

Alireza Farshin | Curriculum Vitae

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I am a distributed systems researcher at NVIDIA. My research interests include computer networks and networked systems. Before joining NVIDIA, I was a senior researcher in the network intelligence unit at RISE. I completed my doctoral studies in the Network Systems Laboratory ([NSLab](#)) at KTH Royal Institute of Technology 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. [You Tube Watch](#)

Work Experience

- | | |
|---|---|
| <ul style="list-style-type: none">○ Networked Software Architecture Research Team at NVIDIA
<i>Distributed Systems Researcher</i> | Stockholm, Sweden
<i>January 2024–now</i> |
| <ul style="list-style-type: none">○ Connected Intelligence Unit at RISE Research Institutes of Sweden
<i>Senior Researcher in AI / Machine Learning and Networking</i><ul style="list-style-type: none">- Improving packet processing at multi-100-Gbps rates.- Using large language models (LLMs) to build and configure networked systems (see NetBuddy, FlowMage, and NetConfEval).- Developing pruning techniques and improving inference of LLMs. | Stockholm, Sweden
<i>August 2023–January 2024</i> |
| <ul style="list-style-type: none">○ Network Systems Laboratory (NSLab) at KTH
<i>Postdoctoral Researcher</i> | Stockholm, Sweden
<i>March 2023–August 2023</i> |
| <ul style="list-style-type: none">○ Network Systems Laboratory (NSLab) at KTH
<i>Doctoral Researcher</i> | Stockholm, Sweden
<i>August 2017–March 2023</i> |
| <ul style="list-style-type: none">○ ICT Doctoral Programme Council at KTH
<i>Student Representative of the Division of Communication Systems (CoS)</i> | Stockholm, Sweden
<i>May 2018–December 2020</i> |
| <ul style="list-style-type: none">○ Mobile Telecommunication Company of Iran (MCCI)
<i>Portal Specialist</i>
Vendor Manager & Portal/Application Supervisor:<ul style="list-style-type: none">- eCare Application: My MCI Application for iOS and Android- eSales Website: eVoucher | Tehran, Iran
<i>December 2015–June 2016</i> |
| <ul style="list-style-type: none">○ CafeYab
<i>Co-founder and CEO</i>
An application for iOS and Android for finding nearby Coffee Shops | Tehran, Iran
<i>Fall-2013</i> |
| <ul style="list-style-type: none">○ Informatics Services Corporation (ISC)
<i>Internship</i><ul style="list-style-type: none">- 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. | Tehran, Iran
<i>June 2013–September 2013</i> |

Publications

Conference Publications.

- [C1] Hamid Ghasemirahni, **Alireza Farshin**, Mariano Scazzariello, Gerald Q. Maguire Jr., Dejan Kostić, Marco Chiesa. FAJITA: Stateful Packet Processing at 100 Million pps, *The 20th International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*. 2024. Download

- [C2] Changjie Wang, Mariano Scazzariello, **Alireza Farshin**, Simone Ferlin, Dejan Kostić, Marco Chiesa. NetConfEval: Can LLMs Facilitate Network Configuration?, *The 20th International Conference on emerging Networking EXperiments and Technologies (CoNEXT)*. 2024. [Download](#)
- [C3] 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%. [**Community Award Winner!**] [Download](#)
- [C4] **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%. [Download](#)
- [C5] **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%. [Download](#)
- [C6] **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%. [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, 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.
- [P2] 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.
- [P3] 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.
- [P4] 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. [Download](#)



- [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. [Download](#)
- [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. [Download](#)
- [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] Hamid Ghasemirahni, **Alireza Farshin**, Dejan Kostić, Marco Chiesa. Just-in-Time Packet State Prefetching, *ArXiv Preprint*. 2024. [Download](#)

- [W2] Hamid Ghasemirahni, **Alireza Farshin**, Mariano Scazzariello, Marco Chiesa, Dejan Kostić. Deploying Stateful Network Functions Efficiently using Large Language Models In *The Workshop on Machine Learning and Systems (EuroMLSys)*. 2024. [Download](#)
- [W3] Changjie Wang, Mariano Scazzariello, **Alireza Farshin**, Dejan Kostić, Marco Chiesa. Making Network Configuration Human Friendly, *ArXiv Preprint*. 2023. [Download](#)
- [W4] **Alireza Farshin**, Amir Roozbeh, Christian Schulte, Gerald Q. Maguire Jr., Dejan Kostić. Scheduling - A Secret Sauce For Resource Disaggregation, *Technical Report*. 2021. [Download](#)
- [W5] **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](#)
- [W6] **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](#)
- [W7] **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

-  **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
 Acted 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

-  **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

- 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

2024: PC Member for [eBPF'24](#).
 2023: Faculty at [Digital Futures](#).
 2023: Reviewer for [IEEE Computer Architecture Letters](#).
 2022: Packet Order Matters! [C3] 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! [C3] 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 [C4] 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 [C6] was featured in the [Ericsson Blog](#), [Tech Xplore](#), [AlphaGalileo](#), and [KTH](#).
 2018: External Reviewer for [NSDI'19](#).
 2015: **Ranked 107th** among more than 20,000 participants in Iran's universities entrance exam for M.Sc.
 2010: **Ranked 46th** among more than 460,000 participants in Iran's universities entrance exam for B.Sc.

Teaching Experience

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

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

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