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Siddhartha Sen

Objective

Seeking a graduate research position in Computer Science and Engineering, particularly in distributed systems/computing, algorithms, and networking.

Education

Massachusetts Institute of Technology (MIT ID: 990088641) Cambridge, MA
M. Eng. in Computer Science and Engineering (Supercomputing Technologies Group), June 2004
GPA: 5.0/5.0

Massachusetts Institute of Technology (MIT ID: 990088641) Cambridge, MA
B.S. in Computer Science and Engineering and B.S. in General Mathematics, June 2003
Minor in Spanish, June 2003
GPA: 4.8/5.0

Relevant Course Work: **[CS]** Theory of Parallel Hardware, Theory of Parallel Systems, Computer System Architecture, Distributed Computer Systems Engineering, Computer Graphics, Network and Computer Security, Artificial Intelligence, Computer System Engineering, Laboratory in Software Engineering, Computation Structures, Information and Entropy, Structure and Interpretation of Computer Programs; **[CS, M]** Parallel Computing, Advanced Data Structures, Theory of Computation, Introduction to Algorithms, Mathematics for Computer Science; **[M]** Complex Variables with Applications, Principles of Applied Mathematics, Probability and Random Variables, Linear Algebra, Differential Equations; **[EE]** Microcomputer Project Laboratory, Signals and Systems, Circuits and Electronics **[Key: CS**=Computer Science, **M**=Math, **EE**=Electrical Engineering**]**

International School Manila High School Manila, Philippines
Graduated Valedictorian and Class Speaker 1999 with GPA: 4.0/4.0

Work/Research Experience

Clustering & High Availability Group (Microsoft Corp.) **September 2004-present**
Software Design Engineer
Current responsibilities include: designing, developing, and testing network load-balancing software for the next release of Windows Server (codename "Longhorn"); architecting the future of high-availability/scale-out software for Windows Server; collaborating with and acting as liaison to MSR on work-inspired projects; and driving the generation of ideas and intellectual property for Microsoft's scale-out technologies (see 'Patents and Publications' section below).

I-Lab Heat Exchanger Project (MIT Chemical Eng. Dept.) **September 2003-May 2004**
Research Assistant
Served as a RA for Prof. Clark Colton in the Chemical Engineering department under the Microsoft I-Campus initiative (enhancing university education through information technology). The I-Lab is an interactive heat exchanger experiment run remotely by students taking courses in control and heat/mass transfer. Responsibilities included designing and maintaining the heat exchanger website, developing interfaces to new experiments, and coordinating use of the experiment by other universities. All experiment interfaces were developed using the LabVIEW 7.0 graphical development language.

Windows Network Load-Balancing Group (Microsoft Corp.) **July 2003-August 2003**
Software Design Engineer Intern Part-time: **September 2003-January 2004**
Worked on three projects over the course of the summer. 1) Designed and implemented a Distributed Assertions Framework (DAF) for programmatically analyzing logs from multiple machines to verify the execution traces of distributed objects. Execution traces were tested against executable specifications written using the Abstract State Machine Language (AsmL), a software specification language founded on the theory of Abstract State Machines. 2) Designed and implemented a prototype of the Asynchronous Remote Procedure Call (ARPC) architecture for next-generation load-balancing software (NLB2). The ARPC protocol is used between load-balancers and hosts in a typical NLB environment. 3) Researched Distributed Shared Memory (DSM) algorithms and systems and designed and implemented a prototype for the Distributed Atom Manager (DAM), a distributed state maintenance system for NLB2. The DAM prototype supports different levels of data consistency and replication.

Supercomputing Technologies Group (MIT CSAIL) **March 2003-June 2003**
Research Assistant **September 2003-September 2004**
Designed and implemented a dynamic processor-allocation system for adaptively parallel jobs, focusing on the specific case of parallel jobs scheduled with the randomized work-stealing algorithm, as is used in the Cilk multithreaded language. Developed a heuristic for estimating the instantaneous parallelism of Cilk jobs, and extended the Cilk runtime environment to include a processor allocation system that

dynamically allocates processors to jobs in a fair and efficient manner.

Scalable Systems Group (IBM T. J. Watson Research Center) **June 2002-September 2002**
Co-op Pre-Professional Programmer/Research Assistant
Researched and analyzed various technologies and architectures of Grid Computing, including the Metacomputing Directory Services (MDS), Grid Monitoring Architecture (GMA), Grid Notification Framework (GNF), Grid Security Infrastructure (GSI), Workload Management System (WMS), and OGSA Policy Service. Participated in the design of data models and architectures for resource metering, logging, and problem determination in heterogeneous grid environments. Designed a Resource Metering System (RMS) for Grid Services based on the Application Response Measurement (ARM) and Common Information Model (CIM) standards, accompanied by a research paper.

6.170 Laboratory in Software Engineering (MIT EECS Dept.) **February 2002-May 2003**
Lab Assistant
Served as a Lab Assistant for students taking the required software engineering laboratory for computer science majors at MIT (taught in Java). Responsibilities included previewing problem sets and assignments, helping students with coding/design problems, performing on-site duty in computer clusters (minimum of 5 hours/week), and providing general assistance to the Professors and Teaching Assistants.

PocketPC Group (Microsoft Corp.) **June 2001-August 2001**
Software Design Engineer Intern
Developed an HTTP (internet) mail transport for the PocketPC Inbox application to complement the already existing IMAP and POP3 transports. The transport performed web-based DAV authentication (for logging on to Hotmail servers) and provided full mail functionality: multithreaded downloading of headers only/full message bodies, synchronizing the folder hierarchy and contents, resolving deleted/moved item conflicts on both the device and server, handling attachments, and implementing a "connected" mode where all transactions are processed instantaneously. The program languages and techniques used included C++, Win32 Programming, COM, XML parsing, and general HTTP connection requests/commands.

Software Agents Group (MIT Media Lab) **February 2000-May 2000**
Software Developer/Research Assistant
Developed business applications on mobile phones that interacted with agents in the back-end using the WAP Gateway/Server, WML, VBScript, JavaScript, and SQL Server. Integrated these services with the Hive infrastructure created by the Software Agents team to enable agent-to-agent communication/interaction.

Patents and Publications

Siddhartha Sen and Amit Date. Sandwich Testing Methodology. *United States Patent Application* (in progress).

Siddhartha Sen. Dynamic Network Load Balancing Using Roundtrip Heuristic. *United States Patent Application* 11/518,673, filed September 11, 2006.

Siddhartha Sen. Load Balancing via Rotation of Cluster Identity. *United States Patent Application* 11/276,761, filed March 13, 2006.

Siddhartha Sen, Joseph M. Joy, Nikolai Tillman, Colin L. Campbell, and Margus Veanes. Diagnosing Problems in Distributed Systems. *United States Patent Application* 11/140,061, filed May 28, 2005.

Anders Selmer, Mike Goodson, Markus Kraft, Siddhartha Sen, V. Faye McNeill, Barry S. Johnston, and Clark Colton. Process Dynamics and Control Experiment Performed Across the Atlantic. *Chemical Engineering Education*, Summer 2005, 232-237.

Siddhartha Sen. Dynamic Processor Allocation for Adaptively Parallel Jobs. Master's thesis, Massachusetts Institute of Technology, September 2004.

Siddhartha Sen. Distributed Assertions Framework (DAF) for the DDC. Microsoft Corporation (internal), August 2003.

Siddhartha Sen. A Resource Metering System (RMS) for Grid Services. Advanced Undergraduate Project, Massachusetts Institute of Technology, May 2003.

Activities/Honors

Member of Phi Beta Kappa, Tau Beta Pi, and Eta Kappa Nu national honor societies
Member of National Society of Collegiate Scholars (NSCS) and Sigma Xi scientific research society

Casino Rueda (Salsa) and Hip-Hop dance instructor, 2000-present
Member of City of Bellevue Volleyball League, Division A, 2005-present
Member of MIT Varsity Gymnastics team, 2002-2003
President of MIT Casino Rueda (Salsa) Group, 2001-2003
President/Treasurer of MIT International Students Association, 2001/2000
Rush Chair/Alumni Secretary of Nu Delta Fraternity, 2002/2001

Miscellaneous

Proficient in playing tabla (Indian drums), other percussion instruments, and baritone
Proficient in juggling (pins, balls); experienced in hip-hop/salsa choreography and gymnastics
Fluent in Spanish and Bengali; extensive public speaking experience