middle-school students and taught them the basics of computer programming and algorithmic thinking.

2010-2014 | BreakTime In University (BTiU)
BTiU is a three-day annual conference consists of tens of parallel workshops held by a group of university students during the summer at Shiraz University. Hundreds of talented high-schoolers attend this event to learn more about various study majors, practice teamwork, life and social skills, and learn how to be creative and innovative. I had the chance to be a part of the organizing team for five years.

May 2012 | Member of Conference Organizing Committee
Internet and technical services assistant at the 16^{th} CSI International Symposiums on Computer Architecture & Digital Systems (CADS 2012) and Artificial Intelligence & Signal Processing (AISP 2012) held at Shiraz University, Shiraz, Iran.

Languages

Persian: Native Proficiency
English: Full Professional Proficiency
French: Elementary Proficiency

Open Source Contributions

2015-2021 | **CloudSuite**

CloudSuite is a benchmark suite of cloud services. The benchmarks are based on real-world software stacks and represent real-world setups. It is one of the early benchmark suites that is representative of modern datacenter services and is included in Google's PerfKit Benchmarker. It has become an industry standard and been used to drive the design of modern datacenter-oriented CPUs, such as Cavium ThunderX. I have been a core member of the team responsible for the maintenance and the third release of CloudSuite, which is a major enhancement over prior releases both in benchmarks and infrastructure.

2016-2021 | **QFlex**

The QFlex project targets quick, accurate, and flexible simulation of multi-node computer systems proceeding along four fronts: QEMU, a popular open-source full-system machine emulator, Flexus, a powerful and flexible simulation framework that enables detailed cycle-accurate simulation, SMARTS, which applies rigorous statistical sampling theory to reduce the simulation time while achieving high accuracy, and NS-3, a popular and flexible network simulation stack. I have been a member of the Flexus maintenance team and the team responsible for its new incarnation branded as QFlex.

Teaching Experience

Fall 2019, Fall 2018, Fall 2017, Fall 2016 | **Introduction to Multiprocessor Architecture**

Assisted in redesigning the course: constructed a new syllabus and prepared course material including lecture slides, exercises, programming assignments, and exams. Graded assignments and exams. Led weekly lab sessions and guided students. | EPFL

Spring 2020, Spring 2019 | **System Oriented Programming**

Assisted in redesigning the course: constructed a new course project and weekly tasks for students. Created a grading and feedback infrastructure for the weekly tasks, graded the final project and led weekly lab sessions. | EPFL

Spring 2018 | **Systems for Data Science**

Graded students' assignments, projects and exams, held lab sessions and gave guidance to students for their projects. | EPFL

Spring 2017 | **Programming II (Using C++)**

Graded students' programming assignments, projects and exams. Led weekly lab sessions and gave guidance to students. | EPFL

Spring 2014 | **Grid Computing**

Graded students' programming assignments and projects. | Shiraz University

Spring 2014 | **Software Architecture**

Graded students' programming assignments and projects. | Shiraz University

Spring 2014, Spring 2013 | **Database Laboratory**

Completely redesigned the course from scratch. Constructed the syllabus and prepared the course material. Led weekly lab sessions, gave guidance to students and graded their assignments and projects. | Shiraz University

Fall 2013 | **GPU Programming**

Prepared and graded students' programming assignments and projects, led weekly lab sessions and gave guidance to students. | Shiraz University

Spring 2013 | **Design & Implementation of Programming Languages**

Prepared students' programming assignments and projects. | Shiraz University

Fall 2012, Fall 2010 | **Fundamentals of Computer and Programming Using Python**

Constructed the syllabus and prepared the course material (programming assignments, labs, and projects). Led weekly lab sessions, gave guidance to students and graded their assignments and projects. | Shiraz University

Spring 2012, Spring 2011 | **Principles of Programming Using C**

Prepared and graded students' programming assignments and projects, led weekly lab sessions and gave guidance to students. | Shiraz University

Fall 2011 | **Advanced Programming Using Java**

Prepared and graded students' programming assignments and projects, led weekly lab sessions and gave guidance to students. | Shiraz University

Last Update: September 2021