

MANYA GHOBADI

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RESEARCH INTERESTS

Networks for Machine Learning, Data Center Networks, High-Performance Cloud Infrastructure, Network Optimization, Hardware-Software Co-design, Optical Networks.

EDUCATION

- 2007 - 2013 **University of Toronto**, ON, Canada. Ph.D. in Computer Science
2005 - 2007 **University of Victoria**, BC, Canada. M.Sc. in Computer Science
2001 - 2005 **Sharif University of Technology**, Tehran, Iran. B.Eng. in Computer Engineering

EMPLOYMENT

- 2018 – **TIBCO Career Development Assistant Professor**, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA
2016 - 2018 **Researcher**, Microsoft Research, Redmond Lab, WA
2014 - 2016 **Postdoctoral Researcher**, Microsoft Research, Redmond Lab, WA
2012 - 2014 **Software Engineer**, Google Inc., Mountain View, CA

AWARDS & HONORS

- 2020 Google faculty research award
2017 N^2 Women rising stars in Networking and Communications
2016 Best dataset award, ACM Internet Measurement Conference
2016 Best paper award finalist, ACM CoNEXT conference
2012 Google Research Excellent Paper award for paper at USENIX Annual Technical Conference
2011 Google Research Excellent Paper award for paper at ACM Internet Measurement Conference
2009 Natural Sciences and Engineering Research Council of Canada (NSERC) award
2008 Best paper award, ACM Internet Measurement Conference

PUBLICATIONS

Refereed articles

1. N. Gebara, A. Lerner, M. Yang, M. Yu, P. Costa, M. Ghobadi, *Challenging the Stateless Quo of Programmable Switches*, In Proc. of ACM HotNets, 2020.
2. J. Shalf, G. Michelogiannakis, B. Austin, T. Groves, M. Ghobadi, L. Dennison, T. Gray, M. Glick, K. Bergman, *The Case for Photonic Memory Disaggregation in Datacenters*, In Proc. of OSA Advanced Photonics Congress, 2020.

3. C. Avin, M. Ghobadi, K. Griner, S. Schmid, *On the Complexity of Traffic Traces and Implications*, In Proc. of ACM SIGMETRICS, 2020.
4. M. T. Arashloo, A. Lavrov, M. Ghobadi, J. Rexford, D. Walker, D. Wentzlaff, *Enabling Programmable Transport Protocols in High-Speed NICs*, In Proc. of USENIX NSDI, 2020.
5. K. Foerster, L. Luo, M. Ghobadi, *OptFlow: A Flow-based Abstraction for Programmable Topologies*, In Proc. of ACM SOSR, 2020.
6. J. Bogle, N. Bhatia, M. Ghobadi, I. Menache, N. Bjorner, A. Valadarsky, M. Schapira, *TeaVaR: Striking the Right Utilization-Availability Balance in WAN Traffic Engineering*, In Proc. of ACM SIGCOMM, 2019.
7. G. Michelogiannakis, Y. Shen, M. Y. Teh, X. Meng, B. Aivazi, T. Groves, J. Shalf, M. Glick, M. Ghobadi, L. Dennison, K. Bergman, *Bandwidth Steering in HPC using Silicon Nanophotonics*, In Proc. of Conference on High Performance Computing (Supercomputing), 2019.
8. M. Apostolaki, L. Vanbever, M. Ghobadi, *FAB: Toward Flow-aware Buffer Sharing on Programmable Switches*, Buffer Sizing Workshop, 2019.
9. J. Salamy, A. Sharma, M. Ghobadi, M. Medard, *FlexEnt: Entropy Coding to Curb Stragglers in Large-Scale Distributed Machine Learning*, SOSP's AI Systems Workshop, 2019.
10. R. Singh, M. Ghobadi, K. Foerster, M. Filer, P. Gill, *RADWAN: Rate Adaptive Wide Area Network*, In Proc. of ACM SIGCOMM, 2018.
11. K. Foerster, M. Ghobadi, S. Schmid, *Characterizing the Algorithmic Complexity of Reconfigurable Data Center Architectures*, In Proc. of ACM/IEEE ANCS, 2018.
12. A. Caulfield, P. Costa, M. Ghobadi, *Beyond SmartNICs: Towards a Fully Programmable Cloud*, In Proc. of IEEE HPSR, 2018.
13. K. Bergman, J. Shalf, G. Michelogiannakis, S. Rumley, L. Dennison, M. Ghobadi, *PINE: An Energy Efficient Flexibly Interconnected Photonic Data Center Architecture for Extreme Scalability*, In Proc. of IEEE Optical Interconnects, 2018.
14. D. Zhuo, M. Ghobadi, R. Mahajan, K. Foerster, A. Krishnamurthy, T. Anderson, *Understanding and Mitigating Packet Corruption in Data Center Networks*, In Proc. of ACM SIGCOMM, 2017.
15. D. Zhuo, M. Ghobadi, R. Mahajan, A. Phanishayee, X. K. Zou, H. Guan, A. Krishnamurthy, T. Anderson, *RAIL: A Case for Redundant Arrays of Inexpensive Links in Data Center Networks*, In Proc. of USENIX NSDI, 2017.
16. R. Singh, M. Ghobadi, K. Foerster, M. Filer, P. Gill, *Run, Walk, Crawl: Towards Dynamic Link Capacities*, In Proc. of ACM HotNets, 2017.
17. M. T. Arashloo, M. Ghobadi, J. Rexford, D. Walker, *HotCocoa: Hardware Congestion Control Abstractions*, In Proc. of ACM HotNets, 2017.
18. M. Ghobadi, R. Mahajan, *Optical Layer Failures in a Large Backbone*, In Proc. of ACM IMC, 2016. **(Best Public Dataset Award)**
19. M. Ghobadi, R. Mahajan, A. Phanishayee, N. Devanur, J. Kulkarni, G. Ranade, P. Blanche, H. Rastegarfar, M. Glick, D. Kilper, *ProjecToR: Agile Reconfigurable Data Center Interconnect*, In Proc. of ACM SIGCOMM, 2016.
20. Y. Zhu, M. Ghobadi, V. Misra, J. Padhye, *ECN or Delay: Lessons Learnt from Analysis of DCQCN and TIMELY*, In Proc. of ACM CoNEXT, 2016. **(Best Paper Award Finalist)**
21. M. Ghobadi, J. Gaudette, R. Mahajan, A. Phanishayee, B. Klinkers, D. Kilper, *Evaluation of Elastic Modulation Gains in Microsoft's Optical Backbone in North America*, In Proc. of Optical Fiber Communication Conference (OFC), 2016.
22. M. Filer, J. Gaudette, M. Ghobadi, R. Mahajan, T. Issenhuth, B. Klinkers, J. Cox, *Elastic Optical Networking in the Microsoft Cloud*, In Proc. of Journal of Optical Communications and Networking (JOCN), 2016.

23. R. Mittal, V. Lam, N. Dukkipati, E. Blem, H. Wassel, M. Ghobadi, A. Vahdat, Y. Wang, D. Wetherall, D. Zats, *TIMELY: RTT-based Congestion Control for the Datacenter*, In Proc. of ACM SIGCOMM, 2015.
24. N. Kang, M. Ghobadi, J. Reumann, A. Shraer, J. Rexford, *Efficient Traffic Splitting on Commodity Switches*, In Proc. of ACM CoNEXT, 2015.
25. M. Ghobadi, Y. Ganjali, *TCP Pacing in Data Center Networks*, In Proc. of IEEE Hot Interconnects, 2013.
26. M. Ghobadi, Y. Cheng, A. Jain, M. Mathis, *Trickle: Rate Limiting YouTube Video Streaming*, In Proc. of USENIX ATC, 2012. (**Google Research Excellent Paper Award**)
27. M. Ghobadi, S. Yeganeh, Y. Ganjali, *Rethinking End-to-End Congestion Control in Software-Defined Networks*, In Proc. of ACM HotNets, 2012.
28. M. Ghobadi, G. Salmon, Y. Ganjali, M. Labrecque, G. Steffan, *Caliper: Precise and Responsive Traffic Generator*, In Proc. of IEEE Hot Interconnects, 2012.
29. N. Dukkipati, M. Mathis, Y. Cheng, M. Ghobadi, *Proportional Rate Reduction for TCP*, In Proc. of ACM IMC, 2011. (**Google Research Excellent Paper Award**)
30. M. Ghobadi, M. Labrecque, G. Salmon, K. Aasaraai, S. H. Yeganeh, Y. Ganjali, J. G. Steffan, *Caliper: a tool to generate precise and closed-loop traffic*, ACM SIGCOMM Demo, 2010.
31. A. Tootoonchian, M. Ghobadi, Y. Ganjali, *OpenTM: Traffic Matrix Estimator for OpenFlow Networks*, In Proc. of Passive and Active Measurement conference (PAM), 2010.
32. H. Rastegarfar, M. Ghobadi, Y. Ganjali. *Emulation of Optical PIFO Buffers*, In Proc. of IEEE GLOBECOM, 2009.
33. M. Labrecque, J. Steffan, G. Salmon, M. Ghobadi, Y. Ganjali. *NetThreads: Programming NetFPGA with Threaded Software*, NetFPGA Developers Workshop, 2009. (**2nd Place for Best Project Award**)
34. G. Salmon, M. Ghobadi, Y. Ganjali, M. Labrecque, J. Steffan. *NetFPGA-based Precise Traffic Generation*, NetFPGA Developers Workshop, 2009.
35. N. Beheshti, Y. Ganjali, M. Ghobadi, N. McKeown, and G. Salmon. *Experimental study of router buffer sizing*, In Proc. of ACM IMC, 2008. (**Best Paper Award**)
36. M. Ghobadi, S. Ganti, G. C. Shoja, *Resource Optimization Algorithms for Virtual Private Networks Using the Hose Model*, In Proc. of Journal of Computer and Telecommunications Networking, Elsevier, 52(16), 2008.
37. N. Beheshti, Y. Ganjali, M. Ghobadi, J. Naous, N. McKeown, and G. Salmon. *Performing Time-sensitive network experiments*, In Proc. of ACM/IEEE Architectures for Networking and Communications Systems (ANCS), 2008.
38. M. Ghobadi, S. Ganti, G. C. Shoja, *Hierarchical Provisioning Algorithm for Virtual Private Networks Using the Hose Model*, In Proc. of IEEE GLOBECOM, pages 2467–2471, Nov. 2007.
39. M. Ghobadi, S. Ganti, G. C. Shoja, *Resource Optimization to Provision a Virtual Private Network Using the Hose Model*, In Proc. of IEEE International Conference on Communications (ICC), pages 512–517, 2007.

Technical reports

1. M. Ghobadi, R. Mahajan, A. Phanishayee, N. Devanur, J. Kulkarni, G. Ranade, P. Blanche, H. Rastegarfar, M. Glick, D. Kilper, *Design of Mirror Assembly for an Agile Reconfigurable Data Center Interconnect*, Microsoft Research Technical Report, 2016.
2. N. Devanur, J. Kulkarni, G. Ranade, M. Ghobadi, R. Mahajan, A. Phanishayee, P. Blanche, H. Rastegarfar, M. Glick, D. Kilper, *Stable Matching Algorithm for an Agile Reconfigurable Data Center Interconnect*, Microsoft Research Technical Report, 2016.

Patents

1. M. Kotaru, E. Cuervo, K. Chintalapudi, M. Ghobadi, *Mixed Reality Offload using Free-Space Optics*, Patent pending, 2017.

2. M. Ghobadi, R. Mahajan, A. Phanishayee, D. Zhuo, X. Zou, *Data Center Topology Having Multiple Classes of Reliability*, US patent, 2016.
3. M. Ghobadi, A. Shraer, *Consistent Hashing Using Exact Matching with Application to Hardware Load Balancing*, US patent, 2014.
4. M. Ghobadi, Y. Cheng, *Bounding Congestion Window to Rate Limit Large Content Transfer*, US patent, 2011.

RESEARCH IMPACT

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| 2018 | The body of work on programmable optical networks moved Microsoft to invest in building an entire infrastructure for optical software-defined networking [ACM SIGCOMM'18, ACM HotNets'17, ACM IMC'16, OFC'16, JOCN'16]. |
| 2017 | Our recommendation system that optimizes link failure recovery is deployed at Microsoft data centers worldwide [ACM SIGCOMM'17] |
| 2016 | Our measurement engine to monitor optical links' power levels is in production at Microsoft data centers worldwide [USENIX NSDI'17] |
| 2015 | Our algorithms on using hardware timestamps to enable a delay-based congestion control in RDMA networks are in production at Google [ACM SIGCOMM'15]. |

PROFESSIONAL SERVICE

1. Co-chair, Optics and Machine Learning Symposium, OFC, 2021
2. Program Committee Member, USENIX SOSP, 2021
3. Program Committee Member, USENIX OSDI, 2021
4. Program Committee Member, USENIX NSDI, 2021
5. Program Committee Member, OFC, 2021
6. Workshops Chair, ACM SIGCOMM, 2020
7. Program Committee, ACM SIGCOMM, 2020
8. Program Committee Member, USENIX NSDI, 2020
9. Program Committee, USENIX ATC, 2020
10. Program Committee Member, ACM HotNets, 2019
11. Program Committee Member, ACM SIGCOMM, 2019
12. Program Chair, New England Network and Systems (NENS), 2019
13. Program Chair, ACM SIGCOMM Workshop on Optical Systems (OptSys), 2019
14. Program Committee Member, USENIX NSDI, 2019
15. Program Committee Member, OSA Photonic Networks and Devices, 2018
16. Program Committee Member, ACM CoNEXT, 2018
17. Program Committee Member, ACM IMC, 2018
18. Program Committee Member, ACM HotNets, 2018

19. Program Committee Member, ACM SOSR, 2018
20. General Chair, ACM SOSR, 2018
21. Program Committee Member, APNet, 2018
22. Program Committee Member, IEEE HPSR, 2018
23. Program Committee Member, ACM HotMobile, 2018
24. Mentoring co-chair, N2Women workshop at ACM SIGCOMM, 2017
25. Program Committee Member, ACM SIGCOMM, 2017
26. Program Committee Member, ACM IMC, 2017
27. Program Committee Member, ACM SOSR, 2017
28. Program Committee Member, ACM CoNEXT, 2017
29. Program Committee Member, IEEE ICNP, 2017
30. Program Committee Member, IEEE/IFICO TMA, 2017
31. Program Committee Member, APNet, 2017
32. Program Committee Member, PAM, 2017
33. Program Committee Member, IEEE MASCOTS, 2017
34. Program Committee Member, USENIX NSDI, 2016
35. Program Committee Member, ACM CoNEXT, 2016
36. Program Committee Member, IEEE Hot Interconnects, 2016
37. Program Committee Member, ACM SOSR, 2015
38. Program Committee Member, ACM CoNEXT, 2015
39. Program Committee Member, IEEE Hot Interconnects, 2015
40. Program Committee Member, ACM CoNEXT student workshop, 2013