

# Leana Golubchik

Computer Science Department  
Joint Appointment: EE-Systems Department  
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## PERSONAL INFORMATION

Research Interests: design and evaluation of large scale distributed systems, including hybrid clouds and (geographically distributed) data centers and their applications in data analytics, QoS-based design of peer-to-peer and multimedia systems, reliability of software architectures, as well as cyber-insurance and privacy.

## Education

- Ph.D. in Computer Science  
University of California, Los Angeles, June 1995
- Master of Science in Computer Science  
University of California, Los Angeles, December 1992
- Bachelor of Science (*summa cum laude*) in Computer Science and Engineering  
University of California, Los Angeles, June 1989

## Employment

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|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 4/11 to present | Professor of Computer Science<br>Joint Appointment: EE-Systems 1/03 to present<br>University of Southern California, Los Angeles, CA               |
| 9/10 to present | Director, Women in Science and Engineering (WiSE) Program<br>University of Southern California, Los Angeles, CA                                    |
| 7/07 to 6/11    | Associate Chair for PhD Programs, Department of Computer Science<br>University of Southern California, Los Angeles, CA                             |
| 1/02 to 4/11    | Associate Professor of Computer Science<br>Joint Appointment: EE-Systems; Affiliations: IMSC<br>University of Southern California, Los Angeles, CA |
| 8/01 to 12/01   | Associate Professor of Computer Science<br>Institute for Advanced Computer Studies (50% appointment)<br>University of Maryland, College Park, MD   |
| 8/97 to 8/01    | Assistant Professor of Computer Science<br>Institute for Advanced Computer Studies (50% appointment)<br>University of Maryland, College Park, MD   |
| 7/95 to 7/97    | Assistant Professor of Computer Science<br>Columbia University, New York, NY                                                                       |

7/94 to 9/94	Summer Research Intern
7/93 to 9/93	Lawrence Livermore National Laboratory, Livermore, CA
6/91 to 9/91	Summer Research Intern T.J. Watson Research Center, IBM, Yorktown Heights, NY
9/88 to 6/91	Member of the Tangram Research Group Computer Science Department, UCLA, Los Angeles, CA
6/89 to 11/90	Performance Analyst Teradata Corporation, El Segundo, CA
6/88 - 8/88	Summer Research Assistant Washington University, St. Louis, MO

## RESEARCH ACTIVITY

### A. Articles in Refereed Journals

- A1. R. Pal, S-H. Lin, L. Golubchik. "The Cloudlet Bazaar - Dynamic Markets for the Small Cloud." Under submission (2016).
- A2. R. Pal, L. Golubchik, K. Psounis. "A Tight Estimate of Correlated Insured-IT Risk." Under submission (2016).
- A3. R. Pal, L. Golubchik, K. Psounis, P. Hui. "Differentiated Security Pricing as an Enabler of Cyber-Insurance - A First Look at a Markets Approach." Under submission (2016).
- A4. S.-H. Lin, R. Pal, B.-C. Wang, L. Golubchik. "On Market-Driven Hybrid-P2P Video Streaming." To appear in *IEEE Transactions on Multimedia*.
- A5. W. Fang, Y. Yao, L. Huang, A.B. Sharma, L. Golubchik, M.J. Neely. *A Comment on "Power Cost Reduction in Distributed Data Centers: A Two Time Scale Approach for Delay Tolerant Workloads."* In *IEEE Transactions on Parallel and Distributed Systems*, Volume 26, Number 5, pp. 1495-1496, 2015.
- A6. B.-C. Wang, A. Chow, L. Golubchik. "A Comprehensive Study of the Use of Advertisements as Incentives in P2P Streaming Systems." In the *Peer-to-Peer Networking and Applications* journal, Springer, Volume 7, Number 4, pp. 555-571, 2014.
- A7. Y. Yao, L. Huang, A. Sharma, L. Golubchik, and M. Neely. "Power Cost Reduction in Distributed Data Centers: A two Time Scale Approach for Delay Tolerant Workloads." In the *IEEE Transactions on Parallel and Distributed Systems*, Volume 25, Number 1, pp. 200-211, 2014.
- A8. C.-C. Hsu, Y.-Y. Chen, C.-F. Chou, L. Golubchik. "On Design of Collaborative Mobile Sensor Networks for Deadline-sensitive Mobile Target Detection." In the *IEEE Sensors Journal*, Volume 13, Number 8, 2013.

- A9. A. Chow, L. Golubchik, S. Khuller, and Y. Yao. "Performance Tradeoffs in Structured Peer to Peer Streaming." *Journal of Parallel and Distributed Computing*, Volume 72, Number 3, pp. 323-337, March 2012.
- A10. L. Golubchik, D. Caron, A. Das, A. Dhariwal, R. Govindan, D. Kempe, C. Oberg, A. Sharma, B. Stauffer, G. Sukhatme, B. Zhang. "AMBROSia: An Overview and Recent Results." *Journal of Applications and Computational Technology (JACT)*, Volume 5, Number 4, December 2011.
- A11. Y. Yao, A. Sharma, L. Golubchik, and R. Govindan. "Online Anomaly Detection for Sensor Systems: a Simple and Efficient Approach." *Performance Evaluation*, Volume 67, Number 11, pp. 1059-1075, November 2010. Presented at the *Performance 2010 Conference*.
- A12. K. C.-J. Lin, C.-P. Wang, C.-F. Chou, L. Golubchik. "SocioNet: A Social-based Multimedia Access System for Unstructured P2P Networks." *IEEE Transactions on Parallel and Distributed Systems*, Volume 21, Number 7, pp. 1027-1041, July 2010.
- A13. A. Sharma, L. Golubchik, R. Govindan. "Sensor Faults: Detection Methods and Prevalence in Real-World Datasets." *ACM Transactions on Sensor Networks*, Volume 6, Number 3, pp. 1-39, June 2010.
- A14. C.-F. Chou, L. Golubchik, and W. C. Cheng. "A Performance Study of Online Batch-based Digital Signature Schemes." *Journal of Network and Computer Applications*, Volume 33, Number 2, pp. 98-114, March 2010.
- A15. Y. Yang, A. L.H. Chow, L. Golubchik. "Multi-Torrent: a Performance Study and Applications." *International Journal of Advanced Media and Communication, Special Issue on High-Quality Multimedia Streaming in P2P Environments*, Volume 4, Number 1, pp. 31-58, 2010.
- A16. L. Golubchik, S. Khanna, S. Khuller, R. Thurimella, A. Zhu. "Approximation Algorithms for Data Placement on Parallel Disks." *ACM Transactions on Algorithms (TALG)*, Volume 5, Number 4, pp. 223-232, October 2009.
- A17. C.-F. Chou, L. Golubchik, and J. C.S. Lui. "Multi-class Multi-server Threshold-based Systems: a Study of Non-instantaneous Server Activation." *IEEE Transaction on Parallel and Distributed Systems*, Volume 18, Number 1, January 2007, pp. 96-110.
- A18. L. Golubchik, S. Khuller, Y. Kim, S. Shargorodskaya, and Y.C. Wan. "Data Migration on Parallel Disks: Algorithms and Evaluation." *Algorithmica*, Volume 45, Number 1, June, 2006, pp. 137-158. (Special issue devoted to selected papers from ESA 2004.)
- A19. A. L.H. Chow, L. Golubchik, J. C.S. Lui, A. W.-J. Lee. "Multi-path Streaming: Optimization of Load Distribution." *Performance Evaluation*, Volume 62, Issues 1-4, October 2005, pp. 417-438. Presented at the *Performance 2005 Conference*.
- A20. W.C. Cheng, C.-F. Chou, L. Golubchik, S. Khuller, and J. Y.C. Wan. "A Coordinated Data Collection Approach: Design, Evaluation, and Comparison." Special issue on Design, Implementation, and Analysis of Communication Protocols of *IEEE Journal on Selected Areas in Communication (JSAC)*, (Eds. E. Brinkema, R. Hao, D. Lee, and R.E. Miller), Volume 22, Number 10, pages 2004-2018, December 2004.
- A21. B. Abdouni, W.C. Cheng, A. L.-H. Chow, L. Golubchik, and J. C.S. Lui. "Picture-Perfect Streaming Over the Internet: Is there Hope?" Special issue on Proxy Support for Streaming

- in the Internet of *IEEE Communications Magazine*, (Eds. N. L.S. da Fonseca and P. Shenoy), Volume 42, Number 8, pp. 72-79, August 2004.
- A22. L. Golubchik, J.C.S. Lui, E. de Souza e Silva, and H.R. Gail. "Performance Tradeoffs in Scheduling Techniques for Mixed Workloads." *Multimedia Tools and Applications*, Volume 21, Numbers 2, pp. 142-172, November 2003.
- A23. L. Golubchik, W.C. Cheng, C.-F. Chou, S. Khuller, H. Samet, Y.C. Wan. "Bistro: A Scalable and Secure Data Transfer Service for Digital Government Applications". A special issue of the *Communications of ACM (CACM)* on Digital Governement, January 2003.
- A24. L. Golubchik, J.C.S. Lui, T.F. Tung, A. L.H. Chow, W.-J. Lee, G. Franceschinis, C. Anglano. "Multi-path Continuous Media Streaming: What are the Benefits?" *Performance Evaluation*, Volume 49, Issues 1-4, September 2002, pp. 429-449. Presented at the *Performance 2002 Conference*.
- A25. C.-F. Chou, L. Golubchik, J.C.S. Lui, and I.-H. Chung. "Design of Scalable Continuous Media Servers." Special issue on QoS of *Multimedia Tools and Applications*, Volume 17, Numbers 2-3, pp. 181-212, 2002.
- A26. L. Golubchik and J.C.S. Lui. "Bounding of Performance Measures for Threshold-based Queueing Systems: Theory and Application to Dynamic Resource Management in Video-on-Demand Servers." *IEEE Transactions on Computers*, Volume 51, Number 4, pp. 353-372, April 2002.
- A27. M.Y.Y. Leung, J.C.S. Lui, and L. Golubchik. "Use of Analytical Performance Models for System Sizing and Resource Allocation in Interactive Video-on-Demand Systems Employing Data Sharing Techniques." *IEEE Transactions on Knowledge and Data Engineering*, Volume 14, Number 3, pp. 615-637, May/June 2002.
- A28. L. Golubchik, R.R. Muntz, C.F. Chou, and S. Berson. "Design of Fault Tolerant Large-Scale VOD Servers: with Emphasis on High-Performance and Low-Cost." *IEEE Transaction on Parallel and Distributed Systems*, Volume 12, Number 1, pp. 363-386, January 2001.
- A29. P.W.K. Lie, J.C.S. Lui, and L. Golubchik. "Threshold-Based Dynamic Replication in Large-Scale Video-on-Demand Systems." *Multimedia Tools and Applications*, Volume 11, Number 1, May 2000, pp. 35-62.
- A30. L. Golubchik, V.S. Subrahmanian, S. Marcus, and J. Biskup. "Sync Classes: A Framework for Optimal Scheduling of Requests in Multimedia Storage Servers." *IEEE Transactions on Knowledge and Data Engineering*, Volume 12, Number 1, 2000, pp. 60-77.
- A31. K.K.W. Law, J.C.S. Lui, and L. Golubchik. "Efficient Support for Interactive Services in Multi-resolution VOD Systems." *VLDB Journal*, Volume 8, Number 2, 1999, pp. 133-153.
- A32. E. de Souza e Silva, H.R. Gail, L. Golubchik, and J.C.S. Lui. "Analytical Models for Mixed Workload Multimedia Storage Servers." *Performance Evaluation*, Volume 36-37, October 1999, pp. 185-211. Presented at the *Performance'99 Conference*.
- A33. J.C.S. Lui and L. Golubchik. "Stochastic Complement Analysis of Multi-Server Threshold Queues with Hysteresis." *Performance Evaluation*, Volume 35, Numbers 1-2, March 1999, pp. 19-48.

- A34. S.W. Lau, J.C.S. Lui, and L. Golubchik. "Merging Video Streams in a Multimedia Storage Server: Complexity and Heuristics." *ACM Multimedia Systems*, Volume 6, Number 1, pp. 29-42, 1998.
- A35. L. Golubchik, J.C.S. Lui, and M. Papadopouli. "A Survey of Approaches to Fault Tolerant Design of VOD Servers: Techniques, Analysis, and Comparison." In a special issue of *Parallel Computing on Parallel Data Servers and Applications*, Volume 24, Number 1, January 1998, pp. 123-155.
- A36. L. Golubchik, J.C.S. Lui, and R.R. Muntz. "Adaptive Piggybacking: A Novel Technique for Data Sharing in Video-On-Demand Storage Servers." *ACM Multimedia Systems*, Volume 4, Number 3, 1996, pp. 140-155.

### B. Articles in Other Journals

- B1. W.C. Cheng, C.-F. Chou, L. Golubchik, and S. Khuller. "A Performance Study of Bistro, a Scalable Upload Architecture." In *ACM SIGMETRICS Performance Evaluation Review*, Volume 29, Number 4, March 2002, pp. 31-39. Invited paper.
- B2. M. Papadopouli and L. Golubchik. "Support of VBR Video Streams Under Disk Bandwidth Limitations." In *ACM SIGMETRICS Performance Evaluation Review*, Volume 25, Number 3, December 1997, pp. 13-20. Invited paper.
- B3. L. Golubchik. "On Issues and Tradeoffs in Design of Fault Tolerant VOD Servers." In *ACM SIGMETRICS Performance Evaluation Review*, Volume 25, Number 2, September 1997, pp. 21-28. Invited paper.
- B4. L. Golubchik, J.C.S. Lui, and R.R. Muntz. "I/O Stream Sharing for Continuous Media Systems." *IEEE Bulletin of the Technical Committee on Data Engineering*, Volume 18, Number 4, December 1995, pp. 17-26. Invited paper.
- B5. L. Golubchik and R.R. Muntz. "Fault Tolerance Issues in Data Declustering for Parallel Database Systems." *IEEE Bulletin of the Technical Committee on Data Engineering*, Volume 17, Number 3, September, 1994, pp. 14-28. Invited paper.

### C. Articles in Books

- C1. I. Krka, G. Edwards, L. Cheung, L. Golubchik, and N. Medvidovic. "A Comprehensive Exploration of Challenges in Architecture-Based Reliability Estimation." *Architecting Dependable Systems VI*, Eds. R. de Lemos, J.-C. Fabre, C. Gacek, F. Gadducci, and M. ter Beek. Springer Berlin / Heidelberg, Volume 5835/2009, 2009, pp. 202-227.
- C2. L. Golubchik. "Scalable Data Collection for Internet-based Digital Government Applications." *Advances in Digital Government: Systems, Human Factors, and Policy*, Eds. W. McIver and A. Elmagarmid. Kluwer, 2002, pp. 107-119 (Chapter 6). Invited chapter.
- C3. F. Özcan, V.S. Subrahmanian, and L. Golubchik. "Optimal Agent Selection." *KI 2001: Advances in Artificial Intelligence*, F. Baader, G. Brewka, T. Eiter (Eds.), Lecture Notes in Artificial Intelligence 2174, Springer Verlag, 2001. Also presented at the KI 2001 Conference as an Invited paper.

- C4. L. Golubchik and R.R. Muntz. "Parallel Database Systems and Multimedia Object Servers." In *Volume 5 Handbook on Parallel and Distributed Processing*, Eds. J. Blazewicz, K. Ecker, B. Plateau and D. Trystram, Springer Verlag, 2000, pp. 364-409 (Chapter 8). Invited chapter.
- C5. M. Papadopouli and L. Golubchik. "A Scalable Video-on-Demand Server for a Dynamic Heterogeneous Environment." In *Advances in Multimedia Information Systems*, S. Jajodia, M. T. Ozsu, A. Dogac (Eds.), Lecture Notes in Computer Science 1508, Springer Verlag, September 1998, pp. 4-17. Presented at the 4th International Workshop on Multimedia Information Systems.

#### D. Articles in Refereed Conferences

- D1. C-L. Chien, R. Pal, and L. Golubchik. "Oblivious Mechanisms in Differential Privacy - Experiments, Conjectures, and Open Questions." In Proceedings of the *IEEE IWPE (International Workshop on Privacy Engineering*, co-located with the IEEE Symposium on Security and Privacy, San Jose, May 2016.
- D2. C.-C. Hung, L. Golubchik, M. Yu. "Scheduling Jobs Across Geo-Distributed Datacenters." In Proceedings of the *ACM SoCC (International Symposium on Cloud Computing*, Big Island, August 2015.
- D3. S.-H. Lin, R. Pal, B.-C. Wang, . Golubchik. "Sustaining Ad-Driven P2P Streaming Ecosystems A Market-Based Approach." In Proceedings of the *IEEE/ACM IWQoS (International Symposium on Quality of Service*, Portland, June 2015.
- D4. R. Pal, L. Golubchik, K. Psounis, P. Hui. "Will Cyber-insurance Improve Network Security? A Market Analysis." In Proceedings of the *IEEE INFOCOM*, Toronto, Canada, April-May 2014.
- D5. M. Moshref, A. Sharma, H. Madhyastha, L. Golubchik, R. Govindan. "MRM: Delivering Predictability and Service Differentiation in Shared Computer Clusters." Proceedings of the *ACM Symposium on Cloud Computing (SoCC)*, Santa Clara, October 2013. Poster paper.
- D6. K. Song, Y. Yao, L. Golubchik. "Improving the Revenue, Efficiency and Reliability in Data Center Spot Market: A Truthful Mechanism." Proceedings of the *IEEE MASCOTS Conference*, San Francisco, August 2013.
- D7. B. Wang, Y.C. Tay, L. Golubchik. "Resource Estimation for Network Virtualization through Users and Network Interaction Analysis." Proceedings of the *IEEE MASCOTS Conference*, San Francisco, August 2013.
- D8. K. Song, Y. Yao, L. Golubchik. "Exploring the Profit-Reliability Trade-off in Amazon Spot Instance Market: A Better Pricing Mechanism." Proceedings of the *ACM/IEEE International Symposium on Quality of Service (IWQoS)*, Montreal, Canada, June 2013.
- D9. R. Pal, L. Golubchik, K. Psounis, P. Hui. "On A Way to Improve Cyber-Insurer Profits: When A Security Vendor Becomes the Cyber-Insurer." Proceedings of the *IFIP Networking Conference*, New York, May 2013.
- D10. L. Golubchik, S. Khuller, K. Mukherjee, Y. Yao. "To send or not to send: Reducing the cost of data transmission." Proceedings of the *IEEE INFOCOM*, Torino, Italy, April 2013.

- D11. L. Cheung, I. Krka, L. Golubchik, and N. Medvidovic. "Architecture-Level Reliability Prediction of Concurrent Systems." In Proceedings of the *International Conference of Performance Engineering (ICPE)*, Boston, MA, April 2012.
- D12. Y. Yao, L. Huang, A. Sharma, L. Golubchik, and M. Neely. "Data Centers Power Reduction: A two Time Scale Approach for Delay Tolerant Workloads." In Proceedings of the *IEEE INFOCOM*, Orlando, FL, March 2012.
- D13. B. Wang, A. Chow, and L. Golubchik. "P2P Streaming: a Study on the Use of Advertisements as Incentives." In Proceedings of the *ACM Multimedia Systems (MMSys)* Conference, Chapel Hill, North Carolina, February 2012.
- D14. R. Pal, L. Golubchik, K. Psounis. "Aegis: A Novel Cyber-Insurance Model." In Proceedings of the GameSec (Conference on Decision and Game Theory for Security), College Park, MD, November 2011.
- D15. L. Cheung, L. Golubchik, F. Sha. "A Study of Web Services Performance Prediction: A Client's Perspective." In Proceedings of the *International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (IEEE MASCOTS)*, Singapore, July 2011.
- D16. M. Neely and L. Golubchik. "Utility Optimization for Dynamic Peer-to-Peer Networks with Tit-for-Tat Constraints." In Proceedings of the *IEEE INFOCOM*, Shanghai, China, April 2011.
- D17. R. Pal and L. Golubchik. "Designing Optimal Cyber-Insurance Contracts" In the *12th Workshop on Mathematical (performance) Modeling and Analysis (MAMA)*, held in conjunction with *ACM SIGMETRICS 2010*, New York, NY, June 2010. Appears as part of the MAMA 2010 Workshop in the *ACM SIGMETRICS Performance Evaluation Review*. September 2010.
- D18. R. Pal and L. Golubchik. "Analyzing Self-Defense Investments in Internet Security Under Cyber-Insurance Coverage." Proceedings of the *International Conference on Distributed Computing Systems (ICDCS)*, Genoa, Italy, June 2010.
- D19. L. Cheung, L. Golubchik, and N. Medvidovic. "SHARP: A Scalable Approach to Architecture-Level Reliability Prediction of Concurrent Systems." Proceedings of the *1st International Workshop on Quantitative Stochastic Models in the Verification and Design of Software Systems (QUOVADIS)*, Cape Town, South Africa, May 2010.
- D20. I. Krka, L. Golubchik, and N. Medvidovic. "Probabilistic Automata for Architecture-Based Reliability Assessment." Proceedings of the *1st International Workshop on Quantitative Stochastic Models in the Verification and Design of Software Systems (QUOVADIS)*, Cape Town, South Africa, May 2010.
- D21. Y. Yang, A. L.-H. Chow, L. Golubchik, and D. Bragg. "Improving QoS in BitTorrent-like VoD Systems." Proceedings of the *IEEE INFOCOM*, San Diego, CA, March 2010.
- D22. A. Sharma, L. Golubchik, R. Govindan, and M. Neely. "Dynamic Data Compression in Multi-hop Wireless Networks." In Proceedings of the *ACM SIGMETRICS/Performance Conference*, Seattle, Washington, June, 2009.
- D23. A. L.-H. Chow, L. Golubchik, S. Khuller, and Y. Yao. "On the Tradeoff Between Playback Delay and Buffer Space in Streaming." Proceedings of the *IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, Rome, Italy, May, 2009.

- D24. A. L.-H. Chow, L. Golubchik, V. and Misra. "BitTorrent: An Extensible Heterogeneous Model." Proceedings of the *IEEE INFOCOM*, Rio De Janeiro, Brazil, April, 2009.
- D25. Y. Yang, A. L.-H. Chow, and L. Golubchik. "Multi-Torrent: A Performance Study." Proceedings of the *International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (IEEE MASCOTS)*, Baltimore, MD, September 2008.
- D26. A. Sharma, R. Bhagwan, M. Choudhury, L. Golubchik, R. Govindan, G. Voelker. "Automatic Request Categorization in Internet Services." In the *1st Workshop on Hot Topics in Measurement and Modeling of Computer Systems (HotMetrics)*, held in conjunction with *ACM SIGMETRICS 2008*, Annapolis, MD, June 2008. Appears as part of the HotMetrics 2008 Workshop, in the *ACM SIGMETRICS Performance Evaluation Review*. Volume 36, Number 2, pp. 16-23, September 2008.
- D27. I. Krka, L. Cheung, G. Edwards, L. Golubchik, and N. Medvidovic. "Architecture-Based Software Reliability Estimation: Problem Space, Challenges, and Strategies." In Proceedings of the *DSN Workshop on Architecting Dependable Systems (WADS)*, June 2008.
- D28. L. Cheung, R. Roshandel, N. Medvidovic, and L. Golubchik. "Early Prediction of Software Component Reliability." In Proceedings of *International Conference on Software Engineering (ICSE)*, May 2008.
- D29. A. L.H. Chow, L. Golubchik, and V. Misra. "Improving BitTorrent: a Simple Approach." In Proceedings of *7th International Workshop on Peer-to-Peer Systems (IPTPS)*, February 2008.
- D30. R. Roshandel, N. Medvidovic, and L. Golubchik. "A Bayesian Model for Predicting Reliability of Software Systems at the Architectural Level." In Proceedings of *3rd International Conference on Quality of Software Architectures (QoSA 2007)*, July 2007.
- D31. A. Sharma, L. Golubchik, and R. Govindan. "On the Prevalence of Sensor Faults in Real-World Deployments." In Proceedings of the *IEEE Communications Society Conferences on Sensor, Mesh and Ad-Hoc Communications and Networks (SECON)*, June 2007.
- D32. R. Raveendran, W.C. Cheng, and L. Golubchik. "Scalable and Secure Data Collection: Incentives Considerations." In Proceedings of the *7th International Conference on Digital Government Research*, May 2006. Poster paper.
- D33. R. Roshandel, S. Banaerjee, L. Cheung, N. Medvidovic, and L. Golubchik. "Estimating Software Component Reliability by Leveraging Architectural Models." In Proceedings of *ICSE 2006, Emerging Results Track*, May 2006.
- D34. S. Kashyap, S. Khuller, Y.C. Wan, and L. Golubchik. "Fast Reconfiguration of Data Placement in Parallel Disks." In Proceedings of *Algorithm Engineering and Experiments (ALENEX)*, Miami, Florida, January, 2006.
- D35. S. Banerjee, C. A. Mattman, N. Medvidovic, and L. Golubchik. "Leveraging Architectural Models to Inject Trust into Software Systems." In Proceedings of the *Software Engineering for Secure Systems Workshop (SESS'05)*, St Louis, Missouri, May, 2005.
- D36. Y. Yang, L. Cheung, and L. Golubchik. "Data Assignment in Fault Tolerant Uploads: A Genetic Algorithms Approach." In Proceedings of the *6th National Conference on Digital Government Research*, Atlanta, Georgia, May, 2005, pp. 29-38.

- D37. B. Abdouni, W.C. Cheng, A. L.H. Chow, L. Golubchik, W.-J. Lee, and J. C.S. Lui. "Multi-path Streaming: Optimization and Performance Evaluation." In Proceedings of Multimedia Computing and Networking (MMCN'05), San Jose, California, January 2005, (MMCN'05 is part of the 2005 IS&T/SPIE Symposium on Electronic Imaging), SPIE Volume 5680, pp. 216-227, S. Chandra, N. Venkatasubramanian, Eds.
- D38. L. Cheung, C-F. Chou, L. Golubchik, Y. Yang. "A Fault Tolerance Protocol for Uploads: Design and Evaluation." In Proceedings of the Second International Symposium of Parallel and Distributed Processing and Applications (ISPA 04), LNCS 3358, Hong Kong, China, December 2004, pp. 136-145.
- D39. W.C. Cheng, L. Golubchik, D. G. Kay. "Total Recall: Are Privacy Changes Inevitable?" In Proceedings of the First ACM Workshop on Continuous Archival and Retrieval of Personal Experiences (CARPE'04), held in conjunction with ACM Multimedia 2004, October 2004, New York, NY, pp. 86-92.
- D40. L. Golubchik, S. Khuller, Y. Kim, S. Shargorodskaya, and Y.C. Wan. "Data Migration on Parallel Disks." In Proceedings of the 12th Annual European Symposium on Algorithms (ESA), LNCS 3221, pp. 689-701, Bergen, Norway, September 2004. (Also selected for submission of extended version to a special issue of the *Algorithmica* journal.)
- D41. W.C. Cheng, L. Cheung, C.F. Chou, L. Golubchik, and Y. Yang. "Scalable and Secure Data Collection: Fault Tolerance Considerations." Proceedings of the *National Conference on Digital Government Research*, Seattle, WA, May 2004, pp. 391-392. Poster paper.
- D42. E. Elnahrawy, W.C. Cheng, and L. Golubchik. "Towards Global Collaboration Tools." In Proceedings of the fourth international conference of the New Zealand chapter of the ACM's Special Interest Group on Computer-Human Interaction, SIGCHI\_NZ, Dunedin, New Zealand, July, 2003.
- D43. E. Elnahrawy, W.C. Cheng, and L. Golubchik. "HTTP-ICE: An HTTP-Based Distributed Application Framework For Interactive Collaborative Environments." In Proceedings of the The 12th International World Wide Web Conference (WWW2003), Budapest, Hungary, May, 2003. Poster paper.
- D44. W.C. Cheng, C.-F. Chou, L. Golubchik, S. Khuller, and J. Y.C. Wan. "Large-scale Data Collection: a Coordinated Approach." In Proceedings of IEEE INFOCOM 2003, San Francisco, California, March-April 2003.
- D45. J. Eisenstein, S. Ghandeharizadeh, L. Golubchik, C. Shahabi, D. Yan and R. Zimmermann. "Device Independence and Extensibility in Gesture Recognition." Proceedings of the IEEE Virtual Reality Conference (VR), Los Angeles, CA, March 2003.
- D46. W.C. Cheng, C.F. Chou, and L. Golubchik. "Performance of Batch-based Digital Signatures." In Proceedings of the *International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (IEEE MASCOTS)*, Fort Worth, Texas, October 2002.
- D47. W.C. Cheng, C.F. Chou, L. Golubchik, S. Khuller, and Y.C. (Justin) Wan. "A Performance Study of a Large-scale Data Collection Problem." Proceedings of the *7th International Workshop on Web Caching and Content Distribution (WCW-7)*, Boulder, Colorado, August 2002, pp. 259-272.

- D48. L. Golubchik and J.C.S. Lui. "Multi-path Streaming: Is It Worth the Trouble?" In the *4th Workshop on Mathematical (performance) Modeling and Analysis (MAMA)*, held in conjunction with *ACM SIGMETRICS 2002*, Los Angeles, CA, June 2002. Appears as part of the MAMA 2002 Workshop in the *ACM SIGMETRICS Performance Evaluation Review*. Volume 30, Number 3, pp. 12-14, December 2002.
- D49. W.C. Cheng, C.F. Chou, L. Golubchik, S. Khuller, and Y.C. Wan. "Scalable and Secure Data Collection Using Bistro." Proceedings of the *National Conference on Digital Government Research*, Los Angeles, CA, May 2002, pp. 91-98.
- D50. W.C. Cheng, C.F. Chou, L. Golubchik, and S. Khuller. "A Secure and Scalable Wide-Area Upload Service." Proceedings of the *2nd International Conference on Internet Computing*, Las Vegas, NV, June 2001, Volume 2, pp. 733-739.
- D51. W.C. Cheng, C.F. Chou, L. Golubchik, S. Khuller, and H. Samet. "Scalable Data Collection for Internet-based Digital Government Applications." Proceedings of the *National Conference on Digital Government Research*, Los Angeles, CA, May 2001, pp. 108-113.
- D52. C.F. Chou, L. Golubchik, and J.C.S. Lui. "A Performance Study of Dynamic Replication Techniques in Continuous Media Servers." Proceedings of the *International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (IEEE MASCOTS)*, San Francisco, CA, August 2000.
- D53. L. Golubchik and J.C.S. Lui. "Open Problems for Threshold-based System." In the *2nd Workshop on Mathematical (performance) Modeling and Analysis (MAMA)*, held in conjunction with *ACM SIGMETRICS 2000*, Santa Clara, CA, June 2000. Appears as part of the MAMA 2000 Workshop in the *ACM SIGMETRICS Performance Evaluation Review*, Volume 28, Number 4, pp. 6-8, March 2001.
- D54. S. Bhattacharjee, W.C. Cheng, C.F. Chou, L. Golubchik, and S. Khuller. "Bistro: a Platform for Building Scalable Wide-Area Upload Applications." In the *Workshop on Performance and Architecture of Web Servers (PAWS)*, held in conjunction with *SIGMETRICS 2000*, Santa Clara, CA, June 2000. Appears as part of the PAWS 2000 Workshop in an issue of the *ACM SIGMETRICS Performance Evaluation Review*, Volume 28, Number 2, pp. 29-35, September 2000.
- D55. L. Golubchik and J.C.S. Lui. "A Fast and Accurate Iterative Solution of a Multi-class Threshold-based Queueing System with Hysteresis." In Proceedings of the *ACM SIGMETRICS Conference*, Santa Clara, CA, June 2000, pp. 196-206.
- D56. C.F. Chou, L. Golubchik, and J.C.S. Lui. "Striping Doesn't Scale: How to Achieve Scalability for Continuous Media Servers with Replication." In Proceedings of the *International Conference on Distributed Computing Systems (ICDCS)*, Taipei, Taiwan, April 2000, pp. 64-71.
- D57. L. Golubchik, S. Khanna, S. Khuller, R. Thurimella, and A. Zhu. "Approximation Algorithms for Data Placement on Parallel Disks." In Proceedings of the *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, San Francisco, CA, January 2000, pp. 223-232.
- D58. D.I. Kang, R. Gerber, L. Golubchik, and J.K. Hollingsworth. "Techniques for Automating Distributed Real-Time Applications Design." In Proceedings of the *High Performance Distributed Computing Conference*, August 1999, pp. 156-163.

- D59. L. Golubchik, J.C.S. Lui, E. de Souza e Silva, and H.R. Gail. "Evaluation of Performance Tradeoffs in Scheduling Techniques for Mixed Workload Multimedia Servers." In Proceedings of the *IEEE International Conference on Multimedia Computing and Systems*, June 1999, pp. 292-296. Poster paper.
- D60. C.F. Chou, L. Golubchik, and J.C.S. Lui. "A Performance Study of Dynamic Replication Techniques in Continuous Media Servers." In Proceedings of the *ACM SIGMETRICS Conference*, May 1999, pp. 202-203. Poster paper.
- D61. D.I. Kang, R. Gerber, L. Golubchik, J.K. Hollingsworth, and M. Saksena. "A Software Synthesis Tool for Distributed Embedded System Design." In the *ACM SIGPLAN Workshop on Languages, Compilers, and Tools for Embedded Systems (LCTES)*, May 1999. Appears in the *ACM SIGPLAN Notices*, Volume 34, Number 7, pp. 87-95.
- D62. L. Golubchik and R.K. Rajendran. "A Study on the Use of Tertiary Storage in Multimedia Systems." In Proceedings of the *Joint IEEE Symposium on Mass Storage and Goddard Conference on Mass Storage Systems and Technologies*, March 23-26, 1998, pp. 229-247.
- D63. P.W.K. Lie, J.C.S. Lui, and L. Golubchik. "Threshold-Based Dynamic Replication in Large-Scale Video-on-Demand Systems." In Proceedings of the *Eighth International Workshop on Research Issues in Data Engineering: Continuous-Media Databases and Applications (RIDE'98)* February 23-24, 1998, pp. 52-59. A full version of this paper was selected for a journal special issue [A30].
- D64. S. Marcus, V.S. Subrahmanian, and L. Golubchik. "Sync Classes: A Framework for Optimal Scheduling of Requests in Multimedia Storage Servers." In Proceedings of the *3rd International Workshop on Multimedia Information Systems*, September 1997, pp. 92-100. A full version of this paper was selected for a journal special issue [A31].
- D65. L. Golubchik and J.C.S. Lui. "Bounding of Performance Measures for a Threshold-based Queuing System with Hysteresis." In Proceedings of the *ACM SIGMETRICS Conference*, Seattle, Washington, June 1997, pp. 147-157.
- D66. M.Y.Y. Leung, J.C.S. Lui, and L. Golubchik. "Buffer and I/O Resource Pre-allocation for Implementing Batching and Buffering Techniques for Video-on-Demand Systems." In Proceedings of the *International Conference on Data Engineering (ICDE)*, Birmingham, UK, April 1997, pp. 344-353.
- D67. L. Golubchik and S. Marcus. "On Multilevel Multimedia Storage Systems." In Proceedings of the *2nd International Workshop on Multimedia Information Systems*, September 1996, pp. 12-16.
- D68. L. Golubchik and R.R. Muntz. "Fault Tolerance Issues in Multidisk Video-on-Demand Storage Servers." In Proceedings of the *SPIE (International Society for Optical Engineering) Conference on High-Density Data Recording and Retrieval Technology*, Volume 2604, October, 1995, pp. 70-87.
- D69. L. Golubchik, R.R. Muntz, and R.W. Watson. "Analysis of Striping Techniques in Robotic Storage Libraries." In Proceedings of the *14th IEEE Symposium on Mass Storage Systems*, Monterey, CA, September, 1995, pp. 225-238.

- D70. S. Berson, L. Golubchik, and R.R. Muntz. "Fault Tolerant Design of Multimedia Servers." In Proceedings of the *ACM SIGMOD Conference*, San Jose, CA, June 1995, pp. 364-375.
- D71. L. Golubchik, J.C.S. Lui, and R.R. Muntz. "Reducing I/O Demand in Video-On-Demand Storage Servers." In Proceedings of the *ACM SIGMETRICS/Performance Conference*, Ottawa, Canada, May 1995, pp. 25-36.
- D72. L. Golubchik, and A. Thomasian. "Token Allocation in Distributed Systems." In Proceedings of the *12th International Conference on Distributed Computing Systems (ICDCS)*, Yokohama, Japan, June 1992, pp. 64-71.
- D73. L. Golubchik, J.C.S. Lui, and R.R. Muntz. "Chained Declustering: Load Balancing and Robustness to Skew and Failures." In Proceedings of the *Second International Workshop on Research Issues in Data Engineering: Transaction and Query Processing (RIDE)*, Tempe, Arizona, February 1992, pp. 88-95.
- D74. L. Golubchik, G.D. Rozenblat, W.C. Cheng, and R.R. Muntz. "The Tangram Modeling Environment." In Proceedings of the *Fifth International Conference on Modeling Techniques and Tools for Computer Performance Evaluation*, Turin, Italy, February 1991, pp. 421-435.

#### E. Invited Conference Articles

- E1. K. Song and L. Golubchik. "Towards User-oriented Live Video Streaming." Proceedings of the *International Conference on Computer Communication Networks (ICCCN 2010)*, Zurich, Switzerland, August 2010. Invited paper.
- E2. L. Cheung, L. Golubchik, N. Medvidovic, and G. Sukhatme. "Identifying and Addressing Uncertainty in Architecture-Level Software Reliability Modeling." In the *NSF Next Generation Software Program Workshop*, held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS), March 2007. Invited paper.
- E3. D. Caron, A. Das, A. Dhariwal, L. Golubchik, R. Govindan, D. Kempe, C. Oberg, A. Sharma, B. Stauffer, G. Sukhatme, and B. Zhang. "AMBROSia: an Autonomous Model-Based Reactive Observing System." In the *Dynamic Data Driven Application Systems Workshop*, held in conjunction with the International Conference on Computational Science (ICCS), May 2007. Invited paper.
- E4. H. Samet and L. Golubchik. "Scalable Data Collection and Retrieval Infrastructure for Digital Government Applications." Proceedings of the *7th International Conference on Digital Government Research*, San Diego, CA, May 2006, pp. 301-302. Project highlights.
- E5. L. Golubchik, D. Caron, A. Das, A. Dhariwal, R. Govindan, D. Kempe, C. Oberg, A. Sharma, B. Stauffer, G. Sukhatme, and B. Zhang. "A Generic Multi-scale Modeling Framework for Reactive Observing Systems: an Overview." In the *Dynamic Data Driven Application Systems Workshop*, held in conjunction with the International Conference on Computational Science (ICCS), May 2006. Invited paper.
- E6. S. Banerjee, L. Cheung, L. Golubchik, N. Medvidovic, R. Roshandel, and G. Sukhatme. "Engineering Reliability into Hybrid Systems via Rich Design Models: Recent Results and Current Directions." In the *NSF Next Generation Software Program Workshop*, held in conjunction with the IEEE International Parallel and Distributed Processing Symposium (IPDPS), April 2006. Invited paper.

- E7. A. L.H. Chow, L. Golubchik, and J. C.S. Lui. "Toward Picture-perfect Streaming on the Internet." Proceedings of the *International Conference on Quantitative Evaluation of SysTems (QEST 2005)*, Torino, Italy, September 2005. Invited paper.
- E8. H. Samet, E. Tanin, and L. Golubchik. "Scalable Data Collection Infrastructure for Digital Government Applications." Proceedings of the *6th National Conference on Digital Government Research*, Atlanta, GA, May 2005, pp. 305-306. Project highlights.
- E9. H. Samet, E. Tanin, and L. Golubchik. "Scalable Data Collection Infrastructure for Digital Government Applications." Proceedings of the *5th National Conference on Digital Government Research*, Seattle, WA, May 2004, pp. 359-360. Project highlights.

## F. Other Articles and Unrefereed Reports

- F1. Y. Yao, A. Sharma, L. Golubchik, and R. Govindan. "Online Anomaly Detection for Sensor Systems: a Simple and Efficient Approach." Technical Report, USC, March 2010.
- F2. L. Golubchik. Discussion Summary for "Synchronized Network Emulation: Matching prototypes with complex simulations.", Appears as part of the HotMetrics 2008 Workshop, in the ACM SIGMETRICS Performance Evaluation Review, Volume 36, Number 2, September 2008.
- F3. C. W. Cheng and L. Golubchik. "XSAstrengthening: Strengthening MD5 and Other Iterated Hash Functions Through Variable-length External Message Expansion." Technical Report, USC, January 2008.
- F4. L. Golubchik. Position paper (accepted for participation). "Total Recall: a Personal Information Management System." CRA Grand Challenges Conference (by invitation only), June 2002.
- F5. E. de Souza e Silva, B.R. Arajo Neto, R.M.M. Leo, S.V.A. Campos, L. Golubchik, D. Towsley; A. de Quevedo Cardozo, F.P. Duarte, "Aplicacoes Multimidia em Tempo Real" ("Real Time Multimedia Applications"), (extended abstract), National Research Network-2 workshop (RNP2), pp. 23-26, May 2001.
- F6. L. Golubchik, D. Towsley, E. de Souza e Silva, and J. C.S. Lui, "Wide-area Applications", Internet2 Workshop, Chicago, IL, 2001.
- F7. L. Golubchik and P. O'Neil. Report on "Data Security and Quality of Service for Information Age", NSF IDM PI Workshop, 2001.
- F8. D.I. Kang, R. Gerber, and L. Golubchik. "Automated Techniques for Designing Embedded Signal Processors on Distributed Platforms." Technical Report No. CS-TR3944, October 1998.
- F9. R. Bunt, D. Eager, L. Golubchik, G. Kotsis, S. Majumdar, R.R. Muntz, E. Rosti, G. Serazzi, E. Smirni. Report of the Computer Resource Management Group, International Workshop on Performance Evaluation - Origins and Directions, Schloss Dagstuhl, Wadern, Germany G. Haring (Wien), Ch. Lindemann (GMD-FIRST Berlin), M. Reiser (Zurich), organizers, 1997.
- F10. S. Berson, A. Dashti, M. Escobar-Molano, S. Ghandeharizadeh, L. Golubchik, R.R. Muntz, C. Shahabi. "Design of a Scalable Multimedia Storage Manager." Technical Report No. CSD-940042, UCLA, December 1994.

## G. Inventions and Patents

- G1. “XSAstrengthening: Strengthening MD5 and Other Iterated Hash Functions Through Variable Length External Message Expansion.” *Invention Disclosure*, 2007. With W.C. Cheng.
- G2. “On a Graph-theoretic Approach to Scheduling Large-scale Data Transfers.” *Invention Disclosure*, 2002. With W.C. Cheng, C.F. Chou, S. Khuller, and Y.C. Wan.
- G3. “Scalable Wide-Area Upload System and Method.” *Invention Disclosure*, March 2000, *Patent Application*, March 2001. With W.C. Cheng, S. Khuller, S. Bhattacharjee, and C.F. Chou. Patent granted, US Patent No. 7,181,623.

## H. Invited Talks

- H1. “Computational Thinking.” *Notre Dame High School*, Los Angeles, CA, October 2013.
- H2. “Cryptography: the art of confusion and diffusion.” *Crossroads School Science Day*, Los Angeles, CA, April 2011.
- H3. “Flexible Clouds: achieving the “right” cost-benefit balance through proper resource management.” *NSF PI Meeting on “The Science of Cloud Computing”*, Arlington, Virginia, March 2011.
- H4. “Computational Thinking.” *The Mirman School Celebration of Women in Math and Science*, Los Angeles, CA, March 2011.
- H5. “BitTorrent: how to plan your seeds.”
  - *Department of Computer Science, University of Maryland*, College Park, MD, April 2009.
  - *IBM T.J. Watson Research Center*, Hawthorne, NY, January 2010.
- H6. “Are Computers Smarter Than a Room 4 Student: an algorithmic approach to life, universe, and everything.” *The Mirman School Celebration of Women in Math and Science*, Los Angeles, CA, March 2009.
- H7. “Engineering Reliability into Hybrid Systems via Rich Design Models: Recent Results and Current Directions.” *NSF Next Generation Software Program Workshop* (in conjunction with IPDPS 2006), Rhodes, Greece, April 2006.
- H8. “A Generic Multi-scale Modeling Framework for Reactive Observing Systems.” *NSF Dynamic Data-Driven Applications Systems (DDDAS) Workshop*, Arlington, VA, January 2006.
- H9. “Picture-perfect Streaming Over the Internet: Is There Hope?.” *Keynote talk at the International Conference on Quantitative Evaluation of SysTems (QEST) Conference*, Torino, Italy, September 2005.
- H10. “Total Recall: a Personal Information Management System.” *Okawa Foundation Award Ceremony Acceptance Speech* (on behalf of all 2002 recipients), San Francisco, CA, October 2002.
- H11. “Application Level Adaptation and Control for Retrieval and Delivery of Continuous Media over the Internet.” *NSF PI meeting*, Irvine, CA, November 2000.

- H12. "Threshold-based Queueing Systems with Hysteresis." *CSHCN Advanced Network Colloquium, University of Maryland, College Park, MD, October 2000.*
- H13. "Bistro: a Platform for Building Scalable Wide-Area Upload Applications."
- *University of Michigan, Ann Arbor, MI, February 2001.*
  - *Georgia Institute of Technology, Atlanta, GA, March 2001.*
  - *Information Sciences Institute, University of Southern California, Los Angeles, CA, May 2000.*
  - *Computer Science Colloquium Series, University of California at Irvine, Irvine, CA, June 2000.*
  - *California Institute of Technology, Los Angeles, CA, June 2000.*
  - *Hewlett-Packard Laboratories, Palo Alto, CA, June 2000.*
  - *University of California at Los Angeles, Los Angeles, CA, June 2000.*
  - *University of California at Riverside, Riverside, CA, June 2000.*
  - *Lawrence Berkeley Laboratory, Berkeley, CA, August 2000.*
  - *University of Texas at Austin, Austin, TX, October 2000.*
- H14. "Striping Doesn't Scale: How to Achieve Scalability for Continuous Media Servers with Replication." Presented at the *DIMACS Workshop on Multimedia Streaming on the Internet, June 2000.*
- H15. "Sync Classes: A Framework for Optimal Scheduling of Requests in Multimedia Storage Servers." Presented at the *INFORMS'98 Conference (Institute for Operations Research and the Management Sciences)*, as part of the Performance Models of Computer/Communication Systems track, June 1998. Short abstract (with S. Marcus and V.S. Subrahmanian) appeared in the proceedings, p. 27.
- H16. "Mixed Workload Scheduling in Multimedia Storage Servers."
- *Computer Science Colloquium Series, Dartmouth College, Hanover, New Hampshire, April 1998.*
  - *Computer Science Colloquium Series, College of William and Mary, Williamsburg, Virginia, May 1999.*
- H17. "A Threshold-Based Approach to Dynamic Resource Management in Large Systems." *System Performance Evaluation - Origins and Directions, International Workshop, Schloss Dagstuhl, Wadern, Germany, September 1997.*
- H18. "On Efficient Use of Resources in On-Demand Multimedia Storage Servers."
- *Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil, May 1996.*
  - *MITL, Panasonic Technologies, Inc., Princeton, New Jersey, July 1996.*
- H19. "Fault Tolerant Design of Multimedia Storage Servers." *IBM Almaden Research Center, Almaden, CA, September 1994.*

- H20. "Improving Performance of Robotic Storage Libraries." *Lawrence Livermore National Laboratory*, Livermore, CA, February 1994.
- H21. "Disk Arrays." *Dipartimento di Informatica, Università di Torino*, Torino, Italy, September 1993.
- H22. "Tangram Modeling Environment." *Digital Equipment Co.*, Malboro, MA, June 1991.

## I. Technical Presentations and Expert Panels

- I1. "Networking Networking Women Workshop." *How To Succeed in Grad School without Really Trying panel*, Orlando, Florida, March 2012.
- I2. "Communication of High Quality Content over Peer-To-Peer Systems: Opportunities and Challenges." *2012 USC Annenberg Graduate Fellows Micro-Seminar Series*, Los Angeles, CA, September 2012.
- I3. "Flexible Distributed Systems." *USC, Taiwan Delegation visit*, Los Angeles, CA, February 2012.
- I4. "Flexible Distributed Systems." *USC, eBay/Milibo visit*, Los Angeles, CA, September 2011.
- I5. "Large-scale Streaming and Content Distribution Systems." *USC, Thomson Visit*, Los Angeles, CA, January 2010.
- I6. "Modeling and Analysis with Reliable QoS-based Designs." *USC, IBM Almaden Visit*, Los Angeles, CA, October 2009.
- I7. "Picture Perfect Streaming Over the Internet: Is There Hope?" *USC, Activision Visit*, Los Angeles, CA, May 2006.
- I8. "Total Recall: an Amassment of Human Memory, Experience, and Knowledge." *DARPA, USC visit*, Los Angeles, CA, March 2004.
- I9. "Bistro: a Platform for Building Scalable Wide-Area Upload Applications."
  - *USC Seminar in Computer Science Research*, Los Angeles, CA, March 2004.
  - *Northrop Grumman Corporation, USC visit*, Los Angeles, CA, April 2004.
- I10. "Master's Program in Cybersecurity."
  - *Wall Street Journal, USC visit*, Los Angeles, CA, March 2003.
  - *Northrop Grumman Corporation, USC visit*, Los Angeles, CA, June 2003.
- I11. "Multi-path Streaming: Is It Worth the Trouble?." *Information Sciences Institute 30th Anniversary, USC*, Los Angeles, CA, September 2002.
- I12. "Scalable Data Collection for Internet-based Applications." *Motorola Visit Presentations, Department of Computer Science, University of Maryland*, College Park, MD, June 2001.
- I13. "Data Security and Quality of Service for Information Age." *NSF IDM PI meeting*, Dallas/Fort Worth, TX, April 2001.
- I14. "Wide Area Applications." *Internet2 Network Research Workshop*, Chicago, IL, April 2001.

- I15. “Computer Systems Modeling and Performance Evaluation.” *Department of Computer Science Colloquium Series, University of Maryland*, College Park, MD, September 2000.
- I16. Member of Experts Panel on “Multimedia Streaming and Network Interaction.” *DIMACS Workshop on Multimedia Streaming on the Internet*, June 2000.
- I17. “Performance Evaluation Methodologies with Application to Continuous Media Servers.” *UMIACS Research Review, University of Maryland*, College Park, MD, February 1999.
- I18. Member of Experts Panel on “Exotic Applications.” *Supercomputing Conferences (SC)*, November 1998.
- I19. Member of Experts Panel on “Visual Information Retrieval.” *International Workshop on Multimedia Information Systems*, September 1998.
- I20. Member of Experts Panel on “Continuous Media Management – Where We Stand Today and Where We will be Over the Next Decade.” *International Workshop on Research Issues in Data Engineering: Continuous-Media Databases and Applications (RIDE)*, February 1998.
- I21. “Multimedia Systems Lab, Overview.” *IBM Site Visit Presentations, UMIACS, University of Maryland*, College Park, MD, December 1997.
- I22. “Resource Management in Large Multimedia Systems.” *Mitsubishi Research Association, visiting Columbia University*, New York, NY, November 1995 & November 1996.

## J. Tutorials and Seminars

- J1. “The Tenure Challenge.” *CRA-W Career Mentoring Workshop*, Pasadena, CA, July 2009. With S. Irani (UC Irvine).
- J2. “Multimedia Information Systems.” *Federal University of Rio de Janeiro*, December 1999. Half day seminar.
- J3. “Multimedia Storage Systems.” *Università di Torino Seminar Series*, July 1999. 3 day seminar.
- J4. “Continuous Media Servers.” *Università del Piemonte Seminar Series*, June 1999. 1 day seminar.
- J5. “Continuous Media Storage Servers.”
  - *1998 ACM SIGMETRICS/PERFORMANCE Conference*, Madison, WI, June 1998. With J.C.S. Lui (CUHK) and R.R. Muntz (UCLA).
  - *1999 ACM SIGMETRICS Conference*, Atlanta, GA, May 1999. With J.C.S. Lui (CUHK).
- J6. “Multimedia Storage Servers.” *1997 ACM SIGMETRICS Conference*, Seattle, WA, June 1997. With H. Vin and P. Shenoy (University of Texas, Austin).
- J7. “System Architectures for Large-Scale Multimedia Information Servers.” *Brazilian Symposium on Networks and Distributed Systems (SBRC)*, Fortaleza, Brazil, May 1996.

## K. Visiting Scholar

- K1. *Department of Computer Science & Engineering, The Chinese University of Hong Kong*, Hong Kong, January 1997, January 1998, and January 2002.
- K2. *Dipartimento di Scienze e Tecnologie Avanzate, Università del Piemonte*, Alessandria, Italy and *Dipartimento di Informatica, Università di Torino*, Torino, Italy, June-July 1999 and July 2001.
- K3. *Department of Computer Science, Federal University of Rio de Janeiro*, Brazil, December 1999.

## Contracts and Grants

- L1. Principal Investigator. (with J. McNitt-Gray and F. Sha) “Towards Data-Driven Human Performance, with Applications to Personalized Intervention.” *Zumberge Interdisciplinary Large Grant*, 2014-2016, \$95,000.
- L2. Co-principal Investigator (with S. Tejada (PI)). “CSavvy: USC workshop on the CS Educational Pipeline for Women & Girls in LA.” *VSoE RIF grant*, 2012, \$15,000.
- L3. Principal Investigator. “Total Recal: an Amassment of Human Memory, Experience, and Knowledge.” *Zumberge Interdisciplinary Small Grant*, 2011-2013, \$10,000.
- L4. Co-principal Investigator. (with N. Medvidovic (PI) and G. Sukhatme (co-PI)). “Early Reliability Modeling and Prediction of Embedded Software Systems.” *National Science Foundation*, 2010-2012, \$210,000.
- L5. Principal Investigator (with F. Sha). “Synergizing statistical machine learning and stochastic system modeling with application to real systems.” *National Science Foundation*, 2009-2011, \$157,000.
- L6. Principal Investigator. “Quantifying Trustworthiness of Distributed Systems: with Application to Web Services.” *IBM Faculty Award*, 2008, \$20,000.
- L7. Co-principal Investigator. (with G. Sukhatme (PI)). “REU Site: Coordination, Communication, Autonomy: Principles and Technologies.” *National Science Foundation, REU Site Program*, 2008-2012, \$310,000.
- L8. Co-principal Investigator. (with N. Medvidovic (PI), G. Sukhatme (senior personnel)). “Engineering Reliability into Hybrid Systems: A Compositional and Hierarchical Approach.” *National Science Foundation, CSR Program*, 2007-2009, \$40,000.
- L9. Senior Personnel (D. Estrin, PI (UCLA), G. Sukhatme (PI at USC), a number of other co-PIs and senior personnel) “Center for Embedded Networked Sensing (Renewal).” *National Science Foundation (subcontract from UCLA)*, 2007-2012, internal grant for 1 RA from this project, with R. Govindan, on “Anomaly Detection.” 2007-2009.
- L10. Principal Investigator (with R. Govindan, G. Sukhatme, D. Kempe, D. Caron). “A Generic Multi-scale Modeling Framework for Reactive Observing Systems.” *National Science Foundation, DDDAS Program*, 2006-2011, \$950,000.
- L11. Co-principal Investigator. (with N. Medvidovic (PI), G. Sukhatme (senior personnel)). “Engineering Reliability into Hybrid Systems via Rich Design Models.” *National Science Foundation, CSR Program*, 2005-2007, \$100,000.

- L12. Principal Investigator. “An Innovative Information Assurance & Security Technology Capacity Development Program and Outreach.” *National Science Foundation, Collaborative Research Project with CSULB*, 2004-2008,  $\approx$  \$600,000 of which \$300,000 is for USC under L. Golubchik. (With (G. Medioni, B.C. Neuman, N. Medvidovic, C. Papadopoulos (co-PIs, USC) and T. Mangir (main co-PI at CSULB, as well as other co-PIs at CSULB)).
- L13. Senior Investigator (IMSC) (with A. Sawchuk (PI), C. Kyriakakis, C. Shahabi, R. Zimmermann, C. Papadopoulos, E. Chew (other Senior Investigators)). “Acquisition of Equipment for Distributed Immersive Performance.” *National Science Foundation*, 2003-2005, \$400,000.
- L14. Principal Investigator. “Total Recall: a Personal Information Management System.” *The Okawa Foundation Research Grant Program*, 2002, \$10,000.
- L15. Principal Investigator. *WiSE (Women in Science and Engineering) Research Supplement* (USC internal grant for new faculty), 2002-2004, \$30,000.
- L16. Co-principal Investigator (with S. Khuller (PI)). “Algorithms for Data Storage and Movement.” *National Science Foundation, ITR program*, 2001-2005, \$360,000.
- L17. Co-principal Investigator (with H. Samet (PI) and S. Khuller (Co-PI)). “Scalable Data Collection Infrastructure for Digital Government Applications.” *National Science Foundation, Digital Government program*, 2001-2006, \$616,972.
- L18. Co-principal Investigator. “Application Level Adaptation and Control for Retrieval and Delivery of Continuous Media over the Internet.” *National Science Foundation, Collaborative Research Program with CNPq/Brazil*, 2000-2004, \$360,000 of which \$241,569 is UMD’s under L. Golubchik. (With R.R. Muntz (PI, UCLA) and D. Towsley, J. Kurose (Co-PIs, University of Massachusetts)).
- L19. Co-principal Investigator (with W. A. Arbaugh (PI) and V. Gligor, P. Keleher (Co-PI)). “Secure Distributed Heterogeneous Systems Management via Confederations and Oracles.” *U.S. Department of Defense, Laboratory for Telecommunications Science*, 2000-2001, \$250,038.
- L20. Senior Personnel (with P. Keleher (PI) and 9 other Co-PIs and senior personnel). “System Support for Enterprise Application Servers.” *National Science Foundation CISE Research Infrastructure Grant*, 2000-2003, \$861,244 (University of Maryland at College Park).
- L21. Co-Principal Investigator (with J.C.S. Lui (PI) and A. U. Shankar, G. Franceschinis (Co-PIs)). “Providing Differentiated Services for the Internet: Design, Analysis and Implementation.” *Hong Kong Mainline Research Grant*, 2000-2001 (Chinese University of Hong Kong).
- L22. Principal Investigator. “Performance Aspects of Multimedia Presentation Servers.” *University of Maryland, International Travel Award for joint research with Università del Piemonte and Università di Torino*, Summer 1999.
- L23. Co-principal Investigator (with J.C.S. Lui (PI) and H.R. Gail (Co-PI)). “Design, Analysis and Implementation of Mixed Workload Schedulers with Application to the Multimedia Digital Library System.” *Research Grant Council in Hong Kong*, 1999-2000 (Chinese University of Hong Kong).
- L24. Principal Investigator. “Adaptive Large-scale Multimedia Storage Systems.” *University of Maryland, GRB Semester Award*, Fall 1998.

- L25. Principal Investigator (Faculty Mentor). “Multilevel Multimedia Storage Systems.” *NSF-sponsored Computing Research Association (CRA) Undergraduate Research Program Grant*, Summer 1998, travel and stipend support awarded to 1 undergraduate summer research assistant.
- L26. Co-principal Investigator (with Y. Yemini (PI) and H. Schulzrinne, S. Stolfo (Co-PIs)). “Market-Net: a Survivable, Market-Based Architecture for Large-Scale Information Systems.” *Advanced Research Projects Agency*, 1997 – 2000,  $\approx$  \$2M (Columbia University).
- L27. Principal Investigator (Faculty Mentor). “Efficient Resource Management in Large Multimedia Information Systems.” *NSF-sponsored Computing Research Association (CRA) Undergraduate Research Program Grant*, Summer 1996, travel and stipend support awarded to 2 undergraduate summer research assistants.
- L28. Co-principal Investigator (with J.C.S. Lui (PI) and E. de Souza e Silva (Co-PI)). “Operating System and Network Support for Distributed Multimedia Services.” *Hong Kong Mainline Research Grant*, 1996-1999,  $\approx$  \$14,000 (Chinese University of Hong Kong).
- L29. Co-principal Investigator (with A. Aho (PI) and 11 other Co-PIs). “Scalable Multimedia Information Processing.” *National Science Foundation CISE Research Infrastructure Grant*, 1996-2000,  $\approx$  \$2.5M (Columbia University).
- L30. Senior Personnel (with Y. Yemini (PI) and SMARTS Corp.). “Embedded Training Technologies.” *Advanced Research Projects Agency*, 1996-1997, \$309,153 (Columbia University).
- L31. Principal Investigator. “Towards a New Generation of Multimedia Storage Systems.” *National Science Foundation, Faculty Early Career Development (CAREER) Grant*, 1996-2001, \$200,000.
- L32. Principal Investigator. “A Study on the Use of Tertiary Storage Devices in Multimedia Information Systems.” *AT&T Foundation Special Purpose Grants in Science and Engineering Program*, 1995-1996, \$24,000.

### Fellowships, Awards, and Honors

- IEEE Senior Member, elected 2014.
- USC Mellon Culture of Mentoring Award, 2013.
- USC Remarkable Women Award, 2012.
- WTS-LA Diversity Leadership Award, 2011.
- IBM Faculty Award, 2008.
- Okawa Foundation Research Award, 2002.
- Member of IFIP WG 7.3, elected 2000.
- NSF Faculty Early Career Development (CAREER) Award, 1996-2001.
- IBM Graduate Fellowship, 1994-1995.
- National Science Foundation Graduate Fellowship, 1991-1994.
- GTE Graduate Fellowship, 1990-1991.
- Member of Tau Beta Pi, elected 1988.

- Society of Women Engineers Scholarship, 1987 - 1989.
- Litton Engineering Scholarship, 1987-1989.

## Reviewing and Editing Activities

### Co-guest Editor

- Special Issue of *IEEE Transactions on Knowledge and Data Engineering*, based on selected papers from the International Workshop on Multimedia Information Systems (MIS'99), Volume 13, Number 5, September 2001. (With S. Tripathi and V. Tsotras.)
- Special Issue of *International Journal of Intelligent Systems on Multimedia Systems*, Volume 13, Number 12, December 1998. (With J.C.S. Lui.)
- Special Issue of *Parallel Computing Journal on Parallel Data Servers and Applications*, Volume 24, Number 1, January 1998. (With R.R. Muntz.)

### Reviewing Activities: Journals and Conferences

- ACM Transactions on Database Systems
- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on Computers
- IEEE Transactions on Parallel and Distributed Systems
- IEEE/ACM Transactions on Networking
- Performance Evaluation Journal
- IEEE Transactions on Software Engineering
- IEEE Transactions on Multimedia
- ACM Transactions on Software Engineering and Methodology
- IEEE Networks
- IBM Journal of Research and Development
- Journal of Systems and Software
- International Conference on Very Large Databases (VLDB)
- ACM SIGMOD Conference
- ACM SIGMETRICS Conference
- IEEE INFOCOM Conference
- IEEE MASCOTS
- TOOLS Conference
- ICS Conference
- IFIP WG7.3 Conference on Modeling and Performance Evaluation of Computer Systems and Networks
- International Telecommunications Symposium (ITS)

- International Conference on the Numerical Solutions of Markov Chains Conference
- International Workshop on Petri Nets and Performance Models (PNPM)
- International Conference on Quantitative Evaluation of Systems (QEST)
- Communication of the ACM (CACM)
- Journal of Parallel Computing
- IEEE MultiMedia
- ACM Symposium on Principles of Database Systems (PODS)
- ACM Multimedia Systems Journal
- ACM Transactions on Multimedia Computing, Communications and Applications

#### **Reviewing Activities: Grant Proposals**

- National Science Foundation, external reviewing/proposal review panels, 1996-2002, 2009.
- Hong Kong Research Grants Council, 1996, 2002, 2013.
- Army Research Office, 1996.

#### **External Examiner**

- PhD Thesis, National University of Singapore, 2015. *A Content Caching Strategy for Named Data Networks*, Seyed Mostafa Seyed Rezazad Dalaly Advisor: Y.C. Tay.
- MS Thesis, The Chinese University of Hong Kong, 2006. *Performance and Availability Issues on BitTorrent-like File Sharing Systems*, Fan Bin. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2003. *An Effective Methodology to Trace-back DDoS Attackers*, Kwok Tai Law. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2003. *Multi-path Multimedia Streaming System: Adaptation and Optimization*, Chow Lik Hang. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2002. *Admission Control and Dynamic Adaptation for a Proportional-Delay Diffserv-Enabled Web Server*, Lee Cheuk Man. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2002. *An Architectural Infrastructure and Topological Optimization for End System Multicast*, Ho Yin Starsky Wong. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2002. *Multi-path Streaming and Dynamic End-point Adaptation*, Tak Fu Tung. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2001. *Characterization and Performance Evaluation for the Proportional Delay Differentiated Services*, Leung Ka Hing. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 2000. *Admission Control Algorithms for Providing Quality-of-Service Guarantee for Individual Connection in Video-on-Demand Systems*, Wang Xiaoqing. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 1999. *Design and Implementation of Distributed Interactive Virtual Environment*, Chan Ming Fei. Advisor: J.C.S. Lui.

- MS Thesis, The Chinese University of Hong Kong, 1999. *Routing Algorithms and Channel Reservation Strategies for a Low Earth Orbit Satellite System*, Tam Tsz Shing. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 1999. *Issues in a Very Large Scale Distributed Virtual Environment*, So King Yan Oldfield. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 1997. *On Design of a Scalable Video Data Placement Strategy for Supporting a Load Balancing Video-on-Demand Storage Server*, Kwok-Wai Law. Advisor: J.C.S. Lui.
- MS Thesis, The Chinese University of Hong Kong, 1997. *Parallel Replication in Distributed Video-on-Demand Systems*, Wai-Kwok Lie. Advisor: J.C.S. Lui.

## TEACHING ACTIVITY

### Advising: Research

#### Doctoral

- current PhD students:
  - Chien-Lun Chen (EE, passed screening), 2016-present.
  - Michael Chien-Chun Hung (CS, passed qualifying exam), 2011-present.
  - Sung-Han Lin (CS, passed qualifying exam), 2010-present.
  - Kai Song (CS, passed qualifying exam), 2008-present.
- former PhD graduates:
  - \* Cheng-Fu Chou, 1998-2002 (UMD, CS, thesis title: “Scalable Designs for Continuous Media Servers and Wide-area Upload Applications”, defended April 2002, currently Full Professor at the National Taiwan University).
  - \* Alix Chow, 2003-2009 (USC, CS, thesis title: “QoS-based Distributed Design of Streaming and Data Distribution Systems”, defended December 2009, formerly at Nokia research lab in Beijing, currently at a startup).
  - \* Yan Yang 2003-2005, 2006-2010 (USC, CS, thesis title: “QoS Based Resource Management in Internet Applications”, defended October 2010, currently at Apple, CA).
  - \* Abhishek Sharma 2007-2010 (USC, CS, co-advising with R. Govindan, thesis title: “Adaptive Resource Management in Distributed Systems”, defended October 2010, currently at NEC lab, NJ).
  - \* Leslie Cheung 2004-2011 (USC, CS, thesis title: “Design-Time Software Quality Modeling and Analysis of Distributed Software-Intensive Systems”, (previously MS student), defended September 2010, currently at NetApp, CA).
  - \* Yuan Yao 2006-2012 (USC, EE, thesis title: “QoS Aware Algorithm Design for Distributed Systems”, defended September 2012, formerly at Oracle, CA, and a startup, currently at Uber, CA).

- \* Ranjan Pal 2009-2014 (USC, CS, co-advising with K. Psounis, thesis title: “Improving Network Security through Cyber-Insurance”, defended May 2014).
- \* Bo-Chun Wang 2009-2015 (USC, CS, thesis title: “Satisfying QoS Requirements through User-System Interaction Analysis”, currently at NetApp, CA).
- former PhD students:
  - Nidhi Shah (first year student), 2015-2016.
  - Ranjit Raveendran, 2004-2006 (acting advisor while Prof. Özden is on leave).
  - Bassem Abdouni (EE-Systems), 2003-2004 (previously MS student).
  - Zhihui Chen, 2002-2004.
  - Adam (Woei-Jyh) Lee (UMD), 2001-2003.
  - I-Hsin Chung (UMD), 2000-2001.
  - Dong-In Kang (UMD, co-advised with R. Gerber and J. Hollingsworth during R. Gerber’s sabbatical, 1998-1999).
  - Joseph Dunnick (UMD), 1997-1998.
  - Maria Papadopouli (Columbia University), 1996-1998.

### Masters

- Nadim Tawileh, co-advised with Prof. Özden, 2004.
- Leslie Cheung, 2003-2004 (thesis title: “Scalable and Secure Data Collection: Fault Tolerance Considerations”, graduated with an *MS thesis award* in Spring 2004 (entered PhD program).
- Bassem Abdouni (EE-CN), 2002-2003 (entered EE-Systems PhD program).
- Eiman M. Elnahrawy (UMD, CS, thesis title: “An HTTP-based Distributed Application Framework for Interactive Group Collaborative Environments, defended April 2002), 2001-2002.
- Raj Kumar (Columbia University, CS), 1997-1998.

### Undergraduate

- Eric Kapitanski, Mirza Sikander, Francesca Nannizzi, Kate Glazko, Irina Tyshkevich, Lizz Brooks, Chelsea Cheng, Michael Borke, co-advising (Dr. Sheila Tejada main advisor) as part of the CSavvy project, Summer 2012.
- Hanjun Xiao, visiting USC from Tsinghua, Summer 2011, under the USC-Tsinghua Summer Internship program.
- Kalyan Sahoo, visiting USC from IIT Kharagpur, Summer 2010, under the USC-IIT Summer Internship program.
- Danielle Bragg, visiting USC from Harvard University, Summer 2009, under the NSF-sponsored REU site program.
- Alexandra Lee, visiting USC from Bryn Mawr College, Summer 2009, under the NSF-sponsored REU site program.
- Sarah Williams, Merit Research Program, 2005-2006.

- Jaime Chinen, WiSE undergraduate research award recipient, 2003-2004.
- Georgina Russell, visiting University of Maryland from Berkeley, Summer 1998, under the NSF-sponsored Computing Research Association (CRA) undergraduate research program.
- Lanphuong Pham, visiting Columbia University from Wilkes University, Summer 1996, under the NSF-sponsored Computing Research Association (CRA) undergraduate research program.
- Hannah K. Lee, Columbia University, Summer 1996, under the NSF-sponsored Computing Research Association (CRA) undergraduate research program.

#### **Advising: Ph.D. Committees**

- 82 at USC (2002-2016)
- 27 at UMD (1997-2005)
- 5 at Columbia University (1995-1997)

#### **K-12 STEM education: NSF Research Experience for Teachers**

- Jami Cabase, Robotics/Science teacher, Yorba Academy of the Arts Middle School, Summer 2013.
- Mara Lansdown, Mathematics teacher, Arroyo Seco Museum Science Magnet, Summer 2013.
- Regina Snyder, Mathematics and Computer Science teacher, Los Alisos Middle School, Summer 2012.
- Angelica Gunderson, Science teacher, Los Alisos Middle School, Summer 2012.

#### **Independent Studies/Directed Research**

- Harsh Bhuwania (MSEE, Privacy in IoT systems, 2015)
- Shashwath Shankar (MSEE, Privacy in IoT systems, 2015)
- Hassan Khan (MSCS, Identifying P2P traffic on the Internet, 2009)
- Wah Ho (MSCS, Internet-based experiments using BitTorrent, 2008)
- Hua Liu (MSCS, Algorithms for Internet-based large-scale data streaming, 2004)
- Gilbert Tawil (MSEE, Development of an Internet-based large-scale data collection system, 2004)
- Nadim Tawileh (MSCS, Internet-based measurements for Multi-path streaming, 2003)
- Jarupat Lewprasert (MSCS, Development of an Internet-based real-time audio system, 2003)
- Yan Yang (PhD, CS, Development of a large-scale data gathering system, 2003)
- Chih-Wen Su (MSCS, Development of a deadline-based data collection system, 2003)
- Lei Zhang (MSCS, Development and instrumentation of a large-scale streaming data collection system, 2003)
- Shashikiran Kolar (MSCS, Design and development of an Internet-based interactive group collaborative environment system, 2002)
- Kalpesh Solanki (MSCS, Design and development of an Internet-based real-time audio delivery system, 2002)
- Taruni U. Seth (Columbia University, Design and development of VOD servers, 1996-1997)
- Alka Sham (Columbia University, Fault tolerant design of VOD Servers, 1996-1997)

**Courses Taught**

Semester	Course	# students	Description
Spring 2017	CSCI697	47	Seminar in Computer Science Research
Fall 2016	CSCI697	54	Seminar in Computer Science Research
Spring 2016	EE/CSCI450	52	Introduction to Computer Networks
Spring 2016	CSCI697	36	Seminar in Computer Science Research
Fall 2015	CSCI697	39	Seminar in Computer Science Research
Spring 2015	CSCI597	59	Seminar in Computer Science Research
Spring 2015	CSCI170	11	Discrete Methods in Computer Science
Fall 2014	CSCI597	54	Seminar in Computer Science Research
Spring 2014	CSCI597	53	Seminar in Computer Science Research
Fall 2013	CSCI170	60	Discrete Methods in Computer Science
Fall 2013	ENGR102	50	Freshman Academy
Fall 2013	CSCI597	66	Seminar in Computer Science Research
Spring 2013	CSCI597	57	Seminar in Computer Science Research
Fall 2012	CSCI597	73	Seminar in Computer Science Research
Fall 2012	CSCI271	100	Discrete Methods in Computer Science
Fall 2012	ENGR102	72	Freshman Academy
Spring 2012	CSCI597	36	Seminar in Computer Science Research
Fall 2011	CSCI271	62	Discrete Methods in Computer Science
Fall 2011	ENGR102	71	Freshman Academy
Spring 2011	CSCI597	37	Seminar in Computer Science Research
Fall 2010	ENGR102	76	Freshman Academy
Fall 2010	CSCI597	32	Seminar in Computer Science Research
Spring 2010	CSCI597	31	Seminar in Computer Science Research
Fall 2009	ENGR102	68	Freshman Academy
Fall 2009	CSCI597	47	Seminar in Computer Science Research
Spring 2009	CSCI597	49	Seminar in Computer Science Research
Spring 2009	CSCI694	9	Topics in Computer Networks and Distributed Systems
Fall 2008	ENGR102	80	Freshman Academy
Fall 2007	CSCI570	111	Analysis of Algorithms
Spring 2007	CSCI570	62	Analysis of Algorithms
Fall 2006	EE/CSCI450	48	Introduction to Computer Networks
Spring 2006	CSCI570	120	Analysis of Algorithms
Fall 2005	EE/CSCI450	34	Introduction to Computer Networks
Spring 2004	CSCI570	80	Analysis of Algorithms
Spring 2004	CSCI599	12	Performance Evaluation
Spring 2003	CSCI599	13	Performance Evaluation
Fall 2002	CSCI551	42	Computer Communications
Spring 2002	CSCI551	50	Computer Communications
Fall 2001	CMSC710	25	Performance Evaluation (UMD)
Spring 2001	CMSC710	36	Performance Evaluation (UMD)
Fall 2000	CMSC420	56	Data Structures (UMD)
Spring 2000	CMSC417	44	Computer Networks (UMD)
Fall 1999	CMSC420	45	Data Structures (UMD)
Spring 1999	CMSC417	44	Computer Networks (UMD)
Spring 1998	CMSC417	26	Computer Networks (UMD)

Fall 1997	CMSC818G	15	Large Multimedia Information Systems (UMD, <i>new course development</i> )
Spring 1997	W3824	69	Computer Organization (Columbia University)
Fall 1996	W4995	50	Multimedia Information Systems (Columbia University, <i>new course development</i> )
Spring 1996	W3824	56	Computer Organization (Columbia University)
Fall 1995	E6998-42	8	Architecture Support for Large Information Systems (Columbia University, <i>new course development</i> )
Summer 1995		15	Data Structures and Algorithms (Johns Hopkins University Center for Talented Youth)
Summer 1994		12	Data Structures and Algorithms (Johns Hopkins University Center for Talented Youth)
Summer 1993		15	Data Structures and Algorithms (Johns Hopkins University Center for Talented Youth)

### Courses or Curriculum Development

**CMSC 818G** - UMD, Large Multimedia Information Systems (1997) (Taught a similar course, **W6998-42** - Architecture Support for Large Information Systems, at Columbia University, 1995)

Created a new course to provide first and second year graduate students with an introduction to large-scale multimedia information systems. This course explores current research directions and design issues in advanced system architectures for storage servers. Specifically it concentrate on multimedia information systems, and explores similar issues in parallel database systems and scientific computing systems. The objective of this course is to bring students up to date on research directions in large multimedia information systems and to provide the requisite background for original research in this area. Specific topics covered in the course include (but are not limited to): current (a) storage device technology and technology trends, (b) interconnect technologies and technology trends, (c) compression technologies and technology trends, and their impact on application areas such as multimedia storage systems; multimedia storage servers; database systems for multicomputer architectures; I/O intensive scientific computing applications. Students are required to read the equivalent of approximately 20 conference/journal research papers. Grades are based on a final examination, class participation, and a term report which includes a class presentation and a term paper. Most reports are expected to be critical summaries and reviews of a small collection of papers in an area relevant to the course. However, reports describing original research are also possible. This course can be used by Ph.D. and M.S. students as part of their comprehensive exams curriculum in the systems area.

**W4995** - Columbia University, Multimedia Information Systems (1996)

Created a new course to provide junior and senior level undergraduate students with a broad introduction to multimedia information systems. This course covers the following topics: media, applications, and their requirements; storage technologies; interconnect technologies; compression technologies for various media; multimedia storage servers; operating systems issues; large distributed storage systems; multimedia networks. Course material is taken from textbooks as well as on-line notes provided by the instructor. The work in the course includes several homeworks, a large programming project (chosen from a list of topics related to the course) with a written report, and a final examination.

**W3824** - Columbia University, Computer Organization (1996, 1997)

Expended course coverage to include detailed coverage of I/O devices and corresponding interconnect architectures.

**CMSC 417** - UMD, Computer Networks (1999, 2000)

Introduced a set of new projects (with Prof. Bhattacharjee) to emphasize current directions in communication networks.

Expended course coverage to include detailed coverage of an introduction to probabilities.

**CSCI 551** - Computer Communication (2002)

Introduced a new project to emphasize current directions in communication networks.

Expended course coverage to include Internet-based upload applications and introductory analysis techniques.

**MSCS-CS program** - MS in Computer Science with specialization in Computer Security (2002)

Developed a new MSCS specialization in computer security, in collaboration with B.C. Neuman, B. Tung, and E. Horowitz.

Computer security is not currently addressed as a specific specialty within any department at USC. Several departments have ongoing research and classes that are relevant to computer security. By creating a masters specialization in Computer Security, we are highlighting those relevant classes across departments, and coordinating some of the coverage to ensure that students can achieve the breadth of specific knowledge from those topics relevant to the practice of computer security research, development, and deployment and in the secure operation of computer systems. Industry and government has voiced a specific need for individuals with training in computer security. There are also opportunities to obtain additional support from government to fund the development of a more comprehensive curriculum specialization in computer security, and to provide scholarships at both the undergraduate and graduate level for students specializing in these areas.

**CSCI 599** - Performance Evaluation (2003) (Taught a similar course, **CMSC 710** - Performance Evaluation, at UMD, 2001)

Designed a graduate level performance evaluation course with focus on the more analytical aspects of performance evaluation. This course covers tools necessary for performance evaluation of computer and communication systems and is focused on techniques needed to construct and analyze performance models that are useful in computer and communication systems design. Although these techniques are useful in other field (e.g., financial modeling), this course focuses on applications to computer and communication systems. Topics include introduction to stochastic processes and queueing theory, Markovian models with special structure, transient analysis, and a brief introduction to queueing networks. It is intended for students interested in computer and/or communication systems and the related performance issues, especially those interested in operating systems, networking, distributed systems, databases, and multimedia systems. The intent of the course is to provide the tools necessary for evaluating designs of such systems as well as for gaining insights that can be obtained. Grades are based on homeworks, exams, and small projects. Although initially taught as a 599, it is intended to become a regular course in the future.

**CSCI 459 - Computer Systems & Applications Modeling Fundamentals**

Designed an undergraduate level modeling course which (1) introduce students to fundamentals of probabilistic and stochastic analysis, in the context of both analytical approaches and simulations; (2) teaches students how to apply these techniques to modeling of computer systems and applications; (3) teaches students how to apply modeling and simulation tools to design and evaluation of computer systems and applications; and (4) illustrates application and utility of such techniques through a set of case studies covering a number of computer science areas, such as operating systems, networking, software engineering, databases, artificial intelligence, etc. Topics include combinatorics & basic probability, conditional probabilities and Bayes rule, random variables, simulations, statistical inference, confidence intervals, basic Markov chains, basic networks of queues, as well as case studies. Grades are based on homeworks, projects, and exams.

**EE/CSCI 450 - Introduction to Computer Networks (2005)** Introduced a new book for the course (Kurose and Ross). Revised the course accordingly, teaching the material using a top-down approach (with respect to networking layers) with emphasis on the Internet.

**SERVICE TO PROFESSION****Moderator, Performance area**

- Computing Research Repository (arXiv.org/corr), December 2010 - present.

**Editorial Board**

- ACM Transactions on Modeling and Performance Evaluation of Computing Systems (ToMPECS), 2014-2017.
- Performance Evaluation journal, October 2009 - present.

**Editor**

- ACM SIGMETRICS Performance Evaluation Review, July 2009 - 2011.

**Chair**

- ACM SIGMETRICS, July 2003 - July 2005.

**Vice Chair**

- ACM SIGMETRICS, July 2001 - July 2003.

**Board of Directors**

- ACM SIGMETRICS, July 2005 - July 2007.
- ACM SIGMETRICS, July 1999 - July 2001.

**Nominating Committee Chair**

- ACM SIGMETRICS, 2014.

**General Chair**

- ACM SIGMETRICS Conference, 2007.

**Program Committee Co-Chair**

- ACM SIGMETRICS Conference, 2017.
- IFIP WG7.3 International Symposium on Computer Performance Modeling, Measurement and Evaluation (Performance Conference), 2015.
- ACM HotMetrics Workshop, 2009.
- Joint ACM SIGMETRICS/Performance Conference, 2001.
- International Workshop on Multimedia Information Systems, 1999.

**Tutorial Chair**

- ACM SIGMETRICS Conference, 2000.

**Member of Program Committee**

- International Workshop of Software-Defined Data Communications and Storage (SDDCS) (part of IEEE ICDCS), 2016.
- ACM CoNEXT Conference, 2014.
- IEEE Region 10 Humanitarian Technology Conference, 2014.
- International Conference on Parallel Processing, 2012 (Performance Modeling and Evaluation track).
- PERFORM (Performance Evaluation of Computer and Communication Systems: Milestones and Future Challenges), 2010.
- International Conference on Queueing Theory and Network Applications (QTNA), 2009.
- ACM HotMetrics Workshop, 2008, 2010.
- International Conference on the Quantitative Evaluation of SysTems (QEST), 2008, 2009, 2010, 2012, 2014.
- ACM Workshop on Capture, Archival and Retrieval of Personal Experiences (CARPE), 2005, 2006.
- International Workshop on Web Content Caching and Distribution (WCW), 2003.
- International Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV), 2003.
- IFIP WG7.3 International Symposium on Computer Performance Modeling, Measurement and Evaluation (Performance Conference), 2002, 2005, 2007, 2010, 2011, 2013, 2014.
- IEEE/ACM Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS), 2002.
- IEEE International Conference on Multimedia and Expo (ICME), 2002.
- Internet Performance Symposium (part of GlobeCom), 2001.
- Workshop on Mathematical (performance) Modeling and Analysis (MAMA), 2000, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016.
- Conference on Extending Database Technology (EDBT), 2000.

- ACM SIGMOD Conference, 1999, 2004.
- Workshop on I/O in Parallel and Distributed Systems (IOPADS), 1997.
- International Conference on Distributed Computing Systems (ICDCS), 1997.
- International Conference on Data Engineering (ICDE), 1997.
- ACM SIGMETRICS Conference, 1997, 1998, 1999, 2000, 2002, 2003, 2004 (member of best paper awards committee), 2005, 2006, 2008, 2009 (member of best paper awards committee), 2010, 2012, 2013, 2015, 2016.
- International Workshop on Multimedia Information Systems, 1996, 1997, 1998.
- International Conference on Parallel and Distributed Information Systems (PDIS), 1996.

**Member Steering Committee**

- ACM HOTMETRICS Workshop, 2008-present.
- Location Privacy Workshop, 2004.

**Chair, Test of Time Awards Committee**

- ACM SIGMETRICS, 2012.

**Member, Test of Time Awards Committee**

- ACM SIGMETRICS, 2011, 2013, 2016.

**Session Chair**

- IFIP WG7.3 International Symposium on Computer Performance Modeling, Measurement and Evaluation (Performance Conference), 2005.
- IEEE Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS), 1999, 2002.
- ACM SIGMETRICS Conference, 1998, 2000, 2001, 2002, 2003, 2004, 2006, 2009.
- International Workshop on Multimedia Information Systems, 1995, 1996, 1997, 1998.

**Advisory Board**

- Member, UCLA UG CS Advisory Board, 2011-present.