

Sitaram Iyer

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Objective

Research or advanced development in areas relating to operating systems (particularly resource management, memory and I/O systems, storage and network servers), and distributed systems.

Education

- **Rice University** *Houston, Texas*
Ph.D. in Computer Science *expected in June 2003*
Thesis : Application-assisted physical memory management
Advisor: Dr. Peter Druschel
- **Rice University** *Houston, Texas*
M.S. in Computer Science *Jan 2001*
Thesis : Anticipatory disk scheduling
Advisor: Dr. Peter Druschel
- **Indian Institute of Technology** *Bombay, India*
B.Tech. in Computer Science and Engineering *May 1998*
Thesis : Xority: A measure of separability of training sets for neural network size estimation
Advisor: Dr. Pushpak Bhattacharyya

Research Experience

- **Rice University** *Houston, Texas*
Graduate assistant *Aug 1998 - present*
 - Researched operating systems, with a focus on hard resource management problems arising in modern systems.
 - ◇ **Application-assisted physical memory management:** Leveraged the ability of many modern software applications to trade off memory consumption for performance. Designed an OS facility that notifies elastic applications about the severity of memory pressure, allows them to adapt to changing memory availability, and enables a powerful mechanism of user control over memory allocations.
 - ◇ **Transparent superpage support in operating systems:** Collaborated with Juan Navarro in developing a practical solution to the decade-old problem of superpage support in operating systems. Achieved sustained speedups often exceeding 30% with our FreeBSD/Alpha implementation.

- ◇ **Anticipatory disk scheduling:** Identified a long-standing problem in OS disk subsystems, where synchronous I/O induces a state of ‘deceptive idleness’. Solved it with a novel disk scheduling paradigm that deliberately delays disk requests before service. Implemented this scheduler in FreeBSD, and experimented with file servers, web servers and databases to observe 30-60% performance improvements in many cases. Results of this work are being implemented and tested by independent parties for inclusion in Linux-2.6.
 - ◇ **Resource management for server QoS:** Collaborated with Mohit Aron in designing a system that enables web and proxy server operators to ensure a probabilistic QoS level for web services co-hosted on servers. Applied methods such as admission control, feedback-based scheduling for multiple resource classes, and resource usage monitoring and readjustment.
 - Contributed to Dr. Peter Druschel’s Pastry research project on peer-to-peer systems, by designing the Squirrel web cache, designing and coding parts of the FreePastry software base, reviewing research papers, and setting up experimental hardware and software.
 - Participated in systems-related course projects and minor research projects: memory management in the IO-Lite unified buffering system; enabling architecture heterogeneity in the TreadMarks DSM; multipath routing for network QoS; parallel profiler for programs written in pthreads; DSR performance under statistical channel fading models; transparently enabling SSL for conventional applications.
- **Microsoft Research Lab** *Cambridge, England*
Summer Intern *July-Sep 2001*
Project : Squirrel: A decentralized peer-to-peer web cache
Mentor : Dr. Antony Rowstron
 - Designed, implemented, experimented with, and authored a paper on a peer-to-peer web cache named Squirrel (published in PODC 2002). Thus contributed to the ongoing peer-to-peer applications effort by exploiting a novel design space tradeoff.
 - **Massachusetts Institute of Technology** *Cambridge, MA*
Visitor *Feb-May 2001*
 - Conducted part of the anticipatory scheduling research at MIT, while accompanying my advisor during his sabbatical.
 - **Bhabha Atomic Research Center** *Bombay, India*
Summer Intern *Aug-Sep 1997*
Project : Parallelization of neural networks for handwritten character recognition
Mentor : Dr. S. M. Mahajan
 - Devised and evaluated two novel parallelization schemes on the ANUPAM parallel processing system, for distributing neural nets that implement modern handwriting recognition techniques.
 - **Indian Institute of Technology** *Bombay, India*
Undergraduate student *Aug-Nov 1996*
 - Took up several, mostly extra-curricular OS-related projects: implementing a basic microkernel for the i386 architecture; writing a Linux file system to perform package management; exploring new parallel disk I/O techniques; network-booting DOS on diskless workstations.

Papers

(copies available at <http://www.cs.rice.edu/~ssiyer/r>)

- Peer-reviewed publications:
 1. *Practical, transparent operating system support for superpages*. Juan Navarro, Sitaram Iyer, Peter Druschel, Alan Cox. Published in the Symposium on Operating Systems Design and Implementation (OSDI), Dec 2002, Boston, MA.
 2. *Squirrel: A decentralized peer-to-peer web cache*. Sitaram Iyer, Ant Rowstron, Peter Druschel. Published in the Symposium on the Principles of Distributed Computing (PODC), July 2002, Monterey, CA.
 3. *Anticipatory scheduling: A disk scheduling framework to overcome deceptive idleness in synchronous I/O*. Sitaram Iyer, Peter Druschel. Published in the Symposium on Operating Systems Principles (SOSP), Sep 2001, Chateau Lake Louise, Banff, Canada.
 4. *Xority: A measure of separability of training sets to estimate hidden layer size in neural networks*. Sitaram Iyer, Pushpak Bhattacharyya. Published in the Intl. Conference of Knowledge Based Computer Systems (KBCS), Dec 1998, Bombay, India.
- Submitted or in preparation:
 1. *Application-assisted physical memory management*. Sitaram Iyer, Juan Navarro, Peter Druschel. Submitted for peer review.
 2. *A resource management framework for predictable quality of service in web servers*. Mohit Aron, Sitaram Iyer, Peter Druschel. In preparation.

Teaching Experience

- **Rice University** *Houston, Texas*
Teaching assistant for five courses *Aug 1998 - Dec 2000*
 - Assisted in teaching advanced undergraduate courses such as Operating Systems (two semesters) and Distributed Program Construction, a graduate level course on Computer Security, and an introductory course on the Principles of Computing and Programming.
 - Conducted laboratory sessions, assisted students with projects, graded exams and assignments, and prepared model answer sets.
 - Co-guided and programmed part of a large, class-wide project in distributed program construction called ObjectWeb, and managed the code repository.
- **Indian Institute of Technology** *Bombay, India*
Teaching assistant for Introduction to Programming *Aug-Nov 1996*
 - Taught tutorial and laboratory sessions, graded exams, and helped students with course projects.

Honors

- Rice University Fellowship for graduate study
- Ranked 49th among 100,000 candidates over India in the IIT entrance exam (9th in the Western Zone)
- Indian National Talent Merit Scholarship awardee, 16th in state
- High School Merit Scholarship awardee

Professional Service

- Refereed 15 papers for the following conferences and symposia: USENIX Security 1999, Sigmetrics 2000, OSDI 2000, USENIX 2001, SOSP 2001, Infocom 2002, ISCA 2002, OSDI 2002, PODC 2003.

Other Contributions

- Created and maintain a popular poetry anthology web site (www.minstrels.org) for the past four years; the associated poem-a-day mailing list has nearly 2000 subscribers.
- Created a script-driven documentation repository at IIT Bombay, which is actively being used and maintained by current students.
- Developed an accounts management web site to keep track of joint finances among groups of friends; it currently hosts 30 users.
- Wrote and released some open-source software applications (SVNCviewer, slash2mail, cluster-tools, cvs-exp, etc.)
- Maintain the technical report archive in the Rice CS department.
- Administered server clusters in the Rice CS systems group, and assisted many colleagues with many technical difficulties.

Other interests

- Rock climbing, rock music, movies.