
ELIZABETH VARKI

Associate Professor of Computer Science

Department of Computer Science
University of New Hampshire
Durham, NH 03824-3591

Office: (603) 862-2319
e-mail: varki@cs.unh.edu

Professional Preparation

Delhi University, India	Mathematics	B.S.	1985
Delhi University, India	Computer Applications	M.A.	1988
Villanova University, PA	Computer Science	M.S.	1991
Vanderbilt University, TN	Computer Science	Ph.D.	1998

Appointments

2003-present	Associate Professor of Computer Science	University of New Hampshire
1997-2003	Assistant Professor of Computer Science	University of New Hampshire
1992-1997	Graduate Scholar	Vanderbilt University
1991-1992	Graduate Scholar	Villanova University
1988-1991	Systems Engineer	CMC Ltd., India

Research Interests

- Operating systems.
- Performance modeling and analysis of computer systems.
- Storage systems.
- Queueing models and Markov analysis.
- Distributed and parallel computer systems.
- Grid/Cloud computing.

Grants

1. NSF Award CCR-0093111 from National Science Foundation's *CAREER* program, August 2001 – July 2007, "Automated Storage Manager: An Operating System for I/O Devices on Storage Area Networks," **Principal investigator**, Amount: \$250,000.00.
2. NSF Award 0082399 from National Science Foundation's *Information Technology Research Program*, September 2000 – August 2005, "Data Management Using Smart Storage Systems," **Principal investigator**, Amount: \$400,308.00.
3. AEG award # 7824-020256-US from *Sun Microsystems*, February 2002, "SoftDisk - A tool for managing enterprise storage systems," **Principal investigator**, Amount: \$50,000.00.
4. NSF Award EIA-9974992 from National Science Foundation's *Next Generation Software Program*, September 1999 – August 2002, "Coordinated Allocation of Processor and I/O Resources in Parallel Systems," Collaborator, Amount: \$350,000.00.
5. Discretionary Research Grant from UNH, April 1998 – August 1999, "Modeling of Parallel Disk Input/Output," **Principal investigator**, Amount: \$4000.00.
6. Travel Grant from Vanderbilt University, May 1996, to present a paper at ACM SIGMETRICS Conference.

Journal Publications

1. E. Varki, A. Merchant, J. Xu, X. Qiu. Issues and challenges in the performance analysis of real disk arrays, *IEEE Transactions on Parallel and Distributed Systems*, Vol 15, No. 6, pp. 559 – 574, June 2004.
2. E. Varki. Response time analysis of parallel computer and storage systems, *IEEE Transactions on Parallel and Distributed Systems*, 12(11):1146-61, November 2001.
3. E. Varki., Mean value technique for closed fork-join networks, *Performance Evaluation Review*, 27(1):103-112, May 1999. (Also listed under Conference Publication #10.)
4. E. Varki, L.W. Dowdy, Analysis of balanced fork-join systems, *Performance Evaluation Review*, 22(1):232–241, May 1996. (Also listed under Conference Publication #11.)

Refereed Conference Publications - acceptance rates mentioned when known

1. S. Bhatia, E. Varki and A. Merchant. Sequential prefetch cache sizing for maximal hit rate, The 18th Annual Meeting of the IEEE International Symposium on Modeling, Analysis and

- Simulation of Computer and Telecommunication Systems (MASCOTS 2010), August 17-19, Acceptance rate 16%.
2. A. H. Villa and E. Varki. It takes know-how to retrieve large files over public networks, ISCA First International Conference on Advanced Computing and Communications, ACC 2010, September 2010. Acceptance rate 26%.
 3. M. Haggen and E. Varki. SCSI on a Converged Data Center Network, PCCS-2009: ISCA 22nd International Conference on Parallel and Distributed Computing and Communication Systems, October 2009.
 4. M. Haggen and E. Varki. Fibre Channel Arbitrated Loop - Performance analysis of loop tenancy overhead, IEEE International Conference on Networking, Architecture, and Storage, May 2008. Acceptance rate: 36%
 5. A. H. Villa and E. Varki. Co-allocation in data grids: a global, multi-user perspective, *3rd IEEE International Conference on Grid and Pervasive Computing*, Kunming, China, May 2008.
 6. M. Li, E. Varki, S. Bhatia, and A. Merchant. TaP: Table-based prefetching for storage caches, *6th USENIX Conference on File and Storage Technologies (FAST'08)*, February 2008. Acceptance rate: 22%.
 7. A. H. Villa and E. Varki. Replica Traffic Manager for Data Grids, *20th ISCA International Conference on Parallel and Distributed Computing Systems*, Las Vegas, NV, September 2007.
 8. E. Varki, A. Merchant, J. Xu, X. Qiu. An integrated performance model of disk arrays, *11th ACM/IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, Orlando, FL, October 2003. Acceptance rate: 25%.
 9. A. Gandhi, E. Varki, S. Bhatia. Reader-Writer Locks for data stored on Network Attached Storage and Storage Area Networks, *ISCA 17th International Conference on Computers and their Applications*, San Francisco, CA, April 2002.
 10. E. Varki, S.X. Wang. A performance model of disk array storage systems, *The Computer Measurement Group's 2000 International Conference*, Orlando, FL, December 2000.
 11. C. Childers, E. Varki. The performance of non-redundant striping in a SSA disk array, *Proceedings of the 12th International Conference on Parallel and Distributed Computing Systems*, August 1999, pp. 63 – 68.
 12. E. Varki. Mean value technique for closed fork-join networks, *Proceedings of ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, Atlanta, GA, May 1999, pp. 103 – 112. Acceptance rate: 20%.
 13. E. Varki, L.W. Dowdy, Analysis of balanced fork-join systems, *Proceedings of ACM SIGMETRICS Conference on the Measurement and Modeling of Computer Systems*, Philadelphia, PA, May 1996, pp. 232 – 241. Acceptance rate: 21%.

14. E. Varki, L.W. Dowdy. Exact response time analysis of two server fork-join systems, *ACM/IEEE 4th International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems*, San Jose, California, February 1996, pp. 287 –295. Acceptance rate: 35%.

Papers In Review

1. A. H. Villa and E. Varki. Characterization of a campus Internet workload. Submitted to the *2011 IEEE International Symposium on Workload Characterization (IISWC)*.
2. A. H. Villa and E. Varki. The feasibility of moving terabyte files between campus and cloud. Submitted to *Grid 2011: 12th IEEE/ACM International Conference on Grid Computing*.

Working papers

1. E. Varki. Removing Belady’s anomaly from prefetch caches. Plan to submit to a SIG or USENIX conference in Fall 2011.
2. E. Varki, A. Hubbe, A. Merchant. A replacement technique for Split prefetch caches. Plan to submit to USENIX FAST in Fall 2011.
3. A. Villa and E. Varki. Tortoise vs. Hare model for terabyte file transfer. Plan to submit to a conference and a journal in Fall 2011.
4. A. Villa and E. Varki. Why is my Internet sometimes slow and jittery? Plan to submit as a position paper to a journal.

Honors

- The Faculty Early Career Development (CAREER) Award from National Science Foundation in 2001.

Teaching Award

- Student teaching award, Vanderbilt University, Department of Computer Science, 1996.

Teaching Experience

- Operating system fundamentals
- Advanced/distributed operating system
- Operating system programming

- Computer system performance analysis
- Programming in C/Pascal/FORTRAN

Student Supervision

PhD.

- Adam Villa, Data grids, in progress.
- Mikkel Haggen, Storage networks, in progress.

MS

- Allen Hubbe, Cache replacement techniques, May 2011.
- Mingju Li, Storage caches, Summer 2010.
- Mahadevan Balasubramaniam, Storage systems, August 2005.
- Chong Zhang, Storage systems, May 2004.
- Jianzhang Xu, Performance evaluation of real storage systems, May 2004, 2 papers based on this work were published.
- Zhaopeng Li, Scheduling algorithms for real-time storage systems, May 2004.
- Hui Chen, Evaluation of the M/M/1 variable sub-task queue, May 2003, technical paper.
- Xiaozhou Qiu, An analytical performance model of disk-arrays under a synchronous I/O workload, August 2001, 2 papers based on part of this work were published.
- Sreeram Venkataraman, VBR-MPEG traffic over ATM networks, August 2001.
- Sheila X. Wang, A performance model of disk arrays, August 2000, paper based on part of this work was published.
- Chang Zhang, Quick performance bounding techniques for parallel computer and storage systems, December 1999, technical paper.

MS. and PhD. Committee Member

- Dmitri, MS., in progress.
- Michael Karrel, MS., in progress.
- Swapnil Bhatia, PhD., Feb 2010.
- Sachin Goel, MS., summer 2006.

- Philip J. Rhodes, PhD., summer 2004.
- Keith McGuigan, MS. 2002.
- Anshul Chadda, MS., 2001.
- Matt Reno, MS. 2000.
- Mrinalini Chavan, MS., 2000.
- Xiangdong Huang, MS., 2000.
- Monalisa Aggarwal, MS., 1999.
- Todd Medlock, MS., 1999.

University Service

- Graduate Program Coordinator, 2007 - 2011, Department of Computer Science.
- Graduate Fellowship Committee, 2009 - present, School of Engineering.
- TA Awards Committee, 2009 - present, School of Engineering.
- Indian Academic Credentials committee, 2006, University of New Hampshire.
- University Faculty Excellence Awards Committee, 2006 - 2008, University of New Hampshire.
- Graduate Studies Committee, 1997 - present, Department of Computer Science.
- P&T Committee, 2004 - present, Department of Computer Science.
- Faculty Adviser, 1998 - 2007, Department of Computer Science, Undergraduate classes of 2002, 2005, 2009.
- Faculty Search Committee, 1999, 2001, 2002, 2007, Department of Computer Science.
- CEPS Teaching Awards Committee, 2000, 2001, School of Engineering.
- UNH Women's Studies Committee, 1998, 1999, University of New Hampshire.

Industrial Collaborations

- HP Labs, technical collaboration and student support. My students, Xiaozhou Qiu and Jianzhang Xu, did summer internships in HP Storage Systems Lab.
- Sun Microsystems, grant for research.

Expert Panels

- USENIX FAST program committee, 2010.
- NSF CSR Panel, NSF, 2009, 2010.
- NSF CAREER Program, UNH, 2005, 2006, 2007.
- Promotion and Tenure Workshop for Minorities, UNH, 2005, 2006.
- NSF IDM Workshop, IR & DM: Are they moving synergistically?, May 2001.

Reviewing Activities: Journals and Conferences

- IEEE Transactions on Parallel and Distributed Systems.
- IEEE Transactions on Software Engineering.
- IEEE Transactions on Computers.
- Performance Evaluation Journal.
- Performance Evaluation Review.
- ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems.
- International Conference on Parallel and Distributed Computer Systems.
- Computer Measurement Group Conference.
- International Workshop on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS)
- USENIX File and Storage Systems Conference.

Reviewing Activities: Grant Proposals

- NSF CNS
- NSF ITR
- NSF CAREER
- NSF CISE