

Stanford



Nick McKeown

Kleiner Perkins, Mayfield, and Sequoia Capital Professor in the School of Engineering and Professor of Computer Science

Electrical Engineering

CONTACT INFORMATION

- **Administrator**

Lancy Nazaroff - Program Manager

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Bio

BIO

McKeown researches techniques to improve the Internet. Most of this work has focused on the architecture, design, analysis, and implementation of high-performance Internet switches and routers. More recently, his interests have broadened to include network architecture, backbone network design, congestion control; and how the Internet might be redesigned if we were to start with a clean slate.

ACADEMIC APPOINTMENTS

- Professor, Electrical Engineering
- Professor, Computer Science

HONORS AND AWARDS

- Fellow, American Academy of Arts and Sciences (2015)
- Honorary PhD, ETH (Zurich) (2014)
- Lifetime Achievement Award, ACM Sigcomm (2012)
- Fellow, National Academy of Engineering (NAE) (2010)
- Computers and Communications Award, IEEE Koji Kobayashi (2009)
- ACM Fellow Lovelace Medal, British Computer Society (2007)
- Fellow, IEEE (2005)
- Fellow, Royal Academy of Engineering (UK) (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Board Member, P4 Language Consortium (P4.org) (2014 - present)
- Board Member, Open Networking Lab (ON.Lab) (2013 - present)
- Board Member, Open Networking Foundation (ONF) (2010 - present)

PROFESSIONAL EDUCATION

- PhD, UC Berkeley (1995)

Teaching

COURSES

2019-20

- Advanced Topics in Networking: CS 244 (Spr)
- Introduction to Computer Networking: CS 144 (Aut)

2018-19

- Introduction to Computer Networking: CS 144 (Win)
- Introduction to Computer Networking: OSPKYOTO 144K (Aut)

2017-18

- Advanced Topics in Networking: CS 244 (Spr)
- Introduction to Computer Networking: CS 144 (Aut)
- Topics in Computer Networks: CS 344 (Spr)

2016-17

- Advanced Topics in Networking: CS 244 (Spr)
- Introduction to Computer Networking: CS 144 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Anand Atreya, Hudson Ayers, Eyal Cidon

Doctoral Dissertation Advisor (AC)

Serhat Arslan, Stephen Ibanez

Master's Program Advisor

Lemuel Cardenas-Arriaga, Helena Huang, Tian-Shun Jiang, Weixin Liang, Harold WANG

Doctoral (Program)

Serhat Arslan, Gedeon Nyengele, Catalin Voss

Publications

PUBLICATIONS

- **Programming Protocol-Independent Packet Processors** *ACM SIGCOMM COMPUTER COMMUNICATION REVIEW*
Bosshart, P., Daly, D., Gibb, G., Izzard, M., McKeown, N., Rexford, J., Schlesinger, C., Talayco, D., Vahdat, A., Varghese, G., Walker, D.
2014; 44 (3): 87-95
- **Automatic Test Packet Generation** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Zeng, H., Kazemian, P., Varghese, G., McKeown, N.
2014; 22 (2): 554-566
- **Enlarging the SIGCOMM Tent** *ACM SIGCOMM COMPUTER COMMUNICATION REVIEW*
McKeown, N.
2014; 44 (1): 63-65
- **Forwarding Metamorphosis: Fast Programmable Match-Action Processing in Hardware for SDN** *SIGCOMM Conference*
Bosshart, P., Gibb, G., Kim, H., Varghese, G., McKeown, N., Izzard, M., Mujica, F., Horowitz, M.

ASSOC COMPUTING MACHINERY.2013: 99–110

- **Downton Abbey Without the Hiccups: Buffer-Based Rate Adaptation for HTTP Video Streaming**
Huang, T., Johari, R., McKeown, N.
2013
- **Making Use of All the Networks Around Us: A Case Study in Android** *COMPUTER COMMUNICATION REVIEW*
Yap, K., Huang, T., Kobayashi, M., Yiakoumis, Y., McKeown, N., Katti, S., Parulkar, G.
2012; 42 (4): 455-460
- **Where is the Debugger for my Software-Defined Network?** *HotSDN 2012, Helsinki, Finland (Best Student Presentation Award)*
Handigol, N., Heller, B., Jeyakumar, V., Mazieres, D., McKeown, N.
2012: 6
- **Header Space Analysis: Static Checking for Networks**
Kazemian, P., Varghese, G., McKeown, N.
2012
- **Reproducible Network Experiments using Container Based Emulation**
Handigol, N., Heller, B., Jeyakumar, V., Lantz, B., McKeown, N.
2012
- **Designing packet buffers for router linecards** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Iyer, S., Kompella, R. R., McKeown, N.
2008; 16 (3): 705-717
- **Designing a fault-tolerant network using valiant load-balancing** *27th IEEE Conference on Computer Communications (INFOCOM 2008)*
Zhang-Shen, R., McKeown, N.
IEEE.2008: 301–305
- **Ethane: Taking control of the enterprise** *ACM SIGCOMM 2007 Conference*
Casado, M., Freedman, M. J., Pettit, J., Luo, J., McKeown, N., Shenker, S.
ASSOC COMPUTING MACHINERY.2007: 1–12
- **Routers with very small buffers** *IEEE INFOCOM 2006 Conference/25th IEEE International Conference on Computer Communications*
Enachescu, M., Ganjali, Y., Goel, A., McKeown, N., Roughgarden, T.
IEEE.2006: 1833–1843
- **Why flow-completion time is the right metric for congestion control** *COMPUTER COMMUNICATION REVIEW*
Dukkipati, N., McKeown, N.
2006; 36 (1): 59-62
- **Designing a predictable Internet backbone with Valiant Load-balancing** *13th International Workshop on Quality of Service (IWQoS 2005)*
Rui, Z. S., McKeown, N.
SPRINGER-VERLAG BERLIN.2005: 178–192
- **Sizing router buffers** *ACM/SIGCOMM 2004 Conference on Computer Communications*
Appenzeller, G., Keslassy, I., McKeown, N.
ASSOC COMPUTING MACHINERY.2004: 281–92
- **Buffers: How we fell in love with them and why we need a divorce.** *12th Annual IEEE Symposium on High Performance Interconnects*
McKeown, N.
IEEE.2004: 1–1
- **Scaling Internet routers using optics** *SIGCOMM 2003 Conference*
Keslassy, I., Chuang, S. T., Yu, K., Miller, D., Horowitz, M., Solgaard, O., McKeown, N.
ASSOC COMPUTING MACHINERY.2003: 189–200
- **Achieving 100% throughput in an input-queued switch** *INFOCOM 96 Conference*
McKeown, N., Mekkittikul, A., Anantharam, V., Walrand, J.

IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1999: 1260–67

- **Matching output queueing with a combined input/output-queued switch** *Infocom 99 Meeting*
Chuang, S. T., Goel, A., McKeown, N., Prabhakar, B.
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1999: 1030–39
- **The iSLIP scheduling algorithm for input-queued switches** *IEEE-ACM TRANSACTIONS ON NETWORKING*
McKeown, N.
1999; 7 (2): 188-201
- **Matching output queueing with a combined input output queued switch** *18th Annual Joint Conference of the IEEE Computer and Communications Societies (INFOCOM 99)*
Chuang, S. T., Goel, A., McKeown, N., Prabhakar, B.
IEEE.1999: 1169–1178
- **A Fast Switched Backplane for a Gigabit Switched Router** *Business Communications Review*
McKeown, N.
1997: 30
- **THE BAY BRIDGE - A HIGH-SPEED BRIDGE ROUTER** *IFIP TRANSACTIONS C-COMMUNICATION SYSTEMS*
McKeown, N., Edell, R., Le, M. T.
1993; 9: 203-218
- **Democratizing the Network Edge** *ACM SIGCOMM COMPUTER COMMUNICATION REVIEW*
Peterson, L., Anderson, T., Katti, S., McKeown, N., Parulkar, G., Rexford, J., Satyanarayanan, M., Sunay, O., Vandat, A.
2019; 49 (2): 31–36
- **Frequency Stabilized Lasers for Coherent Fiber Interconnects in the Datacenter**
Blumenthal, D. J., Ballani, H., Behunin, R., Bowers, J. E., Costa, P., Lenoski, D., McKeown, N., Morton, P., Papp, S. B., Rakich, P. T., IEEE
IEEE.2019
- **p4v: practical verification for programmable data planes** *SIGCOMM '18 Proceedings of the 2018 Conference of the ACM Special Interest Group on Data Communication*
Liu, J., Hallahan, W., Schlesinger, C., Sharif, M., Lee, J., Soulé, R., Wang, H., Ca#caval, C., McKeown, N., Foster, N.
2018: 490-503
- **Flow Caching for High Entropy Packet Fields** *ACM SIGCOMM Workshop on Hot Topics in Software Defined Networking (HotSDN)*
Shelly, N., Jackson, E. J., Koponen, T., McKeown, N., Rajahalme, J.
ASSOC COMPUTING MACHINERY.2014
- **A Buffer-Based Approach to Rate Adaptation: Evidence from a Large Video Streaming Service** *SIGCOMM Conference*
Huang, T., Johari, R., McKeown, N., Trunnell, M., Watson, M.
ASSOC COMPUTING MACHINERY.2014: 187–98
- **OSNT: Open Source Network Tester** *IEEE NETWORK*
Antichi, G., Shahbaz, M., Geng, Y., Zilberman, N., Covington, A., Bruyere, M., McKeown, N., Feamster, N., Felderman, B., Blott, M., Moore, A. W., Owezarski, P.
2014; 28 (5): 6-12
- **Maturing of OpenFlow and Software-defined Networking through deployments** *COMPUTER NETWORKS*
Kobayashi, M., Seetharaman, S., Parulkar, G., Appenzeller, G., Little, J., van Reijendam, J., Weissmann, P., McKeown, N.
2014; 61: 151-175
- **Rethinking IP Core Networks** *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*
Das, S., Parulkar, G., McKeown, N.
2013; 5 (12): 1431-1442
- **pFabric: Minimal Near-Optimal Datacenter Transport** *SIGCOMM Conference*
Alizadeh, M., Yang, S., Sharif, M., Katti, S., McKeown, N., Prabhakar, B., Shenker, S.
ASSOC COMPUTING MACHINERY.2013: 435–46

- **Rethinking IP Core Networks** *Journal of Optical Communications and Networking*
Das, S., Parulkar, G., McKeown, N.
2013: 12
- **Design Principles for Packet Parsers** *9th ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*
Gibb, G., Varghese, G., Horowitz, M., McKeown, N.
IEEE.2013: 13–24
- **Real Time Network Policy Checking using Header Space Analysis**
Kazemian, P., Chang, M., Zeng, H., Varghese, G., McKeown, N., Whyte, S.
2013
- **Design Principles for Packet Parsers**
Gibb, G., Varghese, G., Horowitz, M., McKeown, N.
2013
- **Late-binding: how to lose fewer packets during handoff**
Yap, K., Huang, T., Yiakoumis, Y., McKeown, N., Katti, S.
2013
- **Forwarding metamorphosis: fast programmable match-action processing in hardware for SDN**
Bosshart, P., Gibb, G., Kim, H. S., Varghese, G., McKeown, N., Izzard, M.
2013
- **Leveraging SDN Layering to Systematically Troubleshoot Networks**
Heller, B., Scott, C., McKeown, N., Shenker, S., Wundsam, A., Zeng, H.
2013
- **pFabric: minimal near-optimal datacenter transport**
Alizadeh, M., Yang, S., Sharif, M., Katti, S., McKeown, N., Prabhakar, B.
2013
- **The Controller Placement Problem** *COMPUTER COMMUNICATION REVIEW*
Heller, B., Sherwood, R., McKeown, N.
2012; 42 (4): 473-478
- **SDN Based Unified Control Architecture** *25th IEEE Photonics Conference (IPC)*
Das, S., Parulkar, G., McKeown, N.
IEEE.2012: 778–779
- **Why OpenFlow/SDN Can Succeed Where GMPLS Failed** *38th European Conference and Exhibition on Optical Communications (ECOC)*
Das, S., Parulkar, G., McKeown, N.
IEEE.2012
- **Why OpenFlow/SDN Can Succeed Where GMPLS Failed** *ECOC Technical Digest*
Das, S., Parulkar, G., McKeown, N.
2012: 3
- **Maturing of OpenFlow and Software Dened Networking through Deployments** *Elsevier*
Kobayashi, M., Seetharaman, S., Parulkar, G., Appenzeller, G., van Reijndam, J. J., Weissmann, P., McKeown, N. W.
2012; 14: 50
- **Putting Home Users in Charge of their Network**
Yiakoumis, Y., Huang, T., Yap, K., Katti, S., Johari, R., McKeown, N.
2012
- **Automatic Test Packet Generation**
Zeng, H., Kazemian, P., Varghese, G., McKeown, N.
2012

- **Outsourcing Network Functionality**
Gibb, G., Zeng, H., McKeown, N.
2012
- **Confused, Timid, and Unstable: Picking a Video Streaming Rate is Hard**
Huang, T., Handigol, N., Heller, B., McKeown, N., Johari, R.
2012
- **Deconstructing Datacenter Packet Transport** *11th ACM SIGCOMM Workshop on Hot Topics in Networks (HotNets)*
Alizadeh, M., Yang, S., Katti, S., McKeown, N., Prabhakar, B., Shenker, S.
ASSOC COMPUTING MACHINERY.2012: 133–138
- **Multi-Server Generalized Processor Sharing** *24th International Teletraffic Congress (ITC)*
Yap, K., McKeown, N., Katti, S.
IEEE COMPUTER SOC.2012: 161–168
- **MPLS-TE and MPLS VPNs with OpenFlow** *COMPUTER COMMUNICATION REVIEW*
Sharafat, A. R., Das, S., Parulkar, G., McKeown, N.
2011; 41 (4): 452-453
- **Optimizing a Virtualized Data Center** *COMPUTER COMMUNICATION REVIEW*
Erickson, D., Heller, B., Yang, S., Chu, J., Ellithorpe, J., McKeown, N., Parulkar, G., Rosenblum, M., Whyte, S., Stuart, S.
2011; 41 (4): 478-479
- **INTERPRETATION OF REFLECTANCE SPECTRA OF CLAY MINERAL-SILICA MIXTURES: IMPLICATIONS FOR MARTIAN CLAY MINERALOGY AT MAWRTH VALLIS** *CLAYS AND CLAY MINERALS*
McKeown, N. K., Bishop, J. L., Cuadros, J., Hillier, S., Amador, E., Makarewicz, H. D., Parente, M., Silver, E. A.
2011; 59 (4): 400-415
- **Architecting for Innovation** *COMPUTER COMMUNICATION REVIEW*
Koponen, T., Shenker, S., Balakrishnan, H., Feamster, N., Ganichev, I., Ghodsi, A., Godfrey, P. B., McKeown, N., Parulkar, G., Raghavan, B., Rexford, J., Arianfar, S., Kuptsov, et al
2011; 41 (3): 24-36
- **Integrated Photonics for Low-Power Packet Networking** *IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS*
Blumenthal, D. J., Barton, J., Beheshti, N., Bowers, J. E., Burmeister, E., Coldren, L. A., Dummer, M., Epps, G., Fang, A., Ganjali, Y., Garcia, J., Koch, B., Lal, et al
2011; 17 (2): 458-471
- **Application-Aware Aggregation and Traffic Engineering in a Converged Packet-Circuit Network**
Das, S., Yiakoumis, Y., Parulkar, Guru, M., Singh, P., Getachew, D., Desai, P. D., McKeown, N. W.
2011
- **Slicing Home Networks**
Yiakoumis, Y., Yap, K., Katti, S., Parulkar, G., McKeown, N.
2011
- **Separating Authentication, Access and Accounting: A Case Study with OpenWiFi** *Stanford University NEC OPENFLOW-TR*
Yap, K., Yiakoumis, Y., Kobayashi, M., Katti, S., Parulkar, G., McKeown, N.
2011: 6
- **Initial thoughts on custom network processing via waypoint services**
Gibb, G., Zeng, H., McKeown, N.
2011
- **MPLS with a Simple OPEN Control Plane**
Das, S., Sharafat, A. R., Parulkar, Guru, M., McKeown, N.
2011
- **Optical Packet Buffers for Backbone Internet Routers** *IEEE-ACM TRANSACTIONS ON NETWORKING*

- Beheshti, N., Burmeister, E., Ganjali, Y., Bowers, J. E., Blumenthal, D. J., McKeown, N.
2010; 18 (5): 1599-1609
- **Ripcord: A Modular Platform for Data Center Networking** *ACM SIGCOMM 2001 Conference 2010*
Heller, B., Erickson, D., McKeown, N., Griffith, R., Ganichev, I., Shenker, S., Zarifis, K., Moon, D., Whyte, S., Stuart, S.
ASSOC COMPUTING MACHINERY.2010: 457-58
 - **OpenRoads: Empowering Research in Mobile Networks** *COMPUTER COMMUNICATION REVIEW*
Yap, K., Kobayashi, M., Sherwood, R., Huang, T., Chan, M., Handigol, N., McKeown, N.
2010; 40 (1): 125-126
 - **Can the Production Network Be the Testbed?**
Sherwood, R., Gibb, G., Yap, K., Appenzeller, G., Casado, M., McKeown, N.
2010
 - **A Network in a Laptop: Rapid Prototyping for Software-Defined Networks.**
Lantz, B., Heller, B., McKeown, N.
2010
 - **ElasticTree: Saving Energy in Data Center Networks**
Heller, B., Seetharaman, S., Mahadevan, P., Yiakoumis, Y., Sharma, P., Banerjee, S., McKeown, N. W.
2010
 - **Towards Software-Friendly Networks**
Yap, K., Huang, T., Dodson, B., Lam, Monica, S., McKeown, N.
2010
 - **PhoneNet: a Phone-to-Phone Network for Group Communication within an Administrative Domain**
Huang, T., Yap, K., Dodson, B., Lam, Monica, S., McKeown, N.
2010
 - **OpenPipes: Making Distributed Hardware Systems Easier.**
Gibb, G., McKeown, N.
2010
 - **Blueprint for Introducing Innovation into Wireless Mobile Networks**
Chan, M., Handigol, N., McKeown, N., Parulkar, G.
2010
 - **FPGA Research Design Platform Fuels Network Advances** *Xcell Journal, Fourth Quarter*
Blott, M., Ellithorpe, J., McKeown, N., Vissers, K., Zeng, H.
2010: 6
 - **Delivering Capacity for the Mobile Internet by Stitching Together Networks**
Yap, K., Katti, S., Parulkar, G., McKeown, N.
2010
 - **Experimental Demonstration of OpenFlow Control of Packet and Circuit Switches** *Conference on Optical Fiber Communication (OFC)/Collocated National Fiber Optic Engineers (NFOEC)*
Gudla, V., Das, S., Shastri, A., Parulkar, G., McKeown, N., Kazovsky, L., Yamashita, S.
IEEE.2010
 - **Packet and Circuit Network Convergence with OpenFlow** *Conference on Optical Fiber Communication (OFC)/Collocated National Fiber Optic Engineers (NFOEC)*
Das, S., Parulkar, G., McKeown, N., Singh, P., Getachew, D., Ong, L.
IEEE.2010
 - **Rethinking Enterprise Network Control** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Casado, M., Freedman, M. J., Pettit, J., Luo, J., Gude, N., McKeown, N., Shenker, S.
2009; 17 (4): 1270-1283

- **The Stanford OpenRoads Deployment** *4th ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation and Characterization (WiNTECH 2009)*
Yap, K., Kobayashi, M., Underhill, D., Seetharaman, S., Kazemian, P., McKeown, N.
ASSOC COMPUTING MACHINERY.2009: 59–66
- **Encouraging Reusable Network Hardware Design** *IEEE International Conference on Microelectronic Systems Education*
Covington, G. A., Gibb, G., Naous, J., Lockwood, J. W., McKeown, N.
IEEE.2009: 29–32
- **Unifying Packet and Circuit Switched Networks** *IEEE Globecom Workshops (Gc Workshops 2009)*
Das, S., Parulkar, G., McKeown, N.
IEEE.2009: 33–38
- **Simple Unified Control for Packet and Circuit Networks** *Digest of the LEOS Summer Topical Meeting*
Das, S., Parulkar, G., McKeown, N.
IEEE.2009: 147–148
- **Delegating Network Security with More Information** *1st Workshop Research on Enterprise Networking*
Naous, J., Stutsman, R., Mazieres, D., McKeown, N., Zeldovich, N.
ASSOC COMPUTING MACHINERY.2009: 19–26
- **Viewpoint Scaling the Academic Publication Process to Internet Scale** *COMMUNICATIONS OF THE ACM*
Crowcroft, J., Keshav, S., McKeown, N.
2009; 52 (1): 27-30
- **Buffer Sizing results for RCP Congestion Control under Connection Arrivals and Departures** *COMPUTER COMMUNICATION REVIEW*
Lakshmikantha, A., Srikant, R., Dukkipati, N., McKeown, N., Beck, C.
2009; 39 (1): 6-15
- **A Packet Generator on the NetFPGA Platform** *17th Annual IEEE Symposium on Field Programmable Custom Computing Machines*
Covington, G. A., Gibb, G., Lockwood, J. W., McKeown, N.
IEEE COMPUTER SOC.2009: 235–238
- **NetFPGA - An open platform for teaching how to build gigabit-rate network switches and routers** *IEEE TRANSACTIONS ON EDUCATION*
Gibb, G., Lockwood, J. W., Naous, J., Hartke, P., McKeown, N.
2008; 51 (3): 364-369
- **NOX: Towards an operating system for networks** *COMPUTER COMMUNICATION REVIEW*
Gude, N., Koponen, T., Pettit, J., Pfaff, B., Casado, M., McKeown, N., Shenker, S.
2008; 38 (3): 105-110
- **OpenFlow: Enabling innovation in campus networks** *COMPUTER COMMUNICATION REVIEW*
McKeown, N., Anderson, T., Balakrishnan, H., Parulkar, G., Peterson, L., Rexford, J., Shenker, S., Turner, J.
2008; 38 (2): 69-74
- **Experimental Study of Router Buffer Sizing** *8th ACM SIGCOMM Internet Measurement Conference*
Beheshti, N., Ganjali, Y., Ghobadi, M., McKeown, N., Salmon, G.
ASSOC COMPUTING MACHINERY.2008: 197–210
- **Performing Time-Sensitive Network Experiments**
Beheshti, N., Ganjali, Y., Ghobadi, M., McKeown, N., Naous, J., Salmon, G.
2008
- **The Effectiveness of Whitelisting: a User-Study**
Erickson, D., Casado, M., McKeown, N.
2008
- **Implementing an OpenFlow Switch on the NetFPGA platform**
Naous, J., Erickson, D., Covington, A., Appenzeller, G., McKeown, N.
2008

- **Designing a Fault-Tolerant Network Using Valiant Load-Balancing**
Zhang-Shen, R., McKeown, N.
2008
- **Obtaining high throughput in networks with tiny buffers** *16th International Workshop on Quality of Service (IWQoS 2008)*
Beheshti, N., Ganjali, Y., Goel, A., McKeown, N.
IEEE.2008: 72–76
- **Guaranteeing quality of service to peering traffic** *27th IEEE Conference on Computer Communications (INFOCOM 2008)*
Zhang-Shen, R., McKeown, N.
IEEE.2008: 2146–2152
- **Stability analysis of explicit congestion control protocols** *IEEE COMMUNICATIONS LETTERS*
Balakrishnan, H., Dukkupati, N., McKeown, N., Tomlin, C. J.
2007; 11 (10): 823-825
- **Prototyping fast, simple, secure switches for ethane** *15th Annual IEEE Symposium on High-Performance Interconnects*
Luo, J., Pettit, J., Casado, M., Lockwood, J., McKeown, N.
IEEE COMPUTER SOC.2007: 73–79
- **Experimenting with Buffer Sizing in Routers**
Beheshti, N., Ganjali, Y., Naous, J., McKeown, N.
2007
- **Packet Scheduling in Optical FIFO Buffers** *High-Speed Networking Workshop (In Conjunction with IEEE Infocom 2007), Anchorage, AK*
Beheshti, N., Ganjali, Y., McKeown, N.
2007: 4
- **Can Overlay hosting services make ip ossification irrelevant** *cabernet.cs.princeton.edu*
Turner, J., McKeown, N.
2007: 4
- **Building a RCP (Rate control protocol) test network** *15th Annual IEEE Symposium on High-Performance Interconnects*
Dukkupati, N., Gibb, G., McKeown, N., Zhu, J.
IEEE COMPUTER SOC.2007: 91–98
- **NetFPGA - An open platform for gigabit-rate network switching and routing** *IEEE International Conference on Microelectronic Systems Education*
Lockwood, J. W., McKeown, N., Watson, G., Gibb, G., Hartke, P., Naous, J., Raghuraman, R., Luo, H.
IEEE COMPUTER SOC.2007: 160–161
- **Update on buffer sizing in Internet routers** *COMPUTER COMMUNICATION REVIEW*
Ganjali, Y., McKeown, N.
2006; 36 (5): 67-70
- **RCP-AC: Congestion control to make flows complete quickly in any environment** *IEEE INFOCOM 2006 Conference/25th IEEE International Conference on Computer Communications*
Dukkupati, N., McKeown, N., Fraser, A. G.
IEEE.2006: 3002–3006
- **The Clack Graphical Router: Visualizing Network Software**
Wendlandt, D., Casado, M., Tarjan, P., McKeown, N.
2006
- **SANE: A protection architecture for enterprise networks** *15th USENIX Security Symposium*
Casado, M., Garfinkel, T., Akella, A., Freedman, M. J., Boneh, D., McKeown, N., Shenker, S.
USENIX ASSOC.2006: 137–151
- **Buffer sizing in all-optical packet switches** *Conference on Optical Fiber Communications/National Fiber Optic Engineers Conference*
Beheshti, N., Ganjali, Y., Rajaduray, R., Blumenthal, D., McKeown, N.
OPTICAL SOC AMERICA.2006: 1367–1369

- **Part I: Buffer sizes for core routers** *COMPUTER COMMUNICATION REVIEW*
Wischik, D., McKeown, N.
2005; 35 (3): 75-78
- **Part III: Routers with very small buffers** *COMPUTER COMMUNICATION REVIEW*
Enachescu, M., Ganjali, Y., Goel, A., McKeown, N., Roughgarden, T.
2005; 35 (3): 83-89
- **The throughput of a buffered crossbar switch** *IEEE COMMUNICATIONS LETTERS*
Lin, M., McKeown, N.
2005; 9 (5): 465-467
- **Reconfigurable networking hardware: A classroom tool** *13th Symposium on High Performance Interconnects*
Casado, M., Watson, G., McKeown, N.
IEEE COMPUTER SOC.2005: 151-157
- **Teaching Networking Hardware**
Casado, M., Watson, G., McKeown, N.
2005
- **Building Packet Buffers with Interleaved Memories**
Shrimali, G., McKeown, N.
2005
- **The Virtual Network System**
Casado, M., McKeown, N.
2005
- **Routing in a highly dynamic topology** *2nd Annual IEEE-Communications-Society Conference on Sensor and Ad Hoc Communications and Networks (SECON 2005)*
Ganjali, Y., McKeown, N.
IEEE.2005: 164-175
- **Using hardware to configure a load balanced switch** *12th Annual IEEE Symposium on High Performance Interconnects*
Arekapudi, S., Chuang, S. T., Keslassy, I., McKeown, N.
IEEE COMPUTER SOC.2005: 70-78
- **Building packet buffers using interleaved memories** *IEEE Workshop on High Performance Switching and Routing (HPSR 2005)*
Shrimali, G., McKeown, N.
IEEE.2005: 1-5
- **Optimal load-balancing** *24th Annual Joint Conference of the IEEE Computer and Communications Societies*
Keslassy, I., Chang, C. S., McKeown, N., Lee, D. S.
IEEE COMPUTER SOC.2005: 1712-1722
- **Practical algorithms for performance guarantees in buffered crossbars** *24th Annual Joint Conference of the IEEE Computer and Communications Societies*
Chuang, S. T., Iyer, S., McKeown, N.
IEEE COMPUTER SOC.2005: 981-991
- **Processor sharing flows in the Internet** *13th International Workshop on Quality of Service (IWQoS 2005)*
Dukkipati, N., Kobayashi, M., Rui, Z. S., McKeown, N.
SPRINGER-VERLAG BERLIN.2005: 271-285
- **A load-balanced switch with an arbitrary number of linecards** *23rd Annual Joint Conference of the IEEE Computer and Communications Societies*
Keslassy, I., Chuang, S. T., McKeown, N.
IEEE.2004: 2007-2016
- **Recent Results on Sizing Router Buffers**
Appenzeller, G., McKeown, N., Sommers, J., Barford, P.
2004

- **Configuring a load-balanced switch in hardware** *12th Annual IEEE Symposium on High Performance Interconnects*
Arekapudi, S., Chuang, S. T., Keslassy, I., McKeown, N.
IEEE.2004: 48–53
- **Designing packet buffers with statistical guarantees** *12th Annual IEEE Symposium on High Performance Interconnects*
Shrimali, G., Keslassy, I., McKeown, N.
IEEE.2004: 54–60
- **Maximum size matching is unstable for any packet switch** *IEEE COMMUNICATIONS LETTERS*
Keslassy, I., Rui, Z. S., McKeown, N.
2003; 7 (10): 496-498
- **Using constraint sets to achieve delay bounds in CIOQ switches** *IEEE COMMUNICATIONS LETTERS*
Iyer, S., McKeown, N.
2003; 7 (6): 275-277
- **Analysis of the parallel packet switch architecture** *IEEE-ACM TRANSACTIONS ON NETWORKING*
Iyer, S., McKeown, N. W.
2003; 11 (2): 314-324
- **Is IP going to take over the world (of communications)?** *1st HotNets Workshop*
Molinero-Fernandez, P., McKeown, N., Zhang, H.
ASSOC COMPUTING MACHINERY.2003: 113–18
- **The performance of circuit switching in the Internet** *OSA Journal of Optical Networking*
Molinero-Fernandez, P., McKeown, N.
2003; 2 (4): 14
- **An Approach to Alleviate Link Overload as Observed on an IP Backbone**
Iyer, S., Bhattacharrya, S., Taft, N., Diot, C., McKeown, N.
2003
- **Optics inside Routers**
McKeown, N.
2003
- **Routers with a single stage of buffering** *ACM SIGCOMM 2002 Conference*
Iyer, S., Zhang, R., McKeown, N.
ASSOC COMPUTING MACHINERY.2002: 251–64
- **TCP switching: Exposing circuits to IP** *IEEE MICRO*
Molinero-Fernandez, P., McKeown, N.
2002; 22 (1): 82-89
- **The Stanford Virtual Router: a teaching tool and network simulator** *ACM SIGCOMM Computer Communication Review*
Casado, M., Vijayaraghavan, V., Appenzeller, G., McKeown, N.
2002; 32 (3): 1
- **Maintaining packet order in two-stage switches** *21st Annual Joint Conference of the IEEE-Computer-and-Communications-Societies*
Keslassy, I., McKeown, N.
IEEE.2002: 1032–1041
- **Maintaining statistics counters in router line cards** *IEEE MICRO*
Shah, D., Iyer, S., Prabhakar, B., McKeown, N.
2002; 22 (1): 76-81
- **On the speedup required for a multicast parallel packet switch** *IEEE COMMUNICATIONS LETTERS*
Iyer, S., McKeown, N.
2001; 5 (6): 269-271

- **Algorithms for packet classification** *IEEE NETWORK*
Gupta, P., McKeown, N.
2001; 15 (2): 24-32
- **Fast IP packet forwarding and classification for next generation Internet services** *IEEE NETWORK*
Buddhikot, M. M., McKeown, N., Varghese, G.
2001; 15 (2): 6-7
- **Analysis of a statistics counter architecture** *Symposium on High Performance Interconnects*
Shah, D., Iyer, S., Prabhakar, B., McKeown, N.
IEEE COMPUTER SOC.2001: 107-111
- **A 2.5Tb/s Switch Core with LCS Interface**
McKeown, N., Calamvokis, C., Chuang, S.
2001
- **Analysis of Scheduling Algorithms That Provide 100% Throughput in Input-Queued Switches**
Keslassy, I., McKeown, N.
2001
- **Congestion Control and Periodic Behavior**
Gilbert, A., Joo, Y., McKeown, N.
2001
- **Analysis of a memory architecture for fast packet buffers** *IEEE Workshop on High Performance Switching and Routing (HPSR 2001)*
Iyer, S., Kompella, R. R., McKeown, N.
IEEE.2001: 368-373
- **TCP switching: Exposing circuits to IP** *Symposium on High Performance Interconnects*
Molinero-Fernandez, P., McKeown, N.
IEEE COMPUTER SOC.2001: 43-48
- **Monitoring very high speed links** *1st ACM SIGCOMM Internet Measurement Workshop (IMW 2001)*
Iannaccone, G., Diot, C., Graham, I., McKeown, N.
ASSOC COMPUTING MACHINERY.2001: 267-271
- **Making parallel packet switches practical** *20th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communication-Society*
Iyer, S., McKeown, N.
IEEE.2001: 1680-1687
- **Scalable high-speed switches/routers with QoS support** *IEEE COMMUNICATIONS MAGAZINE*
Hamdi, M., McKeown, N.
2000; 38 (12): 61-61
- **Classifying packets with hierarchical intelligent cuttings** *7th IEEE Hot Interconnects Symposium*
Gupta, P., McKeown, N.
IEEE COMPUTER SOC.2000: 34-41
- **Packet Classification using Hierarchical Intelligent Cuttings** *Hot Interconnects VII, This paper is also available in IEEE Micro*
Gupta, P., McKeown, N.
2000; 20 (1): 34-41
- **Analysis of a Packet Switch with Memories Running Slower than the Line Rate**
Iyer, S., Awadallah, Amr, A., McKeown, N.
2000
- **Dynamic algorithms with worst-case performance for packet classification** *IFIP-TC6/European Commission International Conference*
Gupta, P., McKeown, N.
SPRINGER-VERLAG BERLIN.2000: 528-539

- **On the speedup required for combined input- and output-queued switching** *AUTOMATICA*
Prabhakar, B., McKeown, N.
1999; 35 (12): 1909-1920
- **Next-generation IP switches and routers** *IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS*
Chao, H. J., Degermark, M., McKeown, N., Tzeng, H. H., Ramaswami, R.
1999; 17 (6): 1009-1012
- **The increasingly important interconnect** *IEEE MICRO*
McKeown, N., Bailey, C.
1999; 19 (1): 12-13
- **iSLIP: A Scheduling Algorithm for Input-Queued Switches** *IEEE Transactions on Networking*
McKeown, N.
1999; 7 (2): 36
- **Design and Implementation of a Fast Crossbar Scheduler** *IEEE Micro Magazine*
Gupta, P., McKeown, N.
1999: 8
- **A 50 Gb/s 32*32 CMOS crossbar chip using asymmetric serial links**
Chang, K. K., Chuang, S., McKeown, N., Horowitz, M.
1999
- **Designing and implementing a fast crossbar scheduler** *6th Annual Hot Interconnects Symposium*
Gupta, P., McKeown, N.
IEEE COMPUTER SOC.1999: 20–28
- **Packet classification on multiple fields** *ACM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communications (SIGCOMM 99)*
Gupta, P., McKeown, N.
ASSOC COMPUTING MACHINERY.1999: 147–60
- **A quantitative comparison of iterative scheduling algorithms for input-queued switches** *COMPUTER NETWORKS AND ISDN SYSTEMS*
McKeown, N., Anderson, T. E.
1998; 30 (24): 2309-2326
- **Doubling memory bandwidth for network buffers** *17th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communications-Society (INFOCOM 98)*
Joo, Y. M., McKeown, N.
I E E E.1998: 808–815
- **Doubling Memory Bandwidths for Network Buffers**
Joo, Y., McKeown, N.
1998
- **ATM Input-Buffered Switches with Guaranteed-Rate Property**
Hung, A., Kesidis, G., McKeown, N.
1998
- **On the speedup required for combined input and output queued switching** *IEEE International Symposium on Information Theory*
Prabhakar, B., McKeown, N.
IEEE.1998: 165–165
- **A practical scheduling algorithm to achieve 100% throughput in input-queued switches** *17th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communications-Society (INFOCOM 98)*
Mekkittikul, A., McKeown, N.
I E E E.1998: 792–799
- **Routing lookups in hardware at memory access speeds** *17th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communications-Society (INFOCOM 98)*

- Gupta, P., Lin, S., McKeown, N.
I E E E.1998: 1240–1247
- **Multicast scheduling for input-queued switches** *IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS*
Prabhakar, B., McKeown, N., Ahuja, R.
1997; 15 (5): 855-866
 - **Tiny Tera: A packet switch core** *4th Annual Hot Interconnects Symposium*
McKeown, N., IZZARD, M., Mekkittikul, A., Ellersick, W., Horowitz, M.
IEEE COMPUTER SOC.1997: 26–33
 - **Output-buffer ATM Packet Switching for Integrated-Services Communication Networks**
Kesidis, G., McKeown, N.
1997
 - **A 2 Gb/s Asymmetric Serial Link for High-Bandwidth Packet Switches**
Chang, Ken, K.-Y., Ellersick, W., Chuang, S., Sidiropoulos, S., Horowitz, M., McKeown, N.
1997
 - **Matching Output Queueing with Combined Input and Output Queueing**
McKeown, N., Prabhakar, B., Zhu, M.
1997
 - **A Simulation Study of IP Switching**
Lin, S., McKeown, N.
1997
 - **Scheduling VOQ Switches under Non-Uniform Traffic.** *CSL Technical Report, CSL-TR 97-747, Stanford University*
Mekkittikul, A., McKeown, N.
1997: 35
 - **A small high-bandwidth ATM switch** *Broadband Access Systems Conference*
Mekkittikul, A., McKeown, N., IZZARD, M.
SPIE - INT SOC OPTICAL ENGINEERING.1996: 387–397
 - **The Tiny Tera: A Small High-Bandwidth Packet Switch Core**
McKeown, N., Izzard, M., Mekkittikul, A., Ellersick, B., Horowitz, M.
1996
 - **The Tiny Tera: A Small High-Bandwidth ATM Switch**
McKeown, N., Izzard, M., Mekkittikul, A.
1996
 - **A Starvation-free Algorithm for Achieving 100% Throughput in an Input-Queued Switch**
Mekkittikul, A., McKeown, N.
1996
 - **Tetris Models for Multicast Switches**
Prabhakar, B., McKeown, N., Mairesse, J.
1996
 - **Achieving 100% throughput in an input-queued switch** *15th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communications-Society on Networking the Next Generation*
McKeown, N., Anantharam, V., Walrand, J.
IEEE COMPUTER SOC.1996: 296–302
 - **8 Tb/s ATM interconnection through optical WDM networks** *Conference on High-Speed Semiconductor Laser Sources*
Mekkittikul, A., Sadot, D., Kazovsky, L. G., McKeown, N.
SPIE-INT SOC OPTICAL ENGINEERING.1996: 186–198

- **Scheduling multicast cells in an input-queued switch** *15th Annual Joint Conference of the IEEE-Computer-Society/IEEE-Communications-Society on Networking the Next Generation*
McKeown, N., Prabhakar, B.
IEEE COMPUTER SOC.1996: 271–278
- **BILLING USERS AND PRICING FOR TCP** *IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS*
EDELL, R. J., McKeown, N., VARAIYA, P. P.
1995; 13 (7): 1162-1175
- **A Fast Scheduling Algorithm for Input-Queued Switches**
McKeown, N., Walrand, J.
1995
- **Designing a Multicast Switch Scheduler**
Prabhakar, B., McKeown, N.
1995
- **SCHEDULING CELLS IN AN INPUT-QUEUED SWITCH** *ELECTRONICS LETTERS*
McKeown, N., Varaiya, P., Walrand, J.
1993; 29 (25): 2174-2175
- **Scheduling Cells in an Input-Queued Switch** *IEE Electronics Letters*
McKeown, N., Varaiya, P., Walrand, J.
1993: 2174-5
- **The Bay Bridge: A High Speed Bridge/Router**
McKeown, N., Edell, R., Le, My, T.
1992
- **AUTOMATIC VEHICLE CONTROL DEVELOPMENTS IN THE PATH PROGRAM** *IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY*
Shladover, S. E., DESOER, C. A., Hedrick, J. K., Tomizuka, M., Walrand, J., Zhang, W. B., MCMAHON, D. H., HUEI, P., SHEIKHOESLAM, S., McKeown, N.
1991; 40 (1): 114-130
- **Automatic Vehicle Control Developments in the PATH Program** *IEEE Transactions on Vehicular Technology*
Schladover, Steven, E., Desoer, Charles, A., Hedrick, J., Karl, Tomizuka, M., Walrand, J., Zhang, W., McKeown, N. W.
1991; 40 (1): 114-130