# Alireza Farshin | Curriculum Vitae

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I am a doctoral student in the Network Systems Laboratory (NSLab) at KTH Royal Institute of Technology. I am doing research under the supervision of Professor Dejan Kostić and Professor Gerald Q. Maguire Jr. My research interests include computer networks and networked systems. During my doctoral studies, I have improved the performance of Network Function Virtualization (NFV) service chains by using **low-level optimization** techniques. Watch

## Education

- **KTH Royal Institute of Technology** — **Stockholm, Sweden**
  *Ph.D. in Information and Communication Technology, School of EECS* — *August 2017–now*
  Advisors: Prof. Dejan Kostić and Prof. Gerald Q. Maguire Jr.

  Dissertation Title: Realizing low-latency Internet services via low-level optimization of NFV service chains

  I have received my licentiate degree (Halfway to Ph.D.) in June 2019, see my Thesis.

- **Amirkabir University of Technology** — **Tehran, Iran**
  *M.Sc. Electrical Engineering - Digital Electronic Circuits, Department of EE* — *September 2015–July 2017*
  Advisor: Associate Prof. Saeed Sharifian

  Thesis: Resource Allocation in Software-Defined Networks for 5G Applications

  I used bio-inspired metaheuristic algorithms to perform resource allocation.

- **Sharif University of Technology** — **Tehran, Iran**
  *B.Sc. Electrical Engineering - Electronics, EE Department* — *September 2010–July 2015*
  Advisor: Associate Prof. Mehran Jahed

  Thesis: Design of Exoskeletal System for Wrist and Forearm

## Publications

### Conference Publications

Conference rankings based on the CORE ranking available at: http://portal.core.edu.au/conf-ranks/

[C1] Hamid Ghasemirahni, Tom Barbette, Georgios Katsikas, **Alireza Farshin**, Massimo Girondi, Amir Roozbeh, Marco Chiesa, Gerald Q. Maguire Jr., Dejan Kostić. Packet Order Matters! Improving Application Performance by Deliberately Delaying Packets In *19th USENIX Symposium on Networked Systems Design and Implementation (**NSDI**)*. 2022. Acceptance rate (Spring): 28/104 ≈ 26.9%, (conference rank **A**). [**Community Award Winner!**] Download

[C2] **Alireza Farshin**, Tom Barbette, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. PacketMill: Toward per-core 100-Gbps Networking In *International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**)*. 2021. Acceptance rate: 75/398 ≈ 18.8%, (conference rank **A***). Download

[C3] **Alireza Farshin**, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. Reexamining Direct Cache Access to Optimize I/O Intensive Applications for Multi-hundred-gigabit Networks In *USENIX Annual Technical Conference (**ATC**)*. 2020. Acceptance rate: 65/348 ≈ 18.6%, (conference rank **A**). Download

[C4] **Alireza Farshin**, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. Make the Most out of Last Level Cache in Intel Processors In *The European Conference on Computer Systems (**EuroSys**)*. 2019. Acceptance rate: 45/207 ≈ 21.7%, (conference rank **A**). Download

## Journal Publications

[J5] **Alireza Farshin**, Saeed Sharifian. A modified knowledge-based ant colony algorithm for virtual machine placement and simultaneous routing of NFV in distributed cloud architecture In *The Journal of Supercomputing (**SUPE**)*. 2019. **Impact factor: 2.469**. Download

[J6] **Alireza Farshin**, Saeed Sharifian. A chaotic grey wolf controller allocator for Software Defined Mobile Network (SDMN) for 5th generation of cloud-based cellular systems (5G) In *The Journal of Computer Communications (**COMCOM**)*. 2017. **Impact factor: 2.816**. Download

[J7] **Alireza Farshin**, Saeed Sharifian. MAP-SDN: a metaheuristic assignment and provisioning SDN framework for cloud datacenters In *The Journal of Supercomputing (**SUPE**)*. 2017. **Impact factor: 2.469**. Download

## Patent Applications

[P8] Amir Roozbeh, Chakri Padala, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Processing Unit, Packet Handling Unit, Arrangement and Methods for Handling Packets. PCT Application PCT/SE2022/050710. Filed in July 2022.

[P9] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa, Tom Barbette, Dejan Kostić. Apparatus, System, and Methods for Sliced Accelerated Packet Processing at Terabit-per-second Networking. US Provisional Application. Filed in May 2022.

[P10] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić. System and Method for Organizing Physical Queues into Virtual Queues. PCT Application PCT/EP2022/051103. Filed in January 2022.

[P11] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa, Fabio Luciano Verdi. System and Method for Accurate Traffic Monitoring on Multi-Pipeline Switches. PCT Application PCT/EP2021/084572. Filed in December 2021.

[P12] Amir Roozbeh, Chakri Padala, **Alireza Farshin**. System and Method for Cache pooling and Efficient Usage and I/O Transfer in disaggregated and Multi-Processor Architectures via Processor Interconnect. PCT Application PCT/SE2021/051016. Filed in October 2021.

[P13] Amir Roozbeh, **Alireza Farshin**, Chakri Padala, Dejan Kostić, Gerald Q. Maguire Jr. System, Method, and Apparatus for Fine-grained Control of I/O Data Placement in Memory Subsystem. PCT Application PCT/SE2021/050803. Filed in August 2021.

[P14] Amir Roozbeh, **Alireza Farshin**, Tom Barbette, Dejan Kostić, Gerald Q. Maguire Jr. Methods and Systems for Efficient Metadata and Data Delivery between a Network Interface and Applications. PCT Application PCT/IB2021/052976. Filed in April 2021.

[P15] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Method and System for Efficient Input/Output Transfer in Network Devices. PCT Application PCT/SE2020/051107 (Download) & PCT/SE2020/051108 (Download).

[P16] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr, Hamid Ghasemirahni, Tom Barbette. Reordering and Reframing Packets. PCT Application PCT/IB2020/054991. Download

[P17] Chakri Padala, Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Efficient Loading of Code Portions to a Cache. PCT Application PCT/SE2020/050527. Download

[P18] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Entities, System and Methods Performed Therein for Handling Memory Operations of an Application in a Computer Environment. PCT Application PCT/SE2019/050948. Download

[P19] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Methods and Devices for Controlling Memory Handling. PCT Application PCT/SE2020/050161. Download

[P20] Amir Roozbeh, Dejan Kostić, Gerald Q. Maguire Jr., **Alireza Farshin**. Memory Allocation in a Hierarchical Memory System. PCT Application PCT/SE2019/050596. Download

[P21] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Methods and Nodes for Handling Memory. PCT Application PCT/SE2018/051311. Download

### Workshop Papers, Extended Abstracts, Technical Reports, Demo, and Posters

[W22] **Alireza Farshin**, Amir Roozbeh, Christian Schulte, Gerald Q. Maguire Jr., Dejan Kostić. Scheduling - A Secret Sauce For Resource Disaggregation, *Technical Report*. 2021. Download

[W23] **Alireza Farshin**, Tom Barbette, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. PacketMill: Toward per-core 100-Gbps Networking In *International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**)*. 2021. Download

[W24] **Alireza Farshin**, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. Optimizing Intel Data Direct I/O Technology for Multi-hundred-gigabit Networks In *The European Conference on Computer Systems (**EuroSys**)*. 2020. Download

[W25] **Alireza Farshin**, Amir Roozbeh, Gerald Q. Maguire Jr., Dejan Kostić. Make the Most out of Last Level Cache in Intel Processors In *The European Conference on Computer Systems (**EuroSys**)*. 2019. Download

## Open-Source Contributions

- **iommu-bench**: Understanding the IOTLB Wall for Multi-100-Gbps Linux-based Networking [Link]
- **DDC-RA**: A Constrained-based Scheduler for Disaggregated Data Centers (DDC) [Link]
- **PacketMill**: Toward per-core 100-Gbps Networking [Link]
- **ddio-bench**: Understanding Intel Data Direct I/O Technology [Link]
- **Slice-aware Memory Management**: Exploiting NUCA Characteristic of LLC in Intel Processors [Link]
- **CacheDirector**: Sending Packets to the Right Slice by Exploiting Intel Last-Level Cache Addressing [Link]

## Work Experience

- **Network Systems Laboratory (NSLab) at KTH** — **Stockholm, Sweden**
  *Doctoral Student, Research Assistant, and Teaching Assistant* — *August 2017–now*

- **ICT Doctoral Programme Council at KTH** — **Stockholm, Sweden**
  *Student Representative of the Division of Communication Systems (CoS)* — *May 2018–December 2020*

- **Mobile Telecommunication Company of Iran (MCCI)** — **Tehran, Iran**
  *Portal Specialist* — *December 2015–June 2016*
  Vendor Manager & Portal/Application Supervisor:
  - eCare Application: My MCI Application for iOS and Android
  - eSales Website: eVoucher

- **CafeYab** **Tehran, Iran**
  *Co-founder and CEO* *Fall-2013*
  An application for iOS and Android for finding nearby Coffee Shops

- **Informatics Services Corporation (ISC)** **Tehran, Iran**
  *Internship* *June 2013–September 2013*
  - Ported an RF unit controller from PIC-16F877A to AtMega64A and tested the new module.
  - Designed a remote-control system with HM-T and HM-R FSK modules.

- **Informatics Services Corporation (ISC)** **Tehran, Iran**
  *Summer Intern* *June 2012–September 2012*
  - Did a literature review on expansion buses and digital data transfer.

## Honors, Awards, and Professional Services

**2022**: Packet Order Matters! [C1] was featured in the Ericsson Blog and KTH.
**2022**: "Framtidens Forskning" has published a Swedish article on my research.
**2022**: PC Member for SIGCOMM'22 posters and demos program.
**2022**: Packet Order Matters! [C1] received the "Community Award" at NSDI'22.
**2022**: Giving a talk, Optimization Techniques for NFV, at Cisco Engineering Switzerland.
**2021**: Awarded Google PhD Fellowship 2021 in Systems and Networking. [Interview with KTH EECS]
**2021**: PacketMill [C2] was featured in the Ericsson Blog.
**2021**: Giving a talk with Tom Barbette at FOSDEM'21. [Watch]
**2020**: EuroSys'20 Shadow Program Committee.
**2019**: CacheDirector [C4] was featured in the Ericsson Blog, Tech Xplore, AlphaGalileo, and KTH.
**2018**: External Reviewer for NSDI'19.
**2015**: **Ranked 107$^{th}$** among more than 20,000 participants in Iran's universities entrance exam for M.Sc.
**2010**: **Ranked 46$^{th}$** among more than 460,000 participants in Iran's universities entrance exam for B.Sc.

## Teaching Experience

Communication System Design (IK2200), KTH. Fall 2021,2020,2019,2018,2017.
SDN and NFV (IK2220), KTH. Spring 2021,2020,2019.
Bio-Inspired Artificial Intelligence, Amirkabir University of Technology. Fall 2016.

## Skills

**Languages**: English (Fluent), Persian (Native), Swedish (Novice)
**Programming Languages**: C/C++, Python, MATLAB, R, Assembly-X86, bash.
**Tools & Libraries**: DPDK, FastClick, Perf, LLVM, TensorFlow, Pandas, Spark, Git, gnuplot, LaTeX.

## Hobbies

Playing Piano and Bass Guitar, Jamming with Friends, Reading Books, Watching Movies and TV Series.