

EVGENIA SMIRNI

College of William and Mary
Department of Computer Science
P.O. Box 8795
Williamsburg, VA 23187-8795
<http://www.cs.wm.edu/~esmirni>

Home: (757) 220-8047
Office: (757) 221-3580
Fax: (757) 221-1717
esmirni@cs.wm.edu

RESEARCH INTERESTS

Performance evaluation, Models for Computer Performance Prediction, Scheduling and Load Balancing, Queueing Networks, Markov Chains, Markovian Arrival Processes, Matrix-Analytic Methods, Workload Characterization and Analysis, Storage Systems, Web Servers, Performance Tools.

EDUCATION

Ph.D. in C.S. Computer Science Department, Vanderbilt University, Nashville, TN.
May 1995 *Dissertation Title: "Processor Allocation and Thread Placement Policies in Parallel Multiprocessor Systems". Advisor: L.W. Dowdy*

M.S. in C.S. Computer Science Department, Vanderbilt University, Nashville, TN.
December 1993

Diploma in C.E. Department of Computer Engineering and Informatics, (5-year curriculum),
January 1988 Polytechnic School, University of Patras, Patras, Greece.

ACADEMIC POSITIONS

Aug. 2005 – present *Wilson and Martha Claiborne Stephens Associate Professor*
Computer Science Department, College of William and Mary, Williamsburg, VA.

Aug. 2002 – 2005 *Associate Professor*
Computer Science Department, College of William and Mary, Williamsburg, VA.

Fall 2003 *Visiting Faculty*
Seagate Research, Pittsburgh, PA.
Worked on workload characterization of E-commerce traffic.

1997 – 2002 *Assistant Professor*
Computer Science Department, College of William and Mary, Williamsburg, VA.

1995 – 1997 *Postdoctoral Research Associate*
Computer Science Department, University of Illinois at Urbana-Champaign, IL.
Conducted research in characterization of input/output access patterns in large-scale scientific applications for the *Scalable I/O Initiative* project. Project leader: Prof. Daniel Reed.

Spring 1993, 1994 *Visiting Researcher*
Polytechnic of Milan, Department of Electronics and Informatics, Milan, Italy.
Conducted research in multiprocessor scheduling algorithms and parallel workload characterization.

1992 – 1995 *Research Assistant*
Vanderbilt University, Computer Science Department, Nashville, TN
Conducted research in performance evaluation of parallel processing systems for the *Early Evaluation of Systems* project of the Oak Ridge National Laboratory.

HONORS/AWARDS

- 2006 ΦBK Award for the Advancement of Scholarship
2005 – 2008 Stephens Term Distinguished Associate Professor.
College of William and Mary, Williamsburg, VA.
2002 Best Paper, *Internet Performance Symposium*, GLOBECOM 2002.
1997 Best Paper, 9th *International Conference on Modeling Techniques and Tools for Computer Performance Evaluation*, 1997.
1996 NSF CISE Postdoctoral Research Associateship, #9625875 (04/96-03/98),
(declined in order to accept the position at Illinois).
1987 First Class Honors Degree, University of Patras
1982 – 1987 Hellenic Fellowship Institute (IKY) Scholarships.

GRANTS

- 2007 NSF, #0720699, Computing Systems Research – Systems Modeling and Analysis,
(CSR-SMA) \$200,000, PI
“Autocorrelated Flows in Systems: Analytic Models and Applications”
September 1, 2007 to August 31, 2010.
2007 HP Labs Gift, \$30,0000, PI
“A Practical Capacity Planning Framework for Multi-Tier Enterprise Services with Real Workloads”
2004 NSF, #0428330, Information Technology Research
(ITR), \$413,941, PI
“Reconfigurable, Data-driven Resource Allocation in Complex Systems: Practice
and Theoretical Foundations”
September 15, 2004 to August 31, 2008.
2001 NSF, #0090221, Advanced Computational Research Program, \$185,449, PI
“Collaborative Research: Adaptive Data Parallel Storage”
October 1, 2001 to September 30, 2005.
2001 NSF, #0098278, Operating Systems and Compilers Program, (\$279,997), PI
“Effective Techniques and Tools for Resource Management in Clustered Web Servers ”
July 15, 2001 to June 30, 2005.
1999 NSF, #9974992, Next Generation Software Program,
NGS, \$350,000, PI
“Coordinated Allocation of Processor and and I/O Resources in Parallel Systems”
September 1, 1999 to February 29, 2004.
1999 NSF, #9977030, Major Research Instrumentation Grant,
MRI, \$461,820, co-PI
“MRI: Acquisition of High Performance Clusters for Effective Parallel Computing
in Computational Science Research and Education”
August 15, 1999 to July 31, 2002 (multi-faculty grant).
1999 Summer Research Grant, (\$5,000), College of William and Mary.
1998 Summer Research Grant, (\$5,000), College of William and Mary.
1995 Vanderbilt University travel grant to attend *IPPS'95*
1994 NSF travel grant to attend the CRA Workshop for Women in Academic Careers.
1994 NSF travel grant to attend the Grace Hopper Celebration Conference.

EDITORIAL BOARD

2003 – Editor, ACM *Sigmetrics* Performance Evaluation Review (PER).
2001 *Calculateurs Parallèles*
Special Issue on Parallel I/O for Cluster Computing.

CONFERENCE ORGANIZATION

General co-Chair

2010 *5th International Conference on Quantitative Evaluation of SysTems* (QEST'10)
September 2010, Williamsburg, VA.

Program Committee co-Chair

2006 *Joint ACM SIGMETRICS/IFIP W.G. 7.3 Performance 2006* Conference
June 2006, Saint-Malo, France.
2005 *Second International Conference on Quantitative Evaluation of Systems*
QEST 2005, (former TOOLS, PNPM, and PAPM-ProbMIV)
September 2005, Torino, Italy.

Expert Panels

2007 “Future Directions in Performance Evaluation Research”, *Panel Organizer and Panelist*
Sigmetrics 2007, Panelists: F. Damera, A. Greenberg, A. Hoisie, D. Towsley.
2001 “Systems Software for Complex Computing Environments”, *Panelist*
NSF organized in conjunction with ICS 2001, Sorrento, Italy, June 2001.
1996 “MPI-2 I/O: What should an MPI parallel I/O library include?”, *Panelist*
MPI Developers Conference, Notre Dame, IN, July 1996.

Steering Committee Member

2005 QEST Conference, elected September 2005, (www.qest.org).

Program Committee Member

2009 *Sigmetrics/Performance 2009*, *DSN 2009*
2008 41st Annual Simulation Symposium, *Sigmetrics 2008*, *QEST 2008*, *MAMA 2008*, *HotMetrics 2008*
2007 *SMCtools'07*, *Performance 2007*, 40th Annual Simulation Symposium, *Sigmetrics 2007*,
QEST 2007, *MAMA 2007*
2006 *SMCtools'06*, *MAMA 2006*, *QEST 2006*, Markov Anniversary Meeting, 3rd European
Performance Engineering Workshop, 39th Annual Simulation Symposium
2005 *Performance 2005*, *SIGMETRICS'05*, Fifth International Conference on Matrix
Analytic Methods in Stochastic Models (MAM5), IPDPS International Workshop
on Parallel and Distributed Real-Time Systems (WPDRTS), 38th Annual Simulation Symposium
2004 *QEST 2004*, *Joint SIGMETRICS'04* and *Performance'04*, 37th Annual Simulation Symposium
2003 *TOOLS 2003*, 4th Meeting on the *Numerical Solution of Markov Chains*, *SIGMETRICS'03*,
Workshop on Parallel I/O in Cluster Computing and Computational Grids, 36th Annual Simulation Symposium

2002 Performance 2002
 Joint *SIGMETRICS'01* and Performance'01 Conference, 10th *Siam Conference on Parallel* 2001
 2000 *IPDS'00, International Computer Performance and Dependability Symposium*
 1999 *SIGMETRICS*
 1997 *ICDCS*

Minisymposium Organizer

2007 “Numerical Solutions of Markov Chains: Techniques and Applications”
 co-organizer with A. Stathopoulos,
 ICIAM'07, Zurich, Switzerland, July 2007

Proceedings Chair

2003 *SIGMETRICS'03*,
 June 2003, San Diego, CA.

Tools Chair

1999 *ICATPN'99, 20th International Conference on Application and Theory of Petri Nets*,
 June 1999, Williamsburg, VA.

RESEARCH PUBLICATIONS

J. Articles in Refereed Journals

- J1. Q. Zhang, L. Cherkasova, N. Mi, and E. Smirni, “A Regression-Based Analytic Model for Capacity Planning of Multi-Tier Applications”, *Cluster Computing*, special issue on the best papers of ICAC'07, to appear, 2008.
- J2. Q. Zhang, N. Mi, A. Riska, E. Smirni, “Performance-Guided Load (Un)Balancing Under Autocorrelated Flows”, *IEEE Transactions on Parallel and Distributed Systems*, Vol.19(5), pp. 652-665, May 2008.
- J3. N. Mi, Q. Zhang, A. Riska, E. Smirni, E. Riedel, “Performance Impacts of Autocorrelated Flows in Multi-tiered Systems”, *Performance Evaluation*, Vol. 64(9-12), pp. 1082-1101, October 2007. Presented at the *Performance'07 Conference*.
- J4. A. Riska, E. Smirni, “ETAQA Solutions for Infinite Markov Processes with Repetitive Structure”, *INFORMS Journal of Computing*, Vol. 19 (2), pp. 215-228, Spring 2007.
- J5. A. Stathopoulos, A. Riska, Z. Hua, E. Smirni, “Bridging ETAQA and Ramaswami’s Formula for the Solution of M/G/1-type Processes”, *Performance Evaluation*, Vol. 62 (1-4), pp. 331-348, October 2005. Presented at the *Performance'05 Conference*.
- J6. Q. Zhang, A. Heindl, E. Smirni, “Characterizing the BMAP/MAP/1 Departure Process via the ETAQA Truncation”, *Communications in Statistics – Stochastic Models*, Vol. 21 (2-3), pp. 821-846 June 2005.
- J7. Q. Zhang, A. Riska, W. Sun, E. Smirni, G. Ciardo, “Workload-Aware Load Balancing for Clustered Web Servers”, *IEEE Transactions on Parallel and Distributed Systems*, Vol. 16 (3), pp. 219-233, March 2005.

- J8. G. Ciardo, W. Mao, A. Riska, E. Smirni, "ETAQA-MG1: An Efficient Technique for the Analysis of M/G/1-type Processes by Aggregation". *Performance Evaluation*, Vol. 57 (3), pp. 235–260, July 2004.
- J9. A. Riska, E. Smirni, G. Ciardo, "Exact Analysis of a Class of GI/G/1-type Performability Models". *IEEE Transactions on Reliability*, Vol.53 (2), pp. 238–249, June 2004.
- J10. A. Riska, V. Diev, and E. Smirni, "An EM-based technique for approximating long-tailed data sets with PH distributions". *Performance Evaluation*, Vol. 55 (1-2), pp. 147–164, January 2004.
A preliminary version of this paper was selected as one of Best Papers at the Internet Performance Symposium at GlobeCom 2002.
- J11. E. Rosti, G. Serazzi, E. Smirni, M.S. Squillante, "Models of Parallel Applications with Large Computation and I/O Requirements", *IEEE Transactions on Software Engineering*, Vol. 28, No. 3, pp. 286-307, March 2002.
- J12. G. Ciardo, A. Riska, E. Smirni, "EquiLoad: a load balancing policy for clustered web servers" *Performance Evaluation*, Vol. 46(2-3), pp. 101-124, October 2001. A preliminary version of this paper was presented at the *Symposium on Advanced Performance Methods 2000*, Orlando, FL.
- J13. G. Ciardo, E. Smirni, "ETAQA: An Efficient Technique for the Analysis of QBD-processes by Aggregation", *Performance Evaluation* 36-37 (1999), pp. 71-93. Presented at the *Performance'99 Conference*.
- J14. P. Cremonesi, E. Rosti, G. Serazzi, E. Smirni, "Performance Evaluation of Parallel Systems", *Parallel Computing*, Vol. 25, pp. 1677-1698, 1999.
- J15. E. Smirni and D.A. Reed, "Lessons from Characterizing the Input/Output Behavior of Parallel Scientific Applications", *Performance Evaluation*, 33, 1998, pp. 27-44.
A preliminary version of this paper was selected as one of Best Papers at the 9th *International Conference on Modeling Techniques and Tools for Computer Performance Evaluation*.
- J16. E. Smirni, E. Rosti, L.W. Dowdy, G. Serazzi, "A Methodology for the Evaluation of Multiprocessor Non-Preemptive Allocation Policies", *Journal of Systems Architecture*, 44/09, pp. 703-721, June 1998.
- J17. E. Rosti, E. Smirni, G. Serazzi, L.W. Dowdy, K.C. Sevcik, "Processor Saving Scheduling Policies for Multiprocessor Systems", *IEEE Transactions on Computers*, Vol. 47, No. 2, pp. 178-189, February 1998.
- J18. E. Rosti, E. Smirni, L.W. Dowdy, G. Serazzi, B.M. Carlson, "Robust Partitioning Policies for Multiprocessor Systems", *Performance Evaluation* 19 (1994), pp. 141-165, Special Issue on Parallel Systems.

OJ. Articles in Other Journals

- OJ1. B.G. Lawson and E. Smirni, "Multiple-queue Backfilling Scheduling with Priorities and Reservations for Parallel Systems", *Performance Evaluation Review*, Vol. 29 (4), pp. 40-47, March 2002.
Invited paper.
Also appeared the *Proceedings of the 8th Workshop on Job Scheduling Strategies for Parallel Processing* [C3].
- OJ2. L.W. Dowdy, E. Rosti, G. Serazzi, E. Smirni, "Scheduling Issues in High-Performance Computing", *Performance Evaluation Review*, special issue on Parallel Scheduling, pp. 60-69, March 1999.
Invited paper.

B. Book Chapters

- B1. A. Riska and E. Smirni, "M/G/1-type Markov Processes: A Tutorial", in *Performance Evaluation of Complex Systems: Techniques and Tools*, Performance 2002 Tutorial Lectures, M. Calzarossa and S. Tucci (eds), Springer-Verlag, Lecture Notes in Computer Science (2459), pp. 36-63, Rome, Italy, September 2002.
- B2. E. Rosti, E. Smirni, T.D. Wagner, A.W. Apon, and L.W. Dowdy, "The KSR1: Experimentation and Modeling of Poststore", *Multiprocessor Performance Measurement and Evaluation*, pp. 292-303, L.N. Bhuyan and X. Zhang (editors), ISBN 0-8186-6522-X, November 1994. Invited Chapter.
Also appeared in the Proceedings of the *ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, 1993, pp. 74–85 [C23].
An extended version of this paper appeared as ORNL technical report, ORNL/TM-12287 [M1].
- B3. E. Smirni, R.A. Aydt, A.A. Chien, and D.A. Reed, "I/O Requirements of Scientific Applications: An Evolutionary View", *High Performance Mass Storage and Parallel I/O: Technologies and Applications*, pp. 576-595, Ch. 40, T. Cortes, H. Jin, and R. Buyya, (editors), IEEE and Wiley Press, ISBN: 0-471-20809-4, New York, USA, 2001. Invited Chapter.
A shorter version of this paper appeared in the Proceedings of the *Fifth IEEE International Symposium on High Performance Distributed Computing*, Syracuse, New York, August 1996, pp. 49-59 [C16].

C. Refereed Conference Publications

Acceptance rates are provided when known.

- C1. G. Casale, E. Zhang, and E. Smirni, "KPC Toolbox: Simple Fitting Using Markovian Arrival Processes", QEST 2008, St. Malo, France, September 2008, (to appear).
- C2. G. Casale, N. Mi, L. Cherkasova, and E. Smirni, "How to Parameterize Models with Bursty Workloads", HotMetrics'08, Annapolis, MD, June 2008. Acceptance Rate: 27%.
- C3. Ningfang Mi, Giuliano Casale, and Evgenia Smirni, "Scheduling for Performance and Availability in Systems with Temporal Dependent Workloads", to appear in the International Conference on Dependable Systems and Networks (DSN'08), Anchorage, AK, 2008. Acceptance Rate: 26%.
- C4. Ningfang Mi, Alma Riska, Evgenia Smirni, and Erik Riedel, "Enhancing Data Availability through Background Activities", to appear in the International Conference on Dependable Systems and Networks (DSN'08), Anchorage, AK, 2008. Acceptance Rate: 26%.
- C5. Ludmila Cherkasova, Kivanc Ozonat, Ningfang Mi, Julie Symons, and Evgenia Smirni, "Anomaly? Application Change? or Workload Change?", to appear in the International Conference on Dependable Systems and Networks (DSN'08), Anchorage, AK, 2008. Acceptance Rate: 26%.
- C6. G. Casale, N. Mi, and E. Smirni, "Bound Analysis of Closed Queueing Networks with Nonrenewal Service", ACM SIGMETRICS'08, Annapolis, MD, June 2008, pp. 13-24. Acceptance Rate: 18%.
- C7. N. Mi, L. Cherkasova, K. Ozonat, J. Symons, and E. Smirni, "Analysis of Application Performance and Its Change via Representative Application Signatures", IEEE/IFIP Network Operations and Management Symposium (NOMS'08), Salvador–Bahia, Brazil, April 2008. Acceptance Rate: 27%.

- C8. Q. Zhang, L. Cherkasova, G. Mathews, W. Greene, E. Smirni, "R-Capriccio: A Capacity Planning and Anomaly Detection Tool for Enterprise Services with Live Workloads", *Middleware 2007*, Newport Beach, CA, Lecture Notes in Computer Science, Vol. (4834), Nov. 2007, pp. 244-265. Acceptance Rate: 20%.
- C9. Q. Zhang, L. Cherkasova, and E. Smirni, "A Regression-Based Analytic Model for Dynamic Resource Provisioning of Multi-Tier Applications", *Proc. of the 4th IEEE International Conference on Autonomic Computing (ICAC'2007)*, Jacksonville, Florida, USA, June 2007, pp. 27. Acceptance Rate: 14%.
- C10. N. Mi, Q. Zhang, A. Riska, and E. Smirni, "Load Balancing for Performance Differentiation in Dual-Priority Clustered Servers", the third International Conference on Quantitative Analysis of Systems (QEST 2006), Riverside, CA, September 2006, pp. 385-394.
- C11. Q. Zhang, A. Riska, N. Mi, E. Riedel and E. Smirni, "Evaluating the Performability of Systems with Background Jobs", International Conference on Dependable Systems and Networks (DSN'06), Philadelphia, PA, June 2006, pp. 495-504. Acceptance Rate: 18%.
- C12. Q. Zhang, N. Mi, A. Riska and E. Smirni, "Load Unbalancing to Improve Performance under Auto-correlated Traffic", 26th International Conference on Distributed Computing Systems (ICDCS2006), Lisboa, Portugal, July 2006, pp. 20 (CD-ROM). Acceptance Rate: 13.8%.
- C13. Q. Zhang, L. Cherkasova, and E. Smirni, "FlexSplit: A Workload-Aware, Adaptive Load Balancing Strategy for Media Clusters", *Multimedia Computing and Networking (MMCN'06)*, January 2006 (CD-ROM).
- C14. B. Lawson and E. Smirni, "Power-aware Resource Allocation in High-end Systems via Online Simulation", in *Proceedings of the 19th ACM International Conference on Supercomputing (ICS'05)*, Cambridge, MA, June 2005, pp. 229-238. Acceptance Rate: 27.6%.
- C15. B. Lawson and E. Smirni, "Self-Adaptive Scheduler Parameterization via Online Simulation", in *Proceedings of the 19th IEEE International Parallel and Distributed Processing Symposium (IPDPS'05)*, Denver, CO, April 2005. Acceptance Rate: 33.5%.
- C16. Q. Zhang, A. Riska, E. Riedel, and E. Smirni, "Bottlenecks and their Performance Implications in E-Commerce Systems", in *Proceedings of the 9th International Workshop on Web Content Caching and Distribution (WCW2004)*, Beijing, China, Oct. 2004, C.-H. Chi, M. van Steen, and Craig Wills (eds), Springer-Verlag, Lecture Notes in Computer Science (3293), pp. 273-282.
- C17. A. Heindl, Q. Zhang, and E. Smirni, "ETAQA truncation models for the MAP/MAP/1 departure process", in *Proceedings of the 1st International Conference on Quantitative Evaluation of Systems (QEST'04) 2004*, Enschede, Netherlands, Sept. 2004, pp. 90-99. Acceptance Rate: 35%.
- C18. Q. Zhang, E. Smirni, and G. Ciardo, "Profit-driven service differentiation in transient environments", in *Proceedings of the 11th ACM/IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2003)*, Orlando, FL, Oct. 2003, pp. 230-233.
- C19. A. Riska, V. Diev, and E. Smirni, "Efficient fitting of long-tailed data sets into hyperexponential distributions", Internet Performance Symposium, IEEE GlobeCom 2002, November 2002, Taipei, Taiwan.

- C20. B. Lawson, E. Smirni, and D. Puiu, "Self-adapting Backfilling Scheduling for Parallel Systems", in *Proceedings of the 2002 International Conference on Parallel Processing (ICPP 2002)*, Vancouver, B.C. Canada, Aug. 2002, pp. 583-592. Acceptance Rate: 35.6%.
- C21. B. Lawson, E. Smirni, "Multiple-queue Backfilling Scheduling with Priorities and Reservations for Parallel Systems", in *Proceedings of the 8th Workshop on Job Scheduling Strategies for Parallel Processing*, Edinburgh, Scotland, July 2002, D. G. Feitelson et al. (eds), Springer-Verlag, Lecture Notes in Computer Science (2537), pp. 72-87.
- C22. A. Riska, W. Sun, E. Smirni, G. Ciardo, "AdaptLoad: effective balancing in clustered web servers under transient load conditions", *22nd International Conference on Distributed Computing Systems (ICDCS 2002)*, Vienna, Austria, July 2002, pp. 104-111. Acceptance Rate: 18%.
- C23. A. Riska and E. Smirni, "M/G/1-Aggregate: exact solution of M/G/1-type Markov processes by aggregation", in *Proceedings of the 2002 ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, Marina Del Rey, CA, June 2002, pp. 86-98. Acceptance Rate: 13.5%.
- C24. A. Riska, E. Smirni, "MAMSolver: A matrix-analytic methods tool", *12th International Conference on Modeling Tools and Techniques for Computer and Communication System Performance Evaluation (TOOLS 2002)*, London, U.K., April 2002, T. Field et al.(eds), Springer-Verlag, Lecture Notes in Computer Science (2324), pp. 205-211.
- C25. R. T. Mills, A. Stathopoulos, E. Smirni, "Algorithmic modifications to the Jacobi-Davidson parallel eigensolver to dynamically balance external CPU and memory load" in *Proceedings of the ACM International Conference on Supercomputing 2001*, Sorrento, Italy, June 2001, pp. 454-463 Acceptance Rate: 34%.
- C26. A. Riska, E. Smirni, G. Ciardo, "Analytic modeling of load balancing policies for tasks with heavy-tailed distributions", in *Proceedings of the 2000 ACM Workshop on Software and Performance, WOSP 2000*, pp. 147-157, Ottawa, Canada, September 2000.
- C27. G. Ciardo, A. Riska, E. Smirni, "An aggregation-based solution method for M/G/1-type processes" *3rd International Meeting on Numerical Solutions of Markov Chains NSMC'99*, Sept. 1999, Zaragoza, Spain, pp. 21-40.
- C28. M.A.Rau, E. Smirni, "Adaptive CPU Scheduling Policies for Mixed Multimedia and Best-effort Workloads", *MASCOTS'99*, College Park, MD, October 1999, pp. 252-261.
- C29. E. Rosti, G. Serazzi, E. Smirni, M.S. Squillante, "The impact of Input/Output on Program Behavior and Parallel Scheduling", *ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, June 1998, Madison, WI, pp. 45-56. Acceptance Rate: 18%.
- C30. E. Smirni, C.L. Elford, A.J. Lavery, and A.A. Chien, "Algorithmic Influences on I/O Access Patterns and Parallel File System Performance", *1997 International Conference on Parallel and Distributed Systems*, December 1997, Seoul, Korea, pp. 794-801.
- C31. E. Smirni and D.A. Reed, "Workload Characterization of Input/Output Intensive Parallel Applications", *the 9th International Conference on Modeling Techniques and Tools for Computer Performance Evaluation*, St. Malo, France, June 1997, Marie et. al. (Eds.), Springer-Verlag, Lecture Notes in Computer Science (1245), pp. 169-180.

- C32. E. Smirni, R.A. Aydt, A.A. Chien, and D.A. Reed, "I/O Requirements of Scientific Applications: An Evolutionary View", *Fifth IEEE International Symposium on High Performance Distributed Computing*, Syracuse, New York, August 1996, pp. 49-59.
An extended version of this paper appeared as invited chapter in *High Performance Storage and Parallel I/O*, T. Cortes, H. Jin, and R. Buyya (Eds.), IEEE Press, 2001 [B2].
- C33. J. Brehm, M. Madhukar, E. Smirni, L.W. Dowdy, "PerPreT - A Performance Prediction Tool for Massively Parallel Systems", *Modeling Techniques and Tools for Computer Performance Evaluation*, H. Beilner and F. Bause (eds.), Springer-Verlag, Lecture Notes in Computer Science Vol. 977, pp. 284-298, 1995.
- C34. E. Smirni, C.A. Childers, E. Rosti, L.W. Dowdy, "Thread Placement on the Intel Paragon: Modeling and Experimentation", *MASCOTS'95*, 1995, pp. 226-231.
- C35. E. Smirni, E. Rosti, "Modeling Speedup Behavior of SPMD applications on the Intel Paragon", *International Conference on High Performance Computing and Networking*, L. Herzberger and G. Serazzi (eds.), Springer-Verlag, Lecture Notes in Computer Science Vol. 919, pp. 94-101, 1995.
- C36. E. Rosti, E. Smirni, G. Serazzi, L.W. Dowdy, "Analysis of Non-Work-Conserving Processor Partitioning Policies", in *Job Scheduling Strategies for Parallel Processing*, D. G. Feitelson and L. Rudolph (eds.), Springer-Verlag, Lecture Notes in Computer Science Vol. 949, pp. 165-181, 1995.
- C37. E. Smirni, E. Rosti, G. Serazzi, L.W. Dowdy, K.C. Sevcik, "Performance Gains from Leaving Idle Processors in Multiprocessor Systems", *1995 International Conference on Parallel Processing*, CRC Press, Vol. III, pp. 203-210, 1995.
- C38. T.D. Wagner, E. Smirni, A.W. Apon, M. Madhukar, and L.W. Dowdy, "The Effects of Thread Placement on the Kendall Square KSR1", *Proceedings of the 8th International Parallel Processing Symposium, IPPS'94*, Cancun, Mexico, 1994, pp. 618-624.
An extended version of this paper appeared as an Oak Ridge National Lab Technical Report ORNL/TM-12462, 1994 [M2].
- C39. E. Rosti, E. Smirni, T.D. Wagner, A.W. Apon, and L.W. Dowdy, "The KSR1: Experimentation and Modeling of Poststore", *ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, 1993, pp. 74-85.
An extended version of this paper appeared as Oak Ridge National Lab technical report, ORNL/TM-12287, [M1].
Also appeared as a book chapter in "Multiprocessor Performance Measurement and Evaluation", pp. 292-303, L.N. Bhuyan and X. Zhang (editors), ISBN 0-8186-6522-X, November 1994, [B2].

I. Invited Publications

- I1. E. Smirni, Q. Zhang, N. Mi, A. Riska, and G. Casale, "New Results on the Performance Effects of Autocorrelated Flows in Systems", in *Next Generation Software Workshop, IPDPS'07*, Long Beach, CA, March 2007.
- I2. E. Smirni, "Reconfigurable, Data-driven Resource Allocation in Complex systems: Practice and Theoretical Foundations", in *Next Generation Software Workshop, IPDPS'05*, Denver, CO, April 2005.
- I3. E. Smirni, C.L. Elford, D.A. Reed, and A.A. Chien, "Performance Modeling of a Parallel I/O System: An Application Based Approach" *8th SIAM Conference on Parallel Processing for Scientific Computing*, March 1997, CD-ROM.

14. D.A. Reed, C.L. Elford, T. Madhyastha, W.H. Scullin, R.A. Aydt, E. Smirni, "I/O, Performance Analysis, and Performance Data Immersion", *MASCOTS'96*, 1996, pp. 5-16.
15. D.A. Reed, C.L. Elford, T. Madhyastha, E. Smirni, and S.L. Lamm, "The Next Frontier: Interactive and Closed Loop Performance Steering", *1996 International Conference on Parallel Processing, Workshop on Challenges for Parallel Processing*, Chicago, Illinois, August 1996, pp. 20-31.
16. D.A. Reed, M.J. Gardner, and E. Smirni, "Performance Visualization: 2-D, 3-D, and Beyond", *IEEE International Computer Performance and Dependability Symposium*, Urbana-Champaign, Illinois, September 1996.

W. Workshop Publications (Refereed Abstracts)

- W1. G. Casale, E.Z. Zhang, E. Smirni, "Characterization and Synthesis of Markovian Workload Models", *GlobeCom 2007 Workshop on Future Service-Oriented Internet*, Washington, DC, Nov. 2007, (to appear).
- W2. G. Casale, E.Z. Zhang, E. Smirni, "Characterization of Moments and Autocorrelation in MAPs", September 2007, Vol. 35(2), Sept. 2007. Special Issue on the MAMA 2007 Workshop.
- W3. Q. Zhang, A. Heindl, E. Smirni, "Models of the Departure Process of a BMAP/MAP/1 Queue", *Performance Evaluation Review*, September 2005, Vol. 33(2), pp. 18-20, Sept. 2005. Special Issue on the MAMA 2005 Workshop.
- W4. B. Lawson, C. Yue, E. Smirni, and D. Nikolopoulos, "Power-aware Resource Allocation via Online Simulation with Multiple-Queue Backfilling", *Seventh International Workshop on Performability Modeling of Computer and Communication Systems (PMCCS7)*, Torino, Italy, September 2005.
- W5. Q. Zhang, A. Riska, and E. Smirni, "Evaluating the performability of systems with background jobs", *Seventh International Workshop on Performability Modeling of Computer and Communication Systems (PMCCS7)*, Torino, Italy, September 2005.
- W6. A. Riska, E. Smirni, and G. Ciardo, "An Aggregation-based Method for the Exact Analysis of a Class of GI/G/1-type Processes", *Performance Evaluation Review*, Vol. 31 (2), pp. 28-30, September 2003. Special Issue on the MAMA 2003 Workshop.
- W7. A. Riska, V. Diev, and E. Smirni, "Efficient Fitting of Long-tailed Data Sets into Phase-type Distributions", *Performance Evaluation Review*, Vol. 30 (3), pp. 6-8, December 2002. Special Issue on the MAMA 2002 Workshop.
- W8. G. Ciardo, E. Smirni, "Projection: An efficient solution algorithm for a class of quasi-birth-death processes", *Fourth International Workshop on Performability Modeling of Computer and Communication Systems (PMCCS4)*, Sept. 1998, Williamsburg, VA, pp. 34-38.

P. Refereed Posters

- P1. Q. Zhang, L. Cherkasova, G. Mathews, W. Greene, and E. Smirni, "R-Capriccio: A Capacity Planning Framework for Multi-tier Enterprise Services with Real Workloads", *Tenth IFIP/IEEE International Symposium on Integrated Management (IM 2007)*.
- P2. N. Mi, A. Riska, Q. Zhang, E. Smirni, and E. Riedel, "Efficient management of idleness in systems", *Sigmetrics'07*, pp. 371-372.

M. Miscellanea

- M1. E. Rosti, E. Smirni, T.D. Wagner, A.W. Apon, and L.W. Dowdy, “The KSR1: Experimentation and Modeling of Poststore”, Oak Ridge National Lab Technical Report ORNL/TM-12287, 1993.
Shorter version of this paper appeared at *Multiprocessor Performance Measurement and Evaluation*, pp. 292-303, L.N. Bhuyan and X. Zhang (*editors*), ISBN 0-8186-6522-X, November 1994 [B1].
Also appeared in the Proceedings of the *ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, 1993, pp. 74–85, [C23].
- M2. T.D. Wagner, E. Smirni, A.W. Apon, M. Madhukar, and L.W. Dowdy, “The Effects of Thread Placement on the Kendall Square KSR1”, Oak Ridge National Lab Technical Report ORNL/TM-12462, 1994.
This paper also appeared at the Proceedings of the *8th International Parallel Processing Symposium, IPPS’94*, Cancun, Mexico, 1994, pp. 618–624, [C22].
- M3. R. Bunt, D. Eager, L. Golubchik, G. Kotsis, S. Majumdar, R.R. Muntz, E. Rosti, G. Serazzi, and E. Smirni. Report of the Computer Resource Management Group, International Workshop on Performance Evaluation – Origins and Directions, Schloss Dagstuhl, Wadern, Germany, 1997. Organizers: G. Haring (Wien), Ch. Lindermann (GMD-FIRST Berlin), M. Reiser (Zurich).

TUTORIALS

- 2002 “M/G/1-type Markov Processes: A Tutorial”
Performance’02, with A. Riska.
- 2002 “Matrix-Analytic Methods for Solving M/G/1-type Markov Processes
SIGMETRICS’02, with A. Riska.
- 1997 “Processor Scheduling in Parallel and Distributed Systems”
SIGMETRICS’97, with M.S. Squillante and L.W. Dowdy.

SOFTWARE

- 2008 “KPC Toolbox: Best Recipes for Workload Fitting into MAPs”.
Available at <http://www.cs.wm.edu/MAPQN/kpctoolbox.html/>.
- 2003 “MAMSolver: A Matrix Analytic Methods Tool”.
Available at <http://www.cs.wm.edu/MAMSolver/>.

INVITED PRESENTATIONS

- 2007 Carleton University, Ottawa, Canada, August 2007.
Presentation Title: “Performance Impacts of Autocorrelation in Systems”.
- 2006 NCSU, Raleigh, North Carolina, December 2006.
Presentation Title: “Performance Impacts of Autocorrelation in Systems”.
- 2005 Institute for Computer Science (ITE), Heraklion, Crete, Greece, December 2005.
Presentation Title: “The Impact of Autocorrelation in Multi-Tiered Systems”.
- 2005 IFIP W.G. 7.3 Meeting, Juan-les-Pins, France, October 2005.
Presentation Title: “Approximate Models of the Departure Process of a BMAP/MAP/1 Queue”.
- 2005 Carnegie-Mellon University, Department of Computer Science, Pittsburgh, PA, March 2005.
Presentation Title: “Modeling the Departure Process of a BMAP/MAP/1 Queue”.
- 2004 University of Erlangen-Nuremberg, Department of Computer Science, Erlangen, Germany, Jan. 2004.
Presentation Title: “Approximating long-tailed data sets with PH distributions”.
- 2003 University of Milano, Department of Informatics, Milano, Italy, Dec. 2003.
Presentation Title: “ETAQA as an Alternative to Matrix Analytic Methods”.
- 2003 University of Pisa, Department of Mathematics, Pisa Italy, Dec. 2003.
Presentation Title: “ETAQA as an Alternative to Matrix Analytic Methods”.

- 2003 University of Athens, Computer Science Department, Athens, Greece, June 2003.
Presentation Title: “Matrix Analytic Techniques: Theory and Practice”.
- 2003 Dagstuhl Seminar 03201 “Probabilistic Methods in verification and Planning”.
Presentation Title: “Using ETAQA for the Solution of Large, Structured Markov Chains”.
- 2003 University of Patras, Computer Science Department, Patras, Greece, May 2003.
Presentation Title: “Approximating long-tailed data sets with PH distributions”.
- 2003 Virginia Tech, Computer Science Department, Blacksburg, VA, January 2003.
Presentation Title: “Matrix Analytic Techniques: Theory and Practice”.
- 2002 University of Patras, Computer Science Department, Patras, Greece, June 2002.
Presentation Title: “Matrix Analytic Techniques: Theory and Practice”.
- 2002 NSF Next Generation Software Workshop, University of Texas at Austin, Feb. 2002.
Presentation Title: “Coordinated Allocation of Multiple Resources in Distributed Systems”.
- 2001 University of Ioannina, Computer Science Department, Ioannina, Greece, June 2001.
Presentation Title: “Matrix Analytic Techniques: Theory and Practice”.
- 1997 Dagstuhl Workshop “Performance Evaluation - Where are we coming from – where are we going to”, Sept. 15 - 19, 1997, Schloss Dagstuhl, Germany.
Presentation Title: “Coordinated Allocation of Processor and Input/Output Resources in Parallel Systems”.
- 1997 8th SIAM Conference on Parallel Processing for Scientific Computing
Minneapolis, MN, March 1997.
Presentation Title: “I/O Requirements of Parallel Scientific Applications”.
- 1996 Workshop on Software Tools for High Performance Computing
Chatham, MA, October 1996.
Presentation Title: “Parallel I/O: Problems and Solutions”.
- 1996 Scalable I/O Initiative Meeting, Chicago, IL, April 1996.
Presentation Title: “Experiences from I/O Characterization”.

TEACHING

Courses taught

<i>Graduate</i>	CSCI664:	Advanced Operating Systems (Spring 2000)
	CSCI649:	Parallel Computing (Fall 1999, Spring 2001)
	CSCI704:	Advanced Operating Systems (Spring 1998)
	CSCI780:	Data Analysis (Spring 2006)
	CSCI754:	Performance Evaluation of Computer Systems (Fall 1998, Fall 2000, Spring 2002, Spring 2003, Spring 2005, Spring 2007)
<i>Undergraduate</i>	CSCI426/526:	Simulation (Fall 2002, Fall 2004, Fall 2005, Fall 2006, Fall 2007)
	CSCI424:	Computer Architecture (Spring 2002, Spring 2008)
	CSCI141:	Introduction to Programming in C++ (Fall 1997, Spring 1999, Spring 2000, Spring 2001)

Students/Personnel

<i>Postdoctoral Associate</i>	Giuliano Casale (January 2007 – present). <i>Project Title:</i> “Analytic Models of Queueing Networks with Non-renewal Processes”.
<i>Ph.D.</i>	Alma Riska (graduated, November 2002), Research Scientist Seagate Research. <i>Ph.D. Thesis Title:</i> “Aggregate matrix-analytic techniques and their applications”.

Barry Lawson (graduated, August 2002), Assistant Professor at University of Richmond, co-advised with S. Park.

Ph.D. Thesis Title: "Simulation Techniques in an Artificial Society Model".

Qi Zhang (graduated, December 2006), Microsoft.

Ph.D. Thesis Title: "The Effect of Workload Dependence in Systems: Experimental Evaluation, Analytic Models, and Policy Development".

Ningfang Mi (in progress).

Eddy Z. Zhang (in progress).

M.S.

Melissa Rau, (graduated, May 1999).

Project Title: "Adaptive CPU Scheduling Policies for Mixed Multimedia and Best-effort Workloads". A short version of Rau's M.S. project paper appeared in the Proceedings of *MASCOTS'99*.

Richard Tran Mills, (Co-advised with A. Stathopoulos).

Project Title: "Algorithmic modifications to the Jacobi-Davidson parallel eigensolver to dynamically balance external CPU and memory load". A short version of Mills's M.S. project paper appeared in the Proceedings of the ACM 2001 *International Conference on Supercomputing*.

Vesselin Diev, (graduated, August 2002).

Project Title: "Fitting of long-tailed data sets into hyperexponential distributions". A short version of Diev's M.S. project paper appeared in the Proceedings of the IEEE GlobeCom 2002 (Internet Performance Symposium).

Daniela Puiu, (graduated, August 2002).

Project Title: "Self-adapting Backfilling Scheduling for Parallel Systems." A short version of Puiu's M.S. project paper appeared in the Proceedings of the 2002 International Conference on Parallel Processing.

Wei Sun, (Co-advised with G. Ciardo).

Project Title: "AdaptLoad: : effective balancing in clustered web servers under transient load conditions". A short version of Sun's M.S. project paper appeared in the Proceedings of the ICDCS 2002 Conference.

Ling Liu, (graduated, May 2004).

Zhili Hua, (graduated, August 2005).

Undergr. Student Research Eric W. Davis, Spring 2002.
Andrew Otto, Fall 2004

Ph.D. Committee Member Y. Yang (completed, summer 1998)
William and Mary A. Miner (completed, summer 2000)
R. Jones (completed, summer 2002)

Z. Zhang (completed, summer 2002)
Z. Zhu (completed, summer 2003)
X. Chen (completed, spring 2005).

*Ph.D. Committee Member
external*

Giuliano Casale, Politecnico di Milano, Italy (completed, spring 2006)
Tao Zheng, Carleton University, Canada (completed, summer 2007)

DEPARTMENTAL and UNIVERSITY SERVICE

- Spring 2008* Evaluation Committee of Dean Sanderson, College of William and Mary.
- Spring 2007* Educational Policy Committee, College of William and Mary.
- Fall 2006 – present* Freshman Advisor, College of William and Mary.
- Summer 2004 – present* *Graduate Director*, Computer Science Department, College of William and Mary.
- Summer 2004 – present* *Committee on Graduate Studies*, College of William and Mary.
- Fall 2002 – 2003* *Graduate Curriculum Committee Chair*, Computer Science Department, College of William and Mary.
- Spring 2001 – 2002* *Colloquium Coordinator*, Computer Science Department, College of William and Mary.
- Fall 1999 – Spring 2005* *Faculty Search Committee*, Computer Science Department, College of William and Mary.
- Fall 1997 – Spring 2004* *Curriculum Committee*, Computer Science Department, College of William and Mary.
- Fall 1997 – 2000* *Curriculum Committee on Computational Science Program Development*. Participated in frequent meetings with the director of the Computational Sciences Cluster and three CS faculty to design four new Computer Science courses that will also play a central role in the Computational Science Cluster at William and Mary.