

# Alireza Farshin | Curriculum Vitae

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I am a Senior Researcher in the Connected Intelligence unit at RISE. My research interests include computer networks, networked systems, and artificial intelligence. Before joining RISE, I was a postdoctoral researcher in the Network Systems Laboratory (NSLab) at KTH Royal Institute of Technology. I completed my doctoral studies in the same group under the supervision of Professor Dejan Kostić and Professor Gerald Q. Maguire Jr. During my doctoral studies, I improved the performance of Network Functions Virtualization (NFV) service chains by using **low-level optimization** techniques. 📺 [Watch](#)

## Work Experience

- Connected Intelligence Unit at RISE Research Institutes of Sweden** **Stockholm, Sweden**  
 ○ *Senior Researcher in AI / Machine Learning and Networking* *August 2023–now*
  - Improving packet processing at multi-100-Gbps rates.
  - Using large language models (LLMs) to build and configure networked systems (see [NetBuddy](#)).
  - Developing pruning techniques and improving inference of LLMs.
- Network Systems Laboratory (NSLab) at KTH** **Stockholm, Sweden**  
 ○ *Postdoctoral Researcher* *March 2023–August 2023*
- Network Systems Laboratory (NSLab) at KTH** **Stockholm, Sweden**  
 ○ *Doctoral Researcher* *August 2017–March 2023*
- 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.

## 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):  $28/104 \approx 26.9\%$ , (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:  $75/398 \approx 18.8\%$ , (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:  $65/348 \approx 18.6\%$ , (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:  $45/207 \approx 21.7\%$ , (conference rank **A**). [Download](#)

### Journal Publications.....

- [J1] **Alireza Farshin**, Luigi Rizzo, Khaled Elmeleegy, Dejan Kostić. Overcoming the IOTLB wall for multi-100-Gbps Linux-based networking In *PeerJ Computer Science (PeerJ CS)*. 2023. **Impact factor: 2.41**. [Download](#)
- [J2] **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](#)
- [J3] **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](#)
- [J4] **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.....

- [P1] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa. Entity and Method Performed Therein for Handling Packets in a Computer Environment (*Other name*: System and Methods for Performing Millions Low-Latency Key-Value Insertion on Switches). PCT Application PCT/SE2023/051174. Filed in November 2023.
- [P2] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa, Dejan Kostić. Network Entity and Method Performed Therein for Handling one or more Packets in a Computer Environment (*Other name*: System and Methods for Minimizing Branch Mispredictions and Executing Highly Optimized Code for Networking Applications). PCT Application PCT/SE2023/050880. Filed in September 2023.
- [P3] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa. Network Entity and Method Performed Therein for Handling one or more Packets in a Computer Environment (*Other name*: System and Methods for Programmatically Storing Packet Payloads in the Per-Port Queue Memory). US Provisional Patent Application 63/511,198. Filed in June 2023.
- [P4] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa. System and Method Performed Therein for Handling one or more Packets in a Computer Environment (*Other name*: System and Methods for Disaggregated Packet Construction). PCT Application PCT/SE2023/050538. Filed in May 2023.
- [P5] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa, Dejan Kostić, Hamid Ghasemirahni. Hint Entity, Receiver Node, System and Methods Performed Therein for Handling Data in a Computer Environment (*Other name*: System and Methods for Network-Accelerated State Prefetching). PCT Application PCT/SE2022/051036. Filed in November 2022.

- [P6] Amir Roozbeh, Chakri Padala, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Processing Unit, Packet Handling Unit, Arrangement and Methods for Handling Packets (*Other name*: System and Methods for Probing and Polling Multiple I/O Operations on I/O Devcies for Priority-Based Packet Processing). PCT Application PCT/SE2022/050710. Filed in July 2022.
- [P7] Amir Roozbeh, **Alireza Farshin**, Marco Chiesa, Tom Barbette, Dejan Kostić. Packet Processing Including an Ingress Packet Part Distributor. PCT Application PCT/EP2023/063619. [Download](#)
- [P8] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić. System and Method for Organizing Physical Queues into Virtual Queues. PCT Application PCT/EP2022/051103. [Download](#)
- [P9] 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. [Download](#)
- [P10] 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. [Download](#)
- [P11] 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. [Download](#)
- [P12] 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. [Download](#)
- [P13] 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](#)).
- [P14] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr, Hamid Ghasemirahni, Tom Barbette. Reordering and Reframing Packets. PCT Application PCT/IB2020/054991. [Download](#)
- [P15] 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](#)
- [P16] 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](#)
- [P17] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Methods and Devices for Controlling Memory Handling. PCT Application PCT/SE2020/050161. [Download](#)
- [P18] Amir Roozbeh, Dejan Kostić, Gerald Q. Maguire Jr., **Alireza Farshin**. Memory Allocation in a Hierarchical Memory System. PCT Application PCT/SE2019/050596. [Download](#)
- [P19] Amir Roozbeh, **Alireza Farshin**, Dejan Kostić, Gerald Q. Maguire Jr. Methods and Nodes for Handling Memory. PCT Application PCT/SE2018/051311. [Download](#) ( [US11714753B2 Granted](#))



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

- [W1] Changjie Wang, Mariano Scazzariello, **Alireza Farshin**, Dejan Kostić, Marco Chiesa. Making Network Configuration Human Friendly, *ArXiv Preprint*. 2023. [Download](#)
- [W2] **Alireza Farshin**, Amir Roozbeh, Christian Schulte, Gerald Q. Maguire Jr., Dejan Kostić. Scheduling - A Secret Sauce For Resource Disaggregation, *Technical Report*. 2021. [Download](#)
- [W3] **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](#)

- [W4] **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](#)
- [W5] **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](#)







## Funded Projects

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-  **SEMLA - Securing Enterprises via Machine-Learning-based Automation**  
 ~9.5 Million SEK November 2023–October 2025  
 Funded by Vinnova - Cyber Security for Industrial Advanced Digitalization 2023  
 Acting as one of the co-PIs from RISE AB  
 other partners: KTH (led by Marco Chiesa), Saab AB, and RedHat AB
-  **Realizing Low-Latency Internet Services via Low-Level Optimization of NFV Service Chains**  
 \$140,000 USD August 2021–August 2023  
 Funded by Google PhD Fellowship in Systems and Networking




## Open-Source Contributions

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-  **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](#)]

## Education

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-  **KTH Royal Institute of Technology** **Stockholm, Sweden**  
*Ph.D. in Information and Communication Technology, School of EECS* August 2017–March 2023  
 Advisors: Prof. [Dejan Kostić](#) and Prof. [Gerald Q. Maguire Jr.](#)  
 Dissertation Title: Realizing Low-Latency Packet Processing on Multi-Hundred-Gigabit-Per-Second Commodity Hardware (see my [Dissertation](#))  
 I also 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

## Honors, Awards, and Professional Services

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**2023:** Faculty at Digital Futures.

**2023:** Reviewer for IEEE Computer Architecture Letters.

**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<sup>th</sup>** among more than 20,000 participants in Iran's universities entrance exam for M.Sc.

**2010:** **Ranked 46<sup>th</sup>** among more than 460,000 participants in Iran's universities entrance exam for B.Sc.

## Teaching Experience

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Communication System Design (IK2200), KTH. Fall 2022,2021,2020,2019,2018,2017.

SDN and NFV (IK2220), KTH. Spring 2022,2021,2020,2019.

Bio-Inspired Artificial Intelligence, Amirkabir University of Technology. Fall 2016.

## Skills

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**Languages:** English (Fluent), Persian (Native), Swedish (Novice)

**Programming Languages:** C/C++, Python, MATLAB, Scala, R, Assembly-X86, bash.

**Tools & Libraries:** DPDK, FastClick, Perf, LLVM, TensorFlow, Pandas, Spark, Gecode, Git, gnuplot,  $\LaTeX$ .

## Hobbies

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