

# MARK E. CROVELLA

Computer Science Department  
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Date of Birth: October 28, 1959  
Location: Buffalo, New York, USA  
Nationality: USA

## EDUCATION

**Ph.D.** Computer Science, University of Rochester, October 1994.

**M.S.** University of Rochester, May 1991.

**M.S.** State University of New York at Buffalo, May 1990.

**B.S.** Cornell University, May 1982.

## PROFESSIONAL EXPERIENCE

**Professor** Department of Computer Science, Boston University, September 2006 to present; **Associate Professor** September 2000 – September 2006; **Assistant Professor** September 1994 – September 2000. On leave September 2000 to September 2001.

**Chief Scientist** Guavus, Inc., February 2012 to present.

**Visiting Associate Professor** Laboratoire d'Informatique de Paris 6 (LIP6). August 2003 to August 2004.

**Technical Director** Network Appliance, Tewksbury, MA. November 2000 to April 2002.

**Chief Architect** Webmanage Technologies, Chelmsford, MA. May 2000 to acquisition by Network Appliance in November 2000.

**Lead Research Scientist** epicRealm, Inc., Richardson, TX. January to May 2001.

**Senior Computer Scientist** Calspan Corporation, Buffalo, NY. August 1984 to August 1994.

## HONORS

**IEEE Fellow**, 2011.

**ACM Fellow**, 2010.

**ACM SIGMETRICS Test of Time Award** for “Self-Similarity in World Wide Web Traffic: Evidence and Possible Causes,” (with Azer Bestavros). One of the three inaugural Test of Time Awards given by SIGMETRICS in 2010. The award is given for a paper published between 1973 and 1999 that has had the greatest impact over the subsequent period.

**CNRS Fellowship**, Centre National de la Recherche Scientifique (Department Sciences et Technologies de l'Information et de la Communication), for 2003-2004 academic year as Visiting Associate Professor at Laboratoire d'Informatique de Paris 6 (LIP6).

**NSF CAREER Award**, 1995.

**ARPA Fellowship in High Performance Computing**, 1993-1994.

**DARPA Parallel Processing Fellowship**, 1992-1993.

**EDITORIAL BOARDS**

- Editor**, Computer Communication Review, 2005 – 2008.
- Editor**, Computer Networks, 2004 – 2005.
- Editor**, IEEE/ACM Transactions on Networking, 2000 – 2006.
- Editor**, IEEE Transactions on Computers, 2000 – 2004.

**FUNDING**

- “Understanding Communication Strategies for Ad Hoc Networks,” NSF CISE/CNS NeTS Small, 8/1/11 – 7/31/14, \$390,853.
- “Information and Software Assurance: A Coordinated Approach to Cyber-Situation Awareness Based on Traffic Anomaly Detection,” DoD ARO, 9/1/2011 - 8/31/2015, \$800,000 with 3 other PIs.
- “Securing the Open Softphone,” NSF CISE/CNS TC Large, 7/1/10 – 6/30/15, \$2,992,896, with 8 other PIs. REU Supplement, 4/13/11 – \$73,125.
- “New Directions in Network Dimensionality Reduction for Routing and Beyond,” NSF CISE/CNS NeTS Small, 7/1/10 – 6/30/13, \$450,000.
- “Wide-Aperture Traffic Analysis for Internet Security,” NSF CISE/CNS TC Medium, 9/1/09 – 8/31/13, \$723,053, with 2 other PIs.
- Sponsoring Advisor for Postdoctoral Fellow under the *Computing Innovations Fellowship Program*, NSF CIF, 9/1/09 – 8/31/11, \$267,500.
- “Passive Methods for Internet Topology Discovery,” National Geospatial Intelligence Agency, 8/1/09 – 7/31/12, \$360,000.
- “Instrumentation and Measurement for GENI,” NSF/BBN, 8/1/08 – 8/31/11, \$80,932
- “Whole-Network Anomaly Diagnosis,” Intel, 1/1/05 – 12/31/07, \$158,000.
- “Coordinate Systems for the Internet,” NSF CISE/ANI, 8/15/03 – 7/31/06, \$222,035.
- “Collaborative Research: Modular Strategies for Global internetnetwork Monitoring,” with 6 other PIs, NSF CISE/CCR ITR, 9/1/03 – 8/31/08, \$1,994,513.
- “Research Support for IP Network Characterization,” Sprint Advanced Technology Laboratories, 9/1/03 – 8/31/04, \$29,592.
- “Research Support for IP Network Characterization,” with 3 other PIs, Sprint Advanced Technology Laboratories, 9/1/02 – 8/31/03, \$80,000.
- “A Control Theoretic Approach to the Design of Internet Traffic Managers,” with 3 other PIs, NSF CISE/ANIR, 9/1/01 – 8/31/05, \$719,994.
- “Diagnosis and Control of Network Variability by Massively Accessed Servers,” with 2 other Principal Investigators, NSF CISE/ANI, 9/1/00 – 8/31/05, \$1,210,768.
- “Wide Area Web Measurement,” GTE Laboratories, 9/1/00 – 8/31/01, \$20,000.
- “Wide Area Web Measurement,” Xerox PARC, 9/1/99 – 8/31/00, \$15,000.
- “COMMONWEALTH: Architecture and Protocols for Scalable WWW Service,” with 2 other Principal Investigators, NSF CISE/CCR Experimental Software Systems, 7/15/97 – 6/30/00, \$590,087.
- “Research Support for Network Performance Characterization, Analysis, and Evaluation,” Principal Investigator, Hewlett-Packard Company, 9/1/96 – 9/1/97: \$69,404. Renewed for 9/1/97 – 9/1/98: \$88,154. Renewed for 9/1/98 – 9/1/99: \$29,873.
- “Practical Performance Prediction for Parallel Programmers,” Principal Investigator, NSF CISE/CCR CAREER, 9/1/95 – 5/31/98, \$91,066

“Research Infrastructure for Parallel and Distributed Systems: Real-Time, Multimedia, and High-Performance,” with 4 other Principal Investigators, NSF CISE Institutional Infrastructure, \$874,019

“Research Instrumentation for Real-Time, Multimedia and High-Performance Computing in Distributed Systems,” with 4 other Principal Investigators, NSF CISE IGR, \$142,744

“Graduate Assistantships in High Performance Computing,” with 5 other Principal Investigators, US Dept. of Education, 9/1/95 – 8/31/98, \$354,645

#### PROFESSIONAL AFFILIATIONS

Association for Computing Machinery (Fellow)  
 IEEE (Fellow)  
 ACM SIGCOMM and SIGMETRICS  
 IEEE Computer Society and Communication Society

#### INVITED CONFERENCE TALKS

Invited Speaker, *Network Links: Connecting Social, Communication and Biological Network Analysis*, Institute for Mathematics and its Applications (IMA), Minneapolis, MN, February 29, 2012.

Invited Speaker, *Statistics of Networks Workshop*, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, June 24-25, 2010.

Keynote Speaker, *NetEval 2009 Workshop, The First Workshop on Performance Evaluation of Next-Generation Networks*, Boston, MA, April 26, 2009.

Keynote Speaker, *2006 Euro-NGI Workshop on Visions of Future Generation Networks (EuroView2006)*, Würzburg, Germany, August 1, 2006.

Invited Speaker, *Maryland Hybrid Networks Center*, Advanced Networks Colloquium Series, University of Maryland, December 16, 2005.

Keynote Speaker, *Workshop on End-to-End Monitoring Techniques and Services (E2EMON)*, Nice, France, May 15, 2005.

Invited Speaker, *Workshop on Internet Measurement, Modeling, and Analysis*, Statistical Research Center for Complex Systems (SRCCS), Seoul National University, Seoul, South Korea, January 11, 2005.

Invited Speaker, *Workshop on Measurement, Modeling and Analysis of the Internet*, Institute for Mathematics and its Applications (IMA), Minneapolis, MN, January 12, 2004.

Keynote Speaker, *First Workshop on Performance of Computational Systems and Communication*, part of the XXII Congress of the Brazilian Computer Society, Florianopolis, Brazil, July 18, 2002.

Invited Speaker, Institute for Pure and Applied Mathematics (IPAM) Program on Large Scale Communication Networks, Los Angeles, CA, March 18-22, 2002.

Invited Speaker, *DIMACS Workshop on Internet and WWW Measurement, Mapping and Modeling*, New Brunswick, NJ, February 13-15, 2002.

Invited Speaker, *Workshop on Job Scheduling Strategies for Parallel Processing*, Cambridge, MA, June 16, 2001.

Invited Speaker, *COST 257 Final Conference*, Würzburg, Germany.

Invited Plenary Speaker, *Performance Tools 2000: The 11th International Conference on Modelling Techniques and Tools for Computer Performance Evaluation*, Schaumburg, Illinois, March 27 - 31, 2000.

Invited Speaker, *Institute for Mathematics and Its Applications Workshop: “Scaling Phenomena in Communication Networks,”* Minneapolis, MN, October 22-24, 1999.

- Invited Speaker, Boston University Minority Engineers' Society, 2nd Annual Technical Exposition, Boston, MA, April 10, 1999.
- Invited Speaker, Workshop on Intelligent Internet Infrastructure, IBM T.J. Watson Laboratory, Yorktown Heights, NY, March 22, 1999.
- Invited Speaker, Workshop on Architectures, Performance, and Applications in Globally Distributed Web Services, Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil, March 11 - 12, 1998.
- Invited Speaker, Long-Range Dependence and Self-Similar Network Traffic Session, Winter Simulation Conference, Atlanta, GA, Dec. 7-10, 1997
- Invited Speaker, DIMACS/NSF Workshop on "End-to-End Network Modeling and Simulations," Princeton University, Princeton, NJ, October 23-25, 1997.
- Invited Panelist, Hot Topic Session On Traffic Characterization, ITC-15, Washington DC, June 22-27, 1997
- Invited Speaker, IFIP Working Group 7.3 Workshop, June 19-20, Orcas Island, WA.
- Invited Panelist, "Engineering Implications of Long-Range Dependence in Teletraffic Data," MASCOTS '97, January 1997, Haifa, Israel
- Invited Speaker, Applied Probability Session of Informs, the Operations Research Society, May 1997, San Diego, CA.
- Invited Speaker, Joint Research Conference on Statistics in Quality, Industry and Technology, May 29-31 1996, NIST, Gaithersburg, MD. Sponsored by the *American Statistical Association*, the *Institute of Mathematical Statistics*, E. I. du Pont, and the *National Institute of Standards and Technology*.

#### PROFESSIONAL ACTIVITIES

- Member, SIGCOMM Rising Star Award Selection Committee, 2011.
- Chair, SIGCOMM Test of Time Award Selection Committee, 2011.
- Team Mentor for Conrad Awards, Cyber Security Challenge 2011.
- External Judge for FCC's Open Internet Apps Challenge, 2011.
- General Co-Chair, CoNEXT 2011.
- Internet2 perfSONAR Workshop, Executive Committee, 2010.
- Chair, ACM SIGCOMM 2007-2009.
- Program Co-Chair, IFIP Networking 2010.
- Internet2 Network Research Strategic Planning Team, 2009-present.
- Internet2 Network Research Review Committee, <http://www.internet2.edu/networkresearch/nrrc.html>, 2009-present.
- Advisory Board of CRAWDAD (Community Resource for Archiving Wireless Data At Dartmouth).
- Steering Committee, Passive and Active Measurement Workshop (PAM), 2004-2006.
- General Chair, Passive and Active Measurement Workshop (PAM) 2005.
- Steering Committee, Internet Measurement Conference, 2003-2007.
- ACM SIGCOMM Executive Committee, Award Committee Chair, 2003-2006.
- Program Committee Chair, Internet Measurement Conference 2003.
- Co-organizer (with C. Lindemann and M. Reiser), Workshop on Internet Performance Modeling, Dagstuhl Castle, Germany, September 26-29, 1999.
- Co-organizer (with five others), BU/NSF Workshop on Internet Measurement, Instrumentation, and Characterization; Boston University, August 30, 1999.

Tutorials Chair, SIGMETRICS '99, Atlanta GA.

Program Committees:

- SIGCOMM: 2002, 2006, 2008, 2012
- SIGMETRICS: 1999, 2000, 2002, 2007, 2009, 2010, 2011, 2012
- CoNEXT: 2005, 2007, 2010, 2011
- Performance: 2011
- Internet Measurement Conference: 2002, 2004, 2007, 2010, 2012
- First IMC Workshop on Internet Visualization: 2012
- Passive and Active Measurement Workshop (PAM): 2009, 2010
- Infocom: 2009 (TPC Area Chair), 2010 (TPC Area Chair)
- IFIP Networking: 2009
- NetEval: 2009
- HotMetrics: 2008
- E2EMON: 2007
- First Workshop on Experimental Computer Science: 2007
- Workshop on Mining Network Data (MineNet-06): 2006
- Workshop on Large Scale Network Inference: 2005
- WWW Conference: 2000, 2001, 2002
- 6th Global Internet Symposium: 2001
- 6th International Workshop on Web Caching and Content Distribution: 2001
- Workshop on Caching, Coherence and Consistency: 2001
- Workshop on Network-Related Data Management: 2001
- ITC Specialist Seminar on IP Traffic Management and Modeling: 2000
- SPIE Performance and Control of Network Systems Conference: 1998, 1999
- 18th International Conference on Distributed Computing Systems (ICDCS-98): 1998
- Third IEEE Workshop on Services in Distributed and Networked Environments (SDNE '96): 1996

#### TUTORIALS AND SHORT COURSES

“Traffic Modeling: Methods and Results for Single Links and Whole Networks,” presented at SIGCOMM 2004, Portland OR.

“Traffic Modeling,” short course presented at Aalborg University, February 2, 2004.

“Performance Characteristics of World Wide Web Information Systems,” presented at SIGMETRICS '97, Seattle WA, June 1997; SIGMETRICS '98, Madison WI, June 1998; and Performance Tools '98, Palma de Mallorca, Spain, September 1998.

#### CONSULTING

**Member of the Technical Advisory Board**, Guavus, Inc. 2006 to present.

**Consultant**, Fujitsu Laboratories of America, Sunnyvale, CA. 2002 to 2004.

**Consultant and Expert Witness**, in litigation cases involving software patents, software trade secrets, and intellectual property. Ongoing.

**Member of the Technical Advisory Board**, epicRealm, Inc., Richardson, TX. March 2000 to May 2001.

**Consultant and Member of the Technical Advisory Board**, WebManage Technologies, Inc., Chelmsford MA. July 1999 to November 2000.

**Founder and Principal Technical Officer**, Commonwealth Network Technologies, Inc., Boston MA. Incorporated April 27, 1998; acquired by WebManage Technologies, October 12, 1999.

**Consultant and Member of the Technical Advisory Board**, VitalSigns Software Inc., Santa Clara, CA; acquired by International Network Services, Inc.; now part of Lucent. November 1996 to October 1999.

#### PATENTS

*Method and Apparatus for Election of Group Leaders in a Distributed Network*, US Patent # 6,993,587, issued January 31, 2006.

*Methods to Detect and Classify Network Anomalies Using Traffic Feature Distributions*, Provisional Application No. 60/694,840, filed June 29, 2005.

*Method and Apparatus for Whole-Network Anomaly Diagnosis*, Provisional Application No. 60/694,853, filed June 29, 2005.

*Method and Apparatus for Scalable Distribution of Information in a Distributed Network*, US Patent # 6,748,447, issued June 8, 2004.

*Method and Apparatus for Reliable and Scalable Distribution of Data Files in Distributed Networks*, US Patent # 6,718,361, issued April 6, 2004.

*Distributed Routing*, US Patent # 6,370,584, issued April 9, 2002.

*Method and Apparatus for Assigning Tasks in a Distributed Server System*, US Patent # 6,223,205, issued April 24, 2001.

#### DOCTORAL STUDENTS

**Vijay Erramilli**, Ph.D. December 2008. "Forwarding in Mobile Opportunistic Networks."

**Nahur Fonseca**, Ph.D. December 2008. "Stochastic Modeling Applied to Detection Problems in Network Protocols and Traffic."

**Anukool Lakhina**, Ph.D. August 2006. "Network-Wide Traffic Analysis: Methods and Applications."

**Jun Liu**, Ph.D. August 2002. "Characterizing Network Elements and Paths Using Packet Loss Behavior."

**Paul Barford**, Ph.D. June 2000. "Modeling, Measurement and Performance of World Wide Web Transactions."

**Robert L. Carter**, Ph.D. January 1998. "Performance Measurement and Prediction in Packet-Switched Networks: Techniques and Applications."

#### OTHER DOCTORAL STUDENTS ADVISED

**Chrisil Arackaparambil**, Ph.D., July 2011, "Anomaly Detection in Network Streams Through a Distributional Lens." Dartmouth College, Member of the Examining Committee.

**Italo Cunha**, Ph.D., July 2011, "Tracking Internet Routes and Path Reachability for Network Tomography." Université Pierre et Marie Curie (U. Paris VI), Rapporteur.

**Hung Nguyen**, Ph.D., February 2008, "User-level Internet Tomography and Overlay Routing." Ecole Polytechnique Fédérale de Lausanne (EPFL), Rapporteur.

**Benoit Donnet**, Ph.D., September 2006, "Algorithms for Large-Scale Topology Discovery." Université Pierre et Marie Curie (U. Paris VI), Président du Jury.

**David Chua**, Ph.D. (Mathematics), May 2006, "Statistical Analysis for Whole Networks." Second Reader.

**Stilian Stoev**, Ph.D. (Mathematics) May 2005.

- Abhishek Kumar**, Ph.D., October 2005, “Network Data Streaming: Algorithms for Network Monitoring and Coordination.” Georgia Tech, Committee Member.
- Marjan Bozinovski**, Ph.D., May 2004, “Fault-Tolerant Platforms for IP-Based Session Control Systems.” Aalborg University, Committee Member.
- Artur Ziviani**, Ph.D. December 2003, “Qualité de Service et Localisation d’Hotes.” University of Paris VI, Examineur.
- Liang Guo**, Ph.D. April 2003, “Size-Aware Scheduling of TCP Flows.” Second Reader.
- Alberto Medina**, Ph.D. March 2003, “Practical Estimation of Internet Traffic Demands.” Third Reader.
- Vladas Pipiras**, Ph.D. (Mathematics) April 2002, “Symmetric Stable Self-Similar Processes.” Third Reader.
- Khaled A. Harfoush**, Ph.D. November 2001, “A Framework for End-to-End Characterization of Metric-Induced Network Topologies.” Committee Member.
- Santiago M. Pericas-Geertsen**, Ph.D. November 2001, “XML-Fluent Mobile Agents.” Committee Member.
- Alia K. Atlas**, Ph.D. August 1998, “Statistical Rate Monotonic Scheduling.” Second Reader.
- Ghulam Bhatti**, Ph.D. January 1998, “Parallel and Distributed Discrete Event Simulation: An Event-Reservation Approach.” Second Reader.
- Sulaiman Mirdad**, Ph.D. June 1997, “WebWave: Globally Load-Balanced, Fully-Distributed Caching”. Second Reader.
- Gi Tae Kim**, Ph.D. June 1997, “Framework for Adaptive Forward Erasure Recovery (AFER) for Fault-Tolerant Real-Time Communications”. Second Reader.
- Carlos Cunha**, Ph.D. June 1997, “Trace Analysis and its Application to Performance Enhancements of Distributed Information Systems”. Second Reader.
- Susan Nagy**, Ph.D. April 1997, “Admission Control and Scheduling Strategies for Real-Time Database Systems”. Second Reader.
- Vadim Teverovksy**, Ph.D. February 1997 (Mathematics), “Detection and Estimation of Long-Range Dependence.” Third Reader.
- Euthimios Panagos**, Ph.D. May 1995, “Client-Based Logging: A New Paradigm for Distributed Transaction Management”. Third Reader.

#### MASTERS STUDENTS

- Megan Hacker**, M.S. May 2012, “Methods for Pairing Mobile Devices Through Shared Sensing”
- Lauren Walters**, MSc. May 2004, “A Web Browsing Workload Model for Simulation,” University of Cape Town, South Africa, external examiner.
- Alan Charbonneau**, M.A. May 2003, “Simulation of an SJF Proxy”
- Iana Vitkova**, M.A. May 2003, “Simulation of an SJF Proxy”
- Robert Frangioso**, M.A. Sept 2002, “Connection Scheduling in Web Servers”
- Xiaohui Zhang**, M.S. May 1999, “Cachability of Web Objects”
- Scott Harrison**, M.S. May 1998, “DPR Monitor: A Web-based DPR Network Monitoring Tool”
- Stanley Gambarin**, M.S. May 1997, “Implementing a Single-Process Non-Multithreaded World Wide Web Server”
- Kostas Magoutis**, M.S. May 1996, “Economies of Scale In Partitioned Disk Caches with Self-Similar References”
- Fred Bierhaus**, M.S. May 1996, “Improving Interactive Traffic Through the EQL Driver”

**BOOKS**

M. Crovella and B. Krishnamurthy, "Internet Measurement: Infrastructure, Traffic, and Applications," John Wiley and Sons, 2006, 512 pp.

**BOOKS EDITED**

M. Crovella and L. M. Feeney and D. Rubenstein (editors), "Proceedings of the 9th International IFIP TC 6 Networking Conference," Springer-Verlag, 410pp, 2010.

**JOURNAL ARTICLES**

- B. Donnet, P. Raouf, T. Friedman, and M. Crovella, "Deployment of an Algorithm for Large-Scale Topology Discovery," *IEEE Journal on Selected Areas in Communications, Special Issue on Sampling the Internet*, Vol 24, Number 12, December 2006.
- D. Chua, E. Kolaczyk, and M. Crovella, "Network Kriging," *IEEE Journal on Selected Areas in Communications, Special Issue on Sampling the Internet*, 2006.
- B. Gueye, A. Ziviani, M. Crovella, and S. Fdida, "Constraint-Based Geolocation of Internet Hosts," *IEEE/ACM Transactions on Networking*, Vol 14, Number 6, December 2006.
- R. Fonseca, V. Almeida, and M. E. Crovella, "Locality in a Web of Streams," *Communications of the ACM*, 48(1), pp. 82–88, January 2005.
- M. Fayed, P. Krapivsky, J. Byers, M. Crovella, D. Finkel, and S. Redner, "On the Emergence of Highly Variable Distributions in the Autonomous System Topology," *Computer Communication Review*, 33(2), pp. 41–49, July 2003.
- A. Lakhina, J. W. Byers, M. E. Crovella, and I. Matta, "On the Geographic Location of Internet Resources," *IEEE Journal on Selected Areas in Communications, Special Issue on Internet and WWW Measurement, Mapping, and Modeling*, 2003.
- P. Barford and M. E. Crovella, "Critical Path Analysis of TCP Transactions," *IEEE/ACM Transactions on Networking*, 9 (3), pp. 238–248.
- M. E. Crovella, C. Lindemann, and M. Reiser, "Internet Performance Modeling: the state of the art at the turn of the century," *Performance Evaluation*, 42 (2–3), pp. 91–108, September 2000.
- R. L. Carter and M. E. Crovella, "On the Network Impact of Dynamic Server Selection," *Computer Networks*, 31 (23–24), pp. 2529–2558.
- M. Harchol-Balter, M. E. Crovella and C. D. Murta, "On Choosing a Task Assignment Policy for a Distributed Server System," *Journal of Parallel and Distributed Computing*, Special Issue on Software Support for Distributed Computing, September 1999.
- P. Barford and M. E. Crovella, "Measuring Web Performance in the Wide Area," *Performance Evaluation Review*, Special Issue on Network Traffic Measurement and Workload Characterization, August 1999.
- P. Barford, A. Bestavros, A. Bradley, and M. E. Crovella, "Changes in Web Client Access Patterns: Characteristics and Caching Implications," *World Wide Web*, Special Issue on World Wide Web Characterization and Performance Evaluation, 1999.
- M. E. Crovella and M. S. Taqqu, "Estimating the Heavy Tail Index from Scaling Properties," *Methodology and Computing In Applied Probability*, 1(1), 1999.
- M. E. Crovella and A. Bestavros, "Self-Similarity in World Wide Web Traffic: Evidence and Possible Causes," *IEEE/ACM Transactions on Networking*, 5(6):835–846, December 1997.

- R. L. Carter and M. E. Crovella, "Measuring Bottleneck Link Speed in Packet-Switched Networks," *Performance Evaluation*, 27&28:297–318, October 1996.
- L. A. Crowl, M. E. Crovella, T. J. LeBlanc, and M. L. Scott, "The Advantages of Multiple Parallelizations in Combinatorial Search," *Journal of Parallel and Distributed Computing*, special issue on Data-Parallel Algorithms and Programming, 21(1):110–123, April 1994.

#### BOOK CHAPTERS

- M. E. Crovella, M. S. Taqqu, and A. Bestavros, "Heavy-Tailed Probability Distributions in the World Wide Web," Chapter 1 of *A Practical Guide To Heavy Tails*, pages 3–25, Chapman & Hall, New York, 1998.
- M. E. Crovella and L. Lipsky, "Simulations with Heavy-Tailed Workloads," Chapter 3 of *Self-Similar Network Traffic and Performance Evaluation*, Wiley/Wiley-Interscience, 1999.
- K. Park, G. Kim and M. Crovella, "The Protocol Stack and its Modulation Effect on Self-Similar Traffic," Chapter 16 of *Self-Similar Network Traffic and Performance Evaluation*, Wiley/Wiley-Interscience, 1999.
- M. E. Crovella, "Performance Characteristics of the World Wide Web," in *White Book on Performance Evaluation*, Günter Haring, Christoph Lindemann, and Martin Reiser, editors, Springer-Verlag, 1999.

#### INVITED PAPERS

- M. E. Crovella, "Performance Evaluation with Heavy Tailed Distributions," in *Lecture Notes in Computer Science 1786*, Proceedings of the 11th International Conference on Modelling Tools and Techniques for Computer and Communication System Performance Evaluation (TOOLS '2000), pp. 1-9, March 2000. Revised version appeared in *Job Scheduling Strategies for Parallel Processing : 7th International Workshop*, pp. 1-10, June 16, 2001.

#### REFEREED CONFERENCE PAPERS

- T. Lappas, M. Crovella, and E. Terzi, "Selecting a Characteristic Set of Reviews," in *Proceedings of the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2012*, Beijing, China, August 2012.
- Q. Ding, N. Katenka, P. Barford, E. Kolaczyk, and M. Crovella, "Intrusion as (Anti)social Communication: Characterization and Detection," in *Proceedings of the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2012*, Beijing, China, August 2012.
- G. Gürsun, N. Ruchansky, E. Terzi, and M. Crovella, "Inferring Visibility: Who's (not) Talking to Whom?," in *Proceedings of SIGCOMM 2012*, Helsinki, Finland, August 2012.
- B. Eriksson and M. Crovella, "Estimating Intrinsic Dimension Via Clustering," in *IEEE Statistical Signal Processing Workshop (SSP)*, Ann Arbor, MI, August 2012.
- C. Thomas, J. Sommers, P. Barford, D. Kim, A. Das, R. Segebre, M. Crovella, "A Passive Measurement System for Network Testbeds," in *Tridentcom 2012*, Thessaloniki, Greece, June 2012.
- G. Comarella, M. Crovella, V. Almeida and F. Benevenuto, "Understanding Factors that Affect Response Rates in Twitter," in *ACM Hypertext 2012*, Milwaukee, WI, June 2012.
- A. Cvetkovski and M. Crovella, "Low-Stretch Greedy Embedding Heuristics," in *Fourth International Workshop on Network Science for Communication Networks (NetSciCom 2012)*, Orlando, FL, March 2012.
- V. Manfredi, M. Crovella, and J. Kurose, "Understanding Stateful vs Stateless Communication Strategies for Ad hoc Networks," in *Proceedings of Mobicom 2011*, Las Vegas, NV, September 2011.
- G. Gürsun and M. Crovella, "Describing and Forecasting Video Access Patterns," in *Proceedings of the Infocom 2011 Miniconference*, Shanghai, China, April 2011.

- V. Bharti, P. Kankar, L. Setia, G. Gürsun, and M. Crovella, "Inferring Invisible Traffic," in *Proceedings of CoNEXT 2010*, Philadelphia, PA, December 2010.
- J. Sommers, P. Barford and M. Crovella, "Router Primitives for Programmable Active Measurement," in *Workshop on Programmable Routers for Extensible Services of Tomorrow (PRESTO '09)*, Barcelona, Spain, August, 2009.
- A. Cvetkovski and M. Crovella, "Hyperbolic Embedding and Routing for Dynamic Graphs," in *Proceedings of Infocom 2009*, Rio de Janeiro, Brazil, April 2009.
- V. Erramilli and M. Crovella, "Forwarding in Opportunistic Networks with Resource Constraints," in *Proceedings of the Fourth ACM Workshop on Challenged Networks (CHANTS 08)*, San Francisco, CA, September, 2008.
- N. Fonseca, M. Crovella, and K. Salamatian, "Long Range Mutual Information," in *Proceedings of the First Workshop on Hot Topics in Measurement and Modeling of Computer Systems (Hotmetrics '08)*, Annapolis, MD, June, 2008.
- V. Erramilli, A. Chaintreau, M. Crovella, and C. Diot, "Delegation Forwarding," in *Proceedings of the 9th ACM International Symposium on Mobile Ad Hoc Networking and Computing (ACM MobiHoc)*, Hong Kong SAR, China, May 2008.
- P. Chhabra, C. Scott, E. D. Kolaczyk, and M. Crovella, "Distributed Spatial Anomaly Detection," in *Proceedings of Infocom 2008*, Phoenix, AZ, April 2008.
- V. Erramilli, A. Chaintreau, M. Crovella, and C. Diot, "Diversity of Forwarding Paths in Pocket Switched Networks," in *Proceedings of the ACM SIGCOMM Internet Measurement Conference*, San Diego, October, 2007.
- B. Eriksson, P. Barford, R. Nowak, and M. Crovella, "Learning Network Structure from Passive Measurements," in *Proceedings of the ACM SIGCOMM Internet Measurement Conference*, San Diego, October, 2007.
- V. Erramilli, M. Crovella, and N. Taft, "An Independent-Connection Model for Traffic Matrices," in *Proceedings of the ACM SIGCOMM Internet Measurement Conference*, Rio de Janeiro, October, 2006.
- X. Li, F. Bian, M. Crovella, C. Diot, R. Govindan, G. Iannaccone, and A. Lakhina, "Detection and Identification of Network Anomalies Using Sketch Subspaces," in *Proceedings of the ACM SIGCOMM Internet Measurement Conference*, Rio de Janeiro, October, 2006.
- A. Lakhina, M. Crovella, and C. Diot, "Detecting Distributed Attacks using Network-Wide Flow Traffic," in *Proceedings of FloCon 2005 Analysis Workshop*, New Orleans, LA, September, 2005.
- A. Lakhina, M. Crovella, and C. Diot, "Mining Anomalies Using Traffic Feature Distributions," in *Proceedings of ACM SIGCOMM*, Philadelphia, PA, August 2005.
- D. B. Chua, E. D. Kolaczyk, and M. Crovella, "A Statistical Framework for Efficient Monitoring of End-to-End Network Properties," (Poster) in *Proceedings of ACM SIGMETRICS*, Banff, Canada, June 2005.
- B. Donnet, P. Raoult, T. Friedman, and M. Crovella, "Efficient Algorithms for Large-Scale Topology Discovery," in *Proceedings of ACM SIGMETRICS*, Banff, Canada, June 2005.
- A. Soule, A. Lakhina, N. Taft, K. Papagiannaki, K. Salamatian, A. Nucci, M. Crovella, and C. Diot, "Traffic Matrices: Balancing Measurements, Inference and Modeling," in *Proceedings of ACM SIGMETRICS*, Banff, Canada, June 2005.
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