

Jasleen Kaur

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Education

Ph.D., Computer Sciences August 2002
University of Texas at Austin Austin, Texas
Thesis Title: Scalable Network Architectures for Providing Per-flow Service Guarantees
Advisor: Prof. Harrick M. Vin

M.S., Computer Sciences May 1999
University of Texas at Austin Austin, Texas

B.Tech., Computer Science and Engineering May 1997
Indian Institute of Technology, Kanpur Kanpur, India

Professional Experience

University of North Carolina at Chapel Hill	<i>Associate Professor</i>	July 2009 – <i>present</i>
University of North Carolina at Chapel Hill	<i>Assistant Professor</i>	July 2002 – June 2009
University of Texas at Austin, TX	<i>Research Assistant</i>	Aug 1999 – July 2002
IBM T.J. Watson Research Labs, NY	<i>Summer Intern</i>	May 1999 – Aug 1999
AT&T Research Labs, NJ	<i>Summer Intern</i>	May 1998 – Aug 1998
Aeronautical Development Est., India	<i>Summer Employee</i>	May 1996 – Aug 1996

Honors & Awards

- *National Science Foundation CAREER Award, 2004.*
- *Junior Faculty Development Award, 2004, University of North Carolina at Chapel Hill, NC.*
- *James C. Browne Fellowship, 2001-02, Computer Sciences, University of Texas at Austin, Texas.*
- *MCD Fellowship, 1997-99, University of Texas at Austin, Texas.*
- *Motorola Student of the Year Gold Medal, 1997, Indian Institute of Technology, Kanpur, India.*
- *Summer Research Fellowship, Summer 1996, Aeronautical Development Establishment, India.*
- *Academic Merit Award, 1993-94, Indian Institute of Technology, Kanpur, India.*

Bibliography

Publications

(According to Google Scholar, these publications had more than **400 citations** in February 2009).

Book Chapter

- A. Srinivasan, P. Holman, J. Anderson, S. Baruah, and J. Kaur, “Multiprocessor Scheduling in Processor-based Router Platforms: *Issues and Ideas*”, in *Network Processors Design: Issues and Practices*, Volume 2, pages 48-62, Morgan Kaufman, 2003.

Refereed Journal Papers

(Impact factors are the latest 3-year average values according to the ISI Web of Knowledge).

- M.C. Weigle, L. Cheng, J. Kaur, and V. Kulkarni, “Generalized Stochastic Performance Models for Loss-based Congestion Control”, *in submission to the Computer Communications Journal*, 30 pages, Feb 2009.
- R. Kumar and J. Kaur, “Practical Beacon Placement for Link Monitoring Using Network Tomography”, *in the IEEE Journal on Selected Areas in Communication (JSAC)*, special issue on *Sampling the Internet: Techniques and Applications*, volume 24, number 12, pages 2196-2209, Dec 2006. **2.104 impact factor**.
- S. Rewaskar, J. Kaur, and F.D. Smith, “A Passive State-machine Based Approach for Reliable Estimation of TCP Losses”, *in the ACM SIGCOMM Computer Communications Review (CCR)*, volume 36, issue 3, pages 51-64, July 2006. **0.536 impact factor**.

Refereed Conference Papers

- V. Konda and J. Kaur, “RAPID: Shrinking the Congestion Control Timescale”, *in Proceedings of the 28th IEEE INFOCOM*, Rio de Janeiro, Brazil, 9 pages, April 2009. **19% acceptance ratio**.
- R. Kumar and J. Kaur, “Towards a Queue Sensitive Transport Protocol”, *in Proceedings of the 27th IEEE International Performance Computing and Communications Conference (IPCCC)*, Austin, TX, 8 pages, Dec 2008.
- S. Rewaskar, J. Kaur, and F.D. Smith, “A Performance Study of Loss Detection/Recovery in Real-world TCP Implementations”, *in Proceedings of IEEE International Conference on Network Protocols (ICNP)*, Beijing, China, 10 pages, Oct 2007. **14% acceptance ratio**.

Empirical results from this paper are being used to inform the loss detection mechanisms in the recently-developed Linux DCCP CCID-2 protocol. Gerrit Renker (University of Aberdeen) is leading this effort.

- A. Shriram and J. Kaur, “Empirical Evaluation of Techniques for Measuring Available Bandwidth”, in *Proceedings of the 26th IEEE INFOCOM*, Anchorage, AK, 9 pages, May 2007. **18% acceptance ratio.**
- A. Shriram and J. Kaur, “Empirical Study of the Impact of Sampling Timescales and Strategies on Measurement of Available Bandwidth”, in *Proceedings of the Seventh Passive and Active Measurement Conference (PAM)*, Adelaide, Australia, 10 pages, March 2006. **25% acceptance ratio.**
- V. Sawant and J. Kaur, “A Peer-to-Peer Architecture to Enable Versatile Lookup System Design”, in *Proceedings of the 2nd IEEE International Workshop on Networking Meets Databases (NetDB)*, Atlanta, GA, 6 pages, April 2006.
- R. Kumar and J. Kaur, “Efficient Beacon Placement for Network Tomography”, in *Proceedings of the ACM SIGCOMM Internet Measurement Conference (IMC)*, Sicily, Italy, 6 pages, October 2004. **24% acceptance ratio.**
- W. Jin, J. Chase, and J. Kaur, “Interposed Proportional Sharing for a Storage Service Utility”, in *Proceedings of the ACM Sigmetrics - Performance (SIGMETRICS)*, New York, 12 pages, June 2004. **12% acceptance ratio.**
- S. Rewaskar and J. Kaur, “Testing the Scalability Limits of Overlay Routing Infrastructures”, in *Proceedings of the Fifth Passive and Active Measurements Workshop (PAM)*, Juan-les-Pins, France, published in the Springer Lecture Notes in Computer Science Series, 10 pages, April 2004. **17% acceptance ratio.**
- J. Aikat, J. Kaur, F.D. Smith, and K. Jeffay, “Variability in TCP Round-trip Times”, in *Proceedings of the ACM SIGCOMM Internet Measurement Conference (IMC)*, Miami, FL, 6 pages, October 2003. **29% acceptance ratio.**
- A. Srinivasan, P. Holman, J. Anderson, S. Baruah, and J. Kaur, “Multiprocessor Scheduling in Processor-based Router Platforms: *Issues and Ideas*”, in *the Second Workshop on Network Processors*, Anaheim, CA, pages 48-62, February 2003.
- J. Kaur and H. Vin, “Providing Deterministic End-to-end Fairness Guarantees in Core-stateless Networks”, in *Proceedings of the Eleventh ACM/IEEE International Workshop on Quality of Service (IWQoS)*, Monterey, CA, published in Springer-Verlag’s Hot Topic Series LNCS 2707, 21 pages, June 2003. **30% acceptance ratio.**
- J. Kaur and H. Vin, “Core-stateless Guaranteed Throughput Networks”, in *Proceedings of the 22nd IEEE INFOCOM*, San Francisco, CA, 11 pages, April 2003. **20% acceptance ratio.**
- J. Kaur and H. Vin, “End-to-end Fairness Analysis of Fair Queuing Networks”, in *the 23rd IEEE International Real-Time Systems Symposium (RTSS)*, Austin, TX, pages 49-58, December 2002. **29% acceptance ratio.**

- J. Kaur and H. Vin, “Core-Stateless Guaranteed Rate Scheduling Algorithms”, in *Proceedings of the 20th IEEE INFOCOM*, Anchorage, AK, pages 1484-1492, April 2001. **23% acceptance ratio.**
- V. Sundaram, A. Chandra, P. Goyal, P. Shenoy, J. Sahni, H. Vin, “Application Performance in the QLinux Multimedia Operating System”, in *Proceedings of the Eighth ACM Conference on Multimedia*, Los Angeles, CA, pages 127-136, November 2000. **17% acceptance ratio.**

The QLinux operating system presented in this paper has been downloaded and used by hundreds of researchers around the world.

- J. Sahni, P. Goyal, and H. Vin, “Scheduling CBR Flows: FIFO or Per-Flow Queuing?” in *Proceedings of the Ninth IEEE International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, Basking Ridge, NJ, pages 13-27, June 1999.

This paper was top-ranked in the reviewing process among all papers that appeared in the conference.

Refereed Extended Abstracts

- S. Rewaskar, J. Kaur, and D. Smith, “Accuracy of Probing Techniques in Estimating TCP Loss Rates”, in *Proceedings of ACM SIGCOMM*, Pisa, Italy, 2 pages, September 2006.
- S. Rewaskar, J. Kaur, and D. Smith, “A Passive State-Machine Based Approach for Reliable Estimation of TCP Losses”, in *Proceedings of the Seventh Passive and Active Measurement Conference (PAM)*, Adelaide, Australia, 2 pages, March 2006.
- V. Sawant and J. Kaur, “Supporting Arbitrary Queries in Peer-to-Peer Networks using Hybrid Routing” in *Proceedings of the 20th ACM Symposium on Operating Systems Principles (SOSP)*, Brighton, UK, 2 pages, October 2005.
- A. Shriram and J. Kaur, “Identifying Bottleneck Links Using Distributed End-to-end Available Bandwidth Measurements”, in *the First ISMA Bandwidth Estimation Workshop (BEst)*, San Diego, CA, 2 pages, December 2003.

Invited (Non-refereed) Paper

- V. Konda and J. Kaur, “Rethinking the Timescales at Which Congestion-control Operates”, in *Proceedings of the 16th IEEE Workshop on Local and Metropolitan Area Networks (LANMAN)*, Transylvania, Romania, 6 pages, September 2008.

Ph.D. Dissertation

- J. Kaur, “Scalable Network Architectures for Providing Per-flow Service Guarantees”, *Ph.D. Dissertation*, Department of Computer Sciences, University of Texas at Austin, pages 1-153, August 2002.

Selected Technical Reports

- B. Hardekopf, T. Riche, J. Mudigonda, M. Dahlin, H. Vin, and J. Kaur, “Impact of Network Protocols on Programmable Router Architectures”, *Technical Report*, Department of Computer Sciences, UT Austin, 20 pages, April 2003.
- M. Venkatachalam, J. Kaur, and H. Vin, “End-to-end Analysis of Packet Inter-arrival Times of CBR Flows”, *Technical Report TR-01-32*, Department of Computer Sciences, UT Austin, 16 pages, October 2001.
- A. Kumar, J. Kaur and H. Vin, “End-to-end Proportional Loss Differentiation ”, *Technical Report TR-01-33*, Department of Computer Sciences, UT Austin, 21 pages, September 2001.
- J. Kaur and H. Vin, “Effect of Higher Priority EF Traffic on TCP Throughput and Fairness”, *Technical Report TR2001-1*, Department of Computer Sciences, UT Austin, 14 pages, July 2000.

Prototype Development

- *TCPdebug: A TCP-aware Passive Network Monitoring Tool-set*

TCPdebug is a set of OS-sensitive passive network monitoring tools for analyzing real-world TCP traces. It can currently analyze traces of connections originating from the Windows XP, Linux, Solaris, MacOS, and FreeBSD stacks. The tool-set was first released in 2007.

The tool-set is available for download at: <http://www.cs.unc.edu/~jasleen/research/tcp-analysis/>.

- *The CS GS Routing Platform*

Prototypes of core and edge routers of a Core-stateless Guaranteed Services (CSGS) network architecture have been implemented using Intel’s IXP1200-based router platform. The prototypes attain packet processing speeds within 10% of those attained in conventional IP routers.

- *QLinux: A Multimedia Operating System*

QLinux is a Linux kernel that can provide QoS guarantees to applications that run on it—it was the first publicly-available operating system that provided such guarantees and is being used by hundreds of researchers around the world. I was an integral part of the team that designed and implemented the original release of QLinux. The first version was released in 1999.

QLinux is available for download at: <http://lass.cs.umass.edu/software/qlinux/>.

Invited Presentations

Talks

- *RAPID: RTT-fair Congestion-control for Terabit Networks*, talk given at:
 - Department of Computer Science, North Carolina State University, January 2008. Host: *Prof. George Rouskas*.
 - Department of Computer Science, University of Massachusetts at Amherst, December 2008. Host: *Prof. Don Towsley*.
 - Department of Computer Science, Columbia University, December 2008. Host: *Prof. Vishal Misra*.
 - AT&T Labs Research, NJ, December 2008. Host: *Dr. K.K. Ramakrishnan*.
 - Computer Science and Engg Dept, Washington University in St. Louis, November 2008. Host: *Prof. Jon Turner*.
 - Hewlett-Packard Labs, Palo Alto, November 2008. Host: *Dr. Sujata Banerjee*.
 - Department of Computer Science, University of California at San Diego, November 2008. Host: *Prof. Amin Vahdat*.
 - College of Computing, Georgia Institute of Technology, October 2008. Host: *Prof. Mostafa Ammar*.
- *Rethinking the Timescales at Which Congestion-control Operates*, the 16th IEEE Workshop on Local and Metropolitan Area Networks, Transylvania, Romania, September 2008. Host: *Prof. Maria Papadopouli*.
- *Extracting Queuing Behavior from Passive End-to-end Measurements*, SAMSI Closing Workshop, Research Triangle Park, NC, June 2004. Host: *Prof. Steve Marron*.
- *Colloquium*, Hewlett Packard Laboratories, Palo Alto, CA, June 2003. Host: *Dr. Nina Bhatti*.
- *Duke Computer Science Colloquium*, Duke University, Durham, NC, October 2002. Host: *Prof. Jun Yang*.
- *Operations Research Colloquium*, University of North Carolina at Chapel Hill, Chapel Hill, NC, September 2002. Host: *Prof. Eylem Tekin*.

Posters

- S. Rewaskar, J. Kaur, and D. Smith, “A TCP-aware Network Performance Monitoring Tool”, *IBM University Day*, October 2004.
- S. Rewaskar, J. Aikat, J. Kaur, D. Smith, D. Pozefsky and K. Jeffay, “Variability in TCP Round-trip Times”, *in the SAMSI Workshop on Congestion Control and Heavy Traffic Modeling*, November 2003.
- A. Shriram and J. Kaur, “Estimating Bottleneck Links Using Distributed End-to-end Measurements”, *in the SAMSI Workshop on Internet Tomography*, October 2003.

Teaching Record

Teaching Experience

Spring 2009	COMP 431	<i>Internet Services and Protocols</i>
Fall 2008	COMP 631	<i>Computer Networks</i>
Spring 2008	COMP 431	<i>Internet Services and Protocols</i>
Fall 2007	COMP 631	<i>Computer Networks</i>
Spring 2007	COMP 431	<i>Internet Services and Protocols</i>
Fall 2006	COMP 790-088	<i>Research Topics in Networking</i>
Fall 2005	COMP 234	<i>Computer Networks</i>
Spring 2005	COMP 190-088	<i>Systems Performance Analysis</i>
Spring 2004	COMP 290-088	<i>Research Topics in Networking</i>
Fall 2003	COMP 234	<i>Computer Networks</i>
Spring 2003	COMP 290-088	<i>Research Topics in Networking</i>

Curriculum Development

- *Computer Networks*, a new introductory graduate course on the design of computer networks, designed in Fall 2003.
- *Systems Performance Analysis*, a new advanced undergraduate/graduate course on the performance evaluation of computer systems, designed in Spring 2005.
- *Research Topics in Networking*, a research-focused graduate seminar course on current open issues in networking, designed in Spring 2003.

Student Advising

Former Ph.D. Advisees

Ritesh Kumar, Ph.D. 2009 (expected, pending submission of thesis revision).

Thesis Title: Reducing Router Queues and Internet Latency Using Explicitly-guided Congestion-control Protocols.

Alok Shriram, Ph.D. 2009.

Thesis Title: Efficient Techniques for End-to-end Bandwidth Estimation: Performance Evaluations and Scalable Deployment.

Sushant Rewaskar, Ph.D. 2008.

Thesis Title: Empirical Evaluation of Techniques for Mitigating the Impact of Packet Losses on TCP Performance.

Current Ph.D. Advisees

Vishnu Konda, Fall 2007 - present.

Research Topic: Adaptive Congestion Control at Fine Timescales.

PRP Research Advising

Sami Benzaid, 2008.

Vishnu Konda, 2007-2008.

Undergraduate Research Advising

Eric Gavaletz, 2008-2009.

Doctoral Dissertation Committees

Jay Aikat.

Nomesh Bolia, Operations Research.

Andy Jones.

Sasa Junuzovic.

Hennadiy Leontyev.

Liqiang Liu, Operations Research (Ph.D. 2007).

Uma Devi (Ph.D. 2006).

Long Le (Ph.D. 2005).

Philip Holman (Ph.D. 2004).

Michele C. Weigle (Ph.D. 2003).

M.S. Thesis Committees

Li Cheng, Operations Research (M.S. 2004).

Feng Chen, Operations Research (M.S. 2003).

Integrative Paper Committees

Sushant Rewaskar, Spring 2005.

Alok Shriram, Spring 2004.

Uma Devi, Spring 2003.

Research Grants

Proposals in Submission

- *RAPID: Towards an RTT-fair Congestion-control Protocol for Terabit Networks*, submitted to the NSF CISE NeTS Program, October 2008.
PI: J. Kaur.
Senior Personnel: Yufeng Xin (RENCI).
Requested Amount: \$782,986 over 3 years (07/2009 – 06/2012).

As Principal Investigator

- *Achieving RTT Fairness in Window-based End-to-end Congestion-control Protocols*, NSF REU Supplemental Award (CNS-0347814).
PI: J. Kaur.
Amount: \$8,000 (Fall 2009).
- *Empirical Evaluation of Router Queue Occupancy at Short-timescales with Internet-derived Traffic Mixes*, NSF REU Supplemental Award.
PI: J. Kaur.
Amount: \$6,000 over 3 months (05/2008 – 08/2008).
- *Re-assessing the Foundations of Internet Transport Protocols*, NSF CAREER Award.
PI: J. Kaur.
Amount: \$500,000 over 5 years (09/2004 – 08/2009).
- *Modeling TCP Round-trip Times*, University Junior Faculty Development Award.
PI: J. Kaur.
Amount: \$5,000 over 1 year (2004).

As Senior Personnel

- *Tera-Pixels: Using High-resolution Pervasive Displays to Transform Collaboration and Teaching*, NSF CISE Research Infrastructure Award.
Role: Senior Personnel.
PIs: K. Jeffay, A. Lastra, K. Mayer-Patel, L. McMillan, and F.D. Smith.
Amount: \$1,200,000 over 5 years (09/2003 – 08/2008).

Professional Service

Conference Organizing Committees

- *Technical Program Co-chair*, the 17th IEEE Workshop on Local and Metropolitan Area Networks (LANMAN 2010), New Jersey, April 2010.
- *Co-organizer*, the DIMACS/DyDAn Workshop on Internet Tomography, Rutgers University, NJ, May 2008. Organized by J. Kaur, D. Towsley, and W. Willinger.
- *Student Travel Grant Committee*, ACM SIGCOMM 2005, Philadelphia, PA, August 2005.
- *Posters Committee*, ACM SIGCOMM 2004, Portland, OR, August 2004.
- *Publicity Chair*, the 24th IEEE Real-time Systems Symposium (RTSS 2003), Cancun, Mexico, December 2003.

Technical Program Committees

- *NSF Panel*, Spring 2009.
- *Program Committee*, the 18th International Conference on Computer Communications and Networks (ICCCN 2009), San Francisco, August 2009.
- *Program Committee*, the 1st IFIP Traffic Monitoring and Analysis Workshop (TMA), Aachen, Germany, May 2009.
- *Program Committee*, the 16th IEEE Workshop on Local and Metropolitan Area Networks (LANMAN 2008), Cluj-Napoca, Romania, September 2008.
- *Program Committee*, the 17th International Conference on Computer Communications and Networks (ICCCN 2008), St. Thomas, Virgin Islands, August 2008.
- *Program Committee*, the 15th International Conference on Computer Communications and Networks (ICCCN 2006), Arlington, Virginia, October 2006.
- *Program Committee*, the 26th IEEE International Conference on Distributed Computing Systems (ICDCS 2006), Lisboa, Portugal, July 2006.
- *Program Committee*, the 16th International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV 2006), Newport, Rhode Island, May 2006.
- *Program Committee*, the ACM Internet Measurement Conference (IMC 2005), New Orleans, LA, Oct 2005.
- *Program Committee*, the 25th IEEE International Conference on Distributed Computing Systems (ICDCS 2005), Columbus, Ohio, June 2005.
- *Program Committee*, the 13th IEEE International Workshop on Quality of Service (IWQoS 2005), Passau, Germany, June 2005.

- *Program Committee*, the 11th ACM/IEEE International Workshop on Quality of Service (IWQoS 2003), Monterey, CA, June 2003.

Journal and Conference Reviewer

- ACM Computer Communication Review.
- ACM Internet Measurement Conference.
- ACM Multimedia.
- ACM SOSP.
- ACM SIGCOMM.
- ACM/IEEE IWQoS.
- Communications of the ACM.
- Computer Communications Journal.
- IEEE/ACM COMSWARE.
- IEEE/ACM Transactions on Networking.
- IEEE ICCCN.
- IEEE ICDCS.
- IEEE INFOCOM.
- IEEE LANMAN.
- IEEE NOSSDAV.
- IEEE Transactions on Computers.
- IEEE Transactions on Dependable and Secure Computing.
- IEEE Transactions on Multimedia.
- Journal of Systems and Software.
- SPIE Multimedia Computing and Networking.

UNC Computer Science Committees

- Graduate Curriculum and Planning Committee, Aug 2005 – *present*. Chair: *Prof. Ming Lin*.
- Preliminary Research Presentation Exam Committees:
 - Xin Huang, Fall 2008.
 - Kyle Moore, Fall 2007.
- Faculty Search Sub-Committee (Security), Spring 2008. Chair: *Prof. Mike Reiter*.
- Curriculum and Planning Committee, Aug 2003 – May 2005. Chair: *Prof. Jack Snoeyink*.
- Ad-hoc Committee on Titles, Fall 2003. Chair: *Prof. Anselmo Lastra*.
- Curriculum and Planning Committee, Aug 2002 – May 2003. Chair: *Prof. Stephen Pizer*.