

## MARK E. CROVELLA

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

Current as of July 31, 2017

### 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 and Chair** Department of Computer Science, Boston University, July 2013 to present; **Professor** September 2006 to present; **Associate Professor** September 2000 – September 2006; **Assistant Professor** September 1994 – September 2000. On leave September 2000 to September 2001.
- Affiliated Faculty** Department of Electrical and Computer Engineering, Center for Information Systems and Engineering, and Division of Systems Engineering, Boston University.
- Chief Scientist** Guavus, Inc., February 2012 to August 2014.
- 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

- Innovator of the Year**, 2014, Boston University.
- IETF/IRTF Applied Networking Research Prize** for “Routing State Distance: A Path-based Metric for Network Analysis,” ACM Internet Measurement Conference (IMC), 2012.
- Best Student Paper Award** for “Intrusion as (Anti)social Communication: Characterization and Detection,” ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2012.
- IEEE Fellow**, 2011, “For contributions to the measurement and analysis of networks and distributed systems.”
- ACM Fellow**, 2010, “For contributions to the measurement and analysis of networks and distributed systems.”
- 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

**Steering Committee**, IEEE Transactions on Network Science and Engineering, 2016–present.

**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

“Analytic Tools for Evolving Path-based Networks,” NSF CISE/CNS NeTS Small, 8/15/16 – 7/31/19, \$499,951.

“Structural Matrix Completion for Data Mining Applications,” NSF CISE/III Small, 9/1/14 – 8/31/17, \$499,702 with 1 other PI.

“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 internetwork 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

- Keynote Speaker, *DATANET 16: Workshop on Data-Driven Networking*, Arizona State University, May 13, 2016.
- Invited Speaker, *Workshop on Mathematics of Data Analysis in Cybersecurity*, ICERM, Brown University, October 24, 2014.
- Invited Speaker, *51st Annual Allerton Conference on Communication, Control, and Computing*, University of Illinois at Urbana-Champaign, October 3, 2013.
- 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

- Scientific Advisory Board of the Max Plank Institute for Software Systems, 2016 – present.
- Member, IETF/IRTF Applied Networking Research Prize Selection Committee, 2014-present.
- Executive Steering Committee of the Hariri Institute for Computing and Computational Science & Engineering.
- Member of the External Review Visiting Committee for the Department of Computer Science at Amherst College, February 2013.
- Organized Workshop: "GPU Programming with CUDA" at Boston University, July 24, 2012.
- 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:
- KDD: 2017
  - SIGCOMM: 2002, 2006, 2008, 2012, 2017
  - SIGMETRICS: 1999, 2000, 2002, 2007, 2009, 2010, 2011, 2012, 2014, 2015, 2016
  - CoNEXT: 2005, 2007, 2010, 2011
  - Internet Measurement Conference: 2002, 2004, 2007, 2010, 2012, 2015, 2017
  - Intelligent Systems for Molecular Biology (ISMB): 2015, 2017
  - First IMC Workshop on Internet Visualization: 2012
  - Performance: 2011
  - 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**

- “Data Mining for Measurement Data,” presented at the 5th PhD School on Traffic Monitoring and Analysis, associated with the 7th International Workshop on Traffic Monitoring and Analysis, Barcelona, April 21-22, 2015. Available at <https://github.com/mcrovella/mining-low-dim-network-data>.
- “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 Whole-Network Anomaly Diagnosis and Method to Detect and Classify Network Anomalies Using Traffic Feature Distributions*, US Patent # 8,869,276, issued October 21, 2014.
- Compressed Set Representation for Sets as Measures in OLAP Cubes*, US Patent # 8,533,167, issued September 10, 2013.
- Method and Apparatus for Dynamic Resource Discovery and Information Distribution in a Data Network*, US Patent # 7,747,741, issued June 29, 2010.
- System for Creating and Distributing Prioritized List of Computer Nodes Selected as Participants in a Distribution Job*, US Patent # 7,346,682, issued March 18, 2008.
- Method and Apparatus for Election of Group Leaders in a Distributed Network*, US Patent # 6,993,587, issued January 31, 2006.
- 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. European Patent # EP1305924 issued March 31, 2010.
- 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

- Giovanni Comarela**, Ph.D. July 2017. “On the Dynamics of Interdomain Routing in the Internet.”
- Natali Ruchansky**, Ph.D. August 2016. “Matrix Completion with Structure.” Co-advised with Evimaria Terzi.
- Andrej Cvetkovski**, Ph.D. May 2013. “Graph Embeddings for Low-Stretch Greedy Routing.”
- Gonca Gürsun**, Ph.D. March 2013. “Inferring Hidden Features in the Internet.”
- 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

- Mengfei Cao**, Ph.D, August 2016, “New Graph Metrics Improve Network-based Protein Function Prediction” Tufts University, Member of the Committee.
- Bimal Viswanath**, Ph.D, April 2016, “Towards Trustworthy Social Computing Systems.” Universität des Saarlandes, Member of the Committee.
- Yonjun Liao**, Ph.D., January 2013, “Learning to Predict End-to-End Network Performance.” Université de Liège, Belgium, Member of the Jury.
- Diana Zeaiter Joumblatt**, Ph.D., December 2012, “Prediction of User Dissatisfaction with Internet Application Performance at End-Hosts.” Université Pierre et Marie Curie, Rapporteur.
- 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

- A. Cvetkovski and M. Crovella, "Low-stress Data Embedding in the Hyperbolic Plane Using Multidimensional Scaling," *Applied Mathematics and Information Sciences*, Vol 11, Number 1, January 2017.
- A. Cvetkovski and M. Crovella, "Multidimensional Scaling in the Poincare Disk," *Applied Mathematics and Information Sciences*, Vol 10, Number 1, January 2016.
- M. Cao, H. Zhang, J. Park, N. Daniels, M. Crovella, L. Cowen, and B. Hescott, "Going the Distance for Protein Function Prediction: A New Distance Metric for Protein Interaction Networks," *PLoS One*, Vol 8, Number 10, October 2013.
- A. Cvetkovski and M. Crovella, "On the Choice of a Spanning Tree for Greedy Embedding of Network Graphs," *Networking Science*, February 2013.
- B. Donnet, P. Raoult, 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. Crawl, 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

- B. Rastegarpanah, K. Gummadi, and M. Crovella, "Exploring Explanations for Matrix Factorization Recommender Systems" (Position Paper), FATREC Workshop on Responsible Recommendation, Como Italy, August 2017.
- L. Spinelli and M. Crovella, "Closed-Loop Opinion Formation", *Proceedings of the 9th International ACM Web Science Conference (WebSci)*, Troy, NY, June 2017.
- N. Ruchansky, E. Terzi, and M. Crovella, "Targeted Matrix Completion," *Proceedings of the SIAM International Conference on Data Mining (SDM)*, Houston, TX, April 2017.
- C. Mavroforakis, D. Erdős, M. Crovella, and E. Terzi, "Active Positive-Definite Matrix Completion," *Proceedings of the SIAM International Conference on Data Mining (SDM)*, Houston, TX, April 2017.
- G. Comarela, E. Terzi, and M. Crovella, "Detecting Unusually-Routed ASes: Methods and Applications," *Proceedings of the ACM Internet Measurement Conference (IMC)*, Santa Monica, CA, November 2016.
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"The Statistics of Human Activity and Implications for Security"

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"Analyzing the Evolution of Internet Routing through Path Analysis"

- Cisco FAST Seminar Series, July 17, 2015.
- Raytheon BBN Technologies, SDP Seminar, September 28, 2015.

"Reversing the Curse of Dimensionality for Security Analysis"

- NYU Poly Department of Computer Science, December 5, 2014.

"Anomaly Detection and Dimensionality Reduction"

- Workshop on Mathematics of Data Analysis in Cybersecurity, ICERM, Brown University, October 24, 2014.

"Targeted Matrix Completion"

- 51st Annual Allerton Conference on Communication, Control, and Computing, University of Illinois at Urbana-Champaign, October 3, 2013.

"Better Routing with Hyperbolic Geometry"

- Laboratory of Information, Networking and Communication Sciences (LINCS) Paris, December 19, 2012.

"A Fine Grained Distance Metric for Small Worlds"

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“Inferring Invisible Traffic”

- Williams College, Dept. of Computer Science, Williamstown, MA, November 22, 2013.
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- University of Miami, Dept. of Computer Science, Miami, FL, March 2, 2011.
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- Statistical Research Center for Complex Systems (SRCCS), Workshop on “Internet Measurement, Modeling, and Analysis,” Seoul National University, Seoul, South Korea, January 11, 2005.
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“Diagnosing Network-Wide Traffic Anomalies”

- Columbia University, Nov. 17, 2004.
- Workshop on Internet Signal Processing (WISP), CAIDA, Nov. 11, 2004.
- Ecole Normale Supérieure, Paris, Apr. 13, 2004.
- France Telecom R&D, Paris, Mar. 18, 2004.

“Structural Analysis of Network Traffic Flows”

- Project Metropolis Meeting, École Nationale Supérieure des Télécommunications de Bretagne (ENST), Rennes, Feb. 10, 2004.
- Institute for Mathematics and its Applications, Workshop on “Measurement, Modeling and Analysis of the Internet,” Minneapolis, MN, January 12, 2004.

“Virtual Landmarks for the Internet”

- Intel Research, Cambridge UK, October 1, 2003.
- Ecole Polytechnique Fédérale de Lausanne (EPFL), November 10, 2003.
- Laboratoire d’Informatique de Paris VI (LIP6), November 14, 2003.

“Sampling Biases in IP Topology Measurements”

- Séminaire Graphes, Réseaux et Modélisation, Laboratoire de Recherche en Informatique, Université d’Orsay, January 8, 2004.
- IBM T.J. Watson Labs, April 11, 2003.
- BU Statistics Colloquium, April 10, 2003.
- National Institute of Statistical Sciences, March 28, 2003.