Shah Asaduzzaman

Contact Information

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Skills/Experience highlights

Employability

Work authorization: Canadian Citizen Security clearance: Eligible for Secret level Official language ability: English – fluent oral/written French – intermediate level oral/written Current position: Postdoctoral fellow, University of Ottawa Availability: immediate Willingness to move: Yes

- **7+ years research experience**, 2+ years independent (Post-doc), 5 years supervised (PhD)
- **Fellowship** from government funding agency
- 3 years of university level **teaching experience**
- Experience in
 - ✓ Authoring, editing, evaluating scientific/technical articles
 - ✓ Initiating research projects and composing proposal documents
 - Mentoring graduate students' research projects
 - ✓ Serving as referee/committee-member in scientific journals and conferences
 - ✓ Curriculum design, course design, course material preparation
- Significant software development experience in research projects (C/C++/Java, 5+years)
- Fluent in problem solving and algorithm design: specialty in concurrent/distributed computing
- Experience in providing technical **consultation** for government projects
- Project management skills, very good adaptability and rapid-learning ability
- Breadth of knowledge across multiple disciplines

Areas of Research Interest

- Large scale distributed systems and networks
 - ✓ Peer-to-peer systems / decentralized self-organizing systems
 - ✓ Decentralized platforms for social communication, collaborative editing and content sharing
 - ✓ Cloud/Grid computing platforms
 - ✓ Distributed indexing of spatial/metric space data
 - ✓ Weak consistency in distributed data-structures
- Security and access control in networked systems
- Mobile ad-hoc networks, sensor networks
- Modeling dynamics and evolution of self-organizing networks

Education

• PhD, Computer Science, McGill University, January 2008, GPA 4.00/4.00

Research area: Networks and distributed systems, hi-performance distributed computing **Thesis:** *Managing opportunistic and dedicated resources in a bi-modal service deployment architecture*

• MSc Engineer, Computer Science and Engineering,

Bangladesh University of Engineering and Technology, June 2002, GPA 3.33/4.00 **Research area:** Bioinformatics, pattern recognition **Thesis:** *Hidden Markov models for computational gene recognition*

• BSc Engineer, Computer Science and Engineering,

Bangladesh University of Engineering and Technology, September 1999, GPA 3.92/4.00 Honors project: *English to Bengali natural language translation*

Awards and Distinctions

- **Postdoctoral Fellowship**, le Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT), 2008-2010
- McGill Major Doctoral Fellowship, McGill University, Montreal, Canada, 2005-2007
- Faculty of Science Entrance Fellowship, University of Manitoba, 2002
- Dean's List Award, Bangladesh University of Engineering and Technology, 1996~1999
- University Merit Scholarship, Bangladesh University of Engineering and Technology, 1998
- Among top three teams in ACM International Collegiate Programming Contest, Asia Region, 1997

Research Experience

Post-Doctoral Research Fellow (October 2007 ~ present)

Distributed Systems Research Group, School of Information Technology and Engineering, University of Ottawa **Supervisor:** Dr. Gregor v. Bochmann

Research Projects:

General agenda is to investigate ways to construction and maintenance of efficient and resilient largescale self-organizing network structure for various applications.

- Weakly Consistent Distributed B-tree: The massively parallel high-throughput computing in cloud-computing platforms are getting crippled by strong consistency requirements of distributed data structures that were not originally designed for such a big scale. B-tree is a search-key indexing data structure widely used in databases and file-systems. Here we attempt to find the minimum consistency requirements for maintaining the navigability of a decentralized bottleneck-free B-tree structure, and define the procedures to perform B-tree operations in that loosely-consistent structure.
- **GeoP2P**: an adaptive and fully decentralized platform for location based search. This uses a distributed indexing scheme for geographic databases, which allows autonomous management of local information and self-organized growth and retraction of the platform, without presence of any central coordinating entity.
- **Using Geography for Routing Locality**: As a corollary to the GeoP2P network, it was realized that geographic coordinates of the Internet end hosts, at the granularity of ISP's POP, can be used to construct overlay networks that restricts most of the traffic in short-distance locality. Use of geographic coordinates eliminates the need for additional measurement of network distance metrics.
- **CliqueStream**: a robust and efficient overlay structure that can seamlessly integrate the serverbased content delivery networks with end-user resources for large scale live video streaming. The overlay structure also constraints peer-to-peer streaming traffic within network locality and reduces traffic burden on ISPs.

Graduate Research Assistant/PhD Student (January 2003 ~ September 2007)

Advanced Networking Research Laboratory, School of Computer Science, McGill University **Supervisor:** Dr. Muthucumaru Maheswaran

PhD Thesis:

Title: Managing opportunistic and dedicated resources in a bi-modal service deployment architecture **Overview:** My thesis involved the question of how to build a system with tangible performance guarantee from unreliable components. My idea was to use a small number of reliable components in conjunction with a large number of cheaply available but unreliable components. The benefit is twofold – the system achieves both scalability and performance guarantee at low cost. I experimented with the resource management policies for two platforms where such combination was possible -- i) a combination of reliable compute-servers and stray processing power from idle end-user computers for high throughput computing, ii) a combination of private dedicated links such as user-controlled-light-path and public internet paths to interconnect distributed compute servers for processing of streaming data.

Research Projects:

Following research projects contributed to my PhD thesis

- A distributed stream processing platform with bi-modal communication links: This is a distributed platform for in-network multi-step processing of data streams (sensors, multimedia). The processing nodes are interconnected with two types of networks dedicated fiber links and virtual links through the Internet. The links and processing nodes are allocated to different components of stream processing tasks in a fully decentralized way. The combination of dedicated and virtual links is found to increase resource utilization and yield better processing throughput.
- A cloud computing platform with bi-modal computing resources: The platform combines server-pools with the stray computing power of desktop workstations to serve high-throughput computing applications. Different policies for resource monitoring and task migrations were evaluated for performance and overhead.
- **Software reliability under rejuvenation:** a simple mathematical model to measure reliability of a long-running software application under pro-active periodic restart.

Peer-reviewed Scientific Publications

(Copies may be downloaded from the applicant's web site)

Journal articles

[J-1] S Asaduzzaman, Ying Qiao and Gergor v. Bochmann, "CliqueStream: Creating an Efficient and Resilient Transport Overlay for Peer-to-Peer Live Streaming using a Clustered DHT", *Peer-to-Peer Networking and Application*, Jun. 2009 (Online preprint)

[J-2] S Asaduzzaman and M Maheswaran, "Strategies to Create Platforms for Differentiated Services from Dedicated and Opportunistic Resources", *Journal of Parallel and Distributed Computing*, 67(10), pp. 1119-1134, 2007

[J-3] S Asaduzzaman and M Maheswaran, "Utilizing Unreliable Public Resources for Higher Profit and Better SLA Compliance in Computing Utilities", *Journal of Parallel and Distributed Computing*, 66(6), pp. 796-806, 2006

[J-4] M M Akon, **S Asaduzzaman**, M S Rahman and M Matsumoto, "Proposal for st-routing protocol", *Telecommunication Systems*, 25(3,4), pp. 287-298, Apr. 2004

Submitted/Under review:

[J-5] S Asaduzzaman and Muthucumaru Maheswaran, "Decentralized Management of Bi-modal Network Resources in a Distributed Stream Processing Platform", *Journal of Parallel and Distributed Computing*, submitted Mar. 2009. Draft available at arXiv:0903.4100

Book Chapters

Y Qiao, **S Asaduzzaman** and G v Bochmann, "Peer-to-peer Platforms for High-Quality Web Services: the Case for Load-balanced Clustered Peer-to-peer Systems", in *Developing Advanced Web Services through P2P Computing and Autonomous Agents: Trends and Innovation*, IGI global, USA, 2009

International Conferences

[C-1] S Asaduzzaman and G v Bochmann, "A Locality Preserving Routing Overlay using Geographic Coordinates", 3rd IEEE Intl Conf on Internet Multimedia Systems Architecture and Application (IMSAA), Dec. 2009, Bangalore, India

[C-2] S Asaduzzaman and M Maheswaran, "Using Opportunistic and Dedicated Networks in Synergy for a Cost-effective Distributed Stream Processing Platform", *14th IEEE Intl. Conf. on Parallel and Distributed Systems (ICPADS)*, Dec. 2008, Melbourne, Australia.

[C-3] S Asaduzzaman, Ying Qiao and Gregor v. Bochmann, "CliqueStream: An Efficient and Faultresilient Live Streaming Network on a Clustered Peer-to-peer Overlay" *8th IEEE Intl. Conf. on Peerto-peer Computing (P2P'08)*, Sep. 2008, Aachen, Germany. **[C-4] S Asaduzzaman** and M Maheswaran, "Towards a Decentralized Algorithm for Mapping Network and Computational Resources for Distributed Data-Flow Computations", *21st IEEE Intl. Conf. on High-performance Computing Systems (HPCS), Calgary, Canada,* 2007.

[C-5] S Asaduzzaman and M Maheswaran, "How the Time-Before-Failure Reacts to Periodic Rejuvenation", *37th IEEE/IFIP Intl. Conf. on Dependable Systems and Networks (DSN): Fast abstract*, Jun 2007, Edinburgh, UK

[C-6] M Maheswaran, B Maniymaran, **S Asaduzzaman**, and A Mitra, "Towards a Quality of Service Aware Public Computing Utility", *IEEE Intl. Conf. on Network Computing and Applications (NCA): Workshops*, pp. 376-379, Cambridge, MA, Aug. 2004

[C-7] S Asaduzzaman and M Maheswaran, "Leveraging Public Resource Pools to Improve the Service Compliances of Computing Utilities", *IEEE Intl. Conf. on High-Performance Computing (HiPC)*, pp. 242-251, Bangalore, India, Dec. 2004

Technical reports/non-reviewed papers:

[C-8] S Asaduzzaman and Gregor v. Bochmann, "GeoP2P: an Adaptive and Fault-tolerant Peer-to-Peer Overlay for Location based Search", Mar. 2009. arXiv:0903.3759

[C-9] S Asaduzzaman and Gregor v. Bochmann, "Overlay Structure for Large Scale Content Sharing: Leveraging Geography as the Basis for Routing Locality", Jan 2009, arXiv: 0903.4113

Regional Conferences

[C-10] S Asaduzzaman and M Maheswaran, "Heuristics for Scheduling Virtual Machines for Improving QoS in Public Computing Utilities", *9th Intl. Conf. on Computer and Information Technology (ICCIT)*, Dhaka, Dec. 2006

[C-11] M N Shakeeb, M I Hasan and **S Asaduzzaman**, "A Knowledge Based Approach for Multicast Routing with Centralized Control", *5th Intl. Conf. on Computer and Information Technology (ICCIT)*, Dhaka, Dec. 2002

[C-12] S Asaduzzaman and M M Ali, "A System for Automatic Translation Between Bangla and Other Natural Languages: the Design Principles", *1st Intl. Conf. on Computer and Information Technology (ICCIT)*, Dhaka, pp 194-198, Dec. 1998

Peer-Review Experience

Served as Referee -

- o Peer-to-Peer Networking and Applications (PPNA), Springer Verlag
- o Journal of Parallel and Distributed Computing (JPDC), Elsevier Science
- Journal of Systems and Software, Elsevier Science
- o 13th International Conference On Principle Of Distributed Systems (OPODIS), 2009
- IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2009
- International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness, 2008

Teaching/Academic Experience

Teaching

- Course Lecturer, School of Computer Science, McGill University, Fall 2006
- Courses: Introduction to Computing
- **Teaching Assistant**, School of Computer Science, McGill University, Winter 2003 ~ Winter 2005 Courses: Computer Networks, Computer Systems Organization, Operating Systems, Internet Programming, Introduction to Computing
- Lecturer, Computer Science and Engg, Bangladesh U of Engg and Tech, Nov 1999 ~ Aug 2002 Courses: Operating Systems, Computer Networks, Simulation and Modeling, Structured Programming, Digital Logic Design, Digital Electronics and Pulse Techniques Supervision: undergraduate thesis project of 2 students

- Visiting Lecturer, Military Institute of Science and Technology, Dhaka (Jan. 2002 ~ Jun. 2002)
- Visiting Lecturer, Ahsanullah University of Science and Technology, Dhaka (2001)
- Visiting Lecturer, American International University Bangladesh, Dhaka (2000 ~ 2001)

Curriculum Design

- Editor of the curriculum for the Computer Science and Engineering undergraduate program, Daffodil International University, Bangladesh
- Author of exam questionnaire for computer studies, Higher Secondary Certificate exam (annual national level exam), Secondary and Higher Secondary Education Board, Dhaka (2000~2001)

Teaching Development Training

- Group Management Workshop, organized by TLSS, University of Ottawa, Nov. 2008
- Workshop on **Teaching Critical Thinking**, organized by TLSS, University of Ottawa, Nov. 2008
- Workshop on Science Teaching, conducted by Dr. Craig Nelson, Indiana University, organized by TPULSE, McGill University, August 29-31, 2006
- Graduate Teaching Workshop, organized by TPULSE, McGill University, January 5-6, 2005
- **Teaching Management** Workshop, Bangladesh University of Engineering and Technology, June 13-14, 2002

Consulting Experience

- Procurement consultant for public/private sector organizations-
 - Installation of nationwide data network and centralized banking software for BASIC Bank limited (2001) and Prime Bank limited (2002)
 - Installation of hardware equipments for automation and data networking of nationwide offices under the Ministry of Fisheries and Livestock, Bangladesh
- Member, monitoring committee for the development of corporate banking software for "Bangladesh Shilpa Reen Sangstha" (a state owned bank in Bangladesh), July 2001 ~ August 2002

Event Management

- Member of organizing committee, National Computer Programming Contest, Bangladesh, July 2001. Responsible for administering the IT support during the contest
- Contest administrator, ACM Intl. Collegiate Programming Contest, Asia regional site, Dhaka, Jan 2002

Programming Skills

- Proficient in programming languages: Java (2003-2008, 4yrs), C (1995-2006, 10yrs), C++ (2yrs)
- Scripting language: **Python** (2004-2007)
- Intel x86 assembly language programming (1996-1997)
- Database: **SQL** (1997-1998)
- Programmed in both Linux/Unix and Windows operating systems
- Concrete knowledge of Linux/Unix kernel data structures and algorithms

IT-Support Experience

- System administrator, Dept of Computer Science, Bangladesh U of Engg. and Tech., 1999-2002
 - Managed Linux and Windows 2000 servers
 - 100+ networked PCs, with Linux and Windows 2000 operating systems
 - Help desk consultant, School of Computer Science, McGill University, 2004-2007
 - Helping students for troubleshooting PC and programming related problems

Other Experiences

Hobbies

- Playing music, singing
- Reading, writing, chasing questions

Community/Volunteer Activities

- Write articles/essays in community blogs/forums on important social issues, such as -
 - ✓ Identity conflicts in children of migrant Bangladeshis
 - ✓ Child education, language learning, parenting
 - ✓ Demoralization of student activism in Bangladesh
 - ✓ Impact of new communication technologies in society
- Was active member of student music club
- Experience in conducting social/cultural events
- Volunteered for helping immigrant students and jobseekers
- Participated in fundraising activities in natural disasters

Career Chronology

P-13	2007/10-present (full-time)	Postdoctoral Research Fellow <u>School of Information Technology & Engineering, University of Ottawa</u> , Ottawa, Ontario, Canada Supervisor: Dr. Gregor y, Bochmann [bochmann@site.uottawa.ca]
P-12	2003/01-2007/09 (full-time)	PhD student and Research Assistant <u>School of Computer Science, McGill University (SOCS-McGill)</u> Montreal, Quebec, Canada Supervisor: Dr. Muthucumaru Maheswaran [^{maheswar@cs.mcgill.ca}]
P-11	2006/09-2006/12 (part-time)	Course Lecturer, <u>SOCS-McGill</u> Supervisor: Joseph Vybihal [j ^{yy} bihal@cs.mcgill.ca
P-10	2003/01-2006/04 (part-time)	Teaching Assistant , <u>SOCS-McGill</u> Supervisors: <u>Dr. Muthucumaru Maheswaran</u> [^{maheswar@cs.mcgill.ca}], Dr. Tim Merret [^{tim@cs.mcgill.ca}]
P-9	2004/10-2007/09 (part-time)	Laboratory Help-desk Consultant, <u>SOCS-McGill</u> Supervisor: Sadaf Mustafiz [^{sadaf@cs.mcgill.ca}]
P-8	2002/09-2002/12 (full-time)	PhD student and Research Assistant <u>Computer Science department, University of Manitoba,</u> Winnipeg, Manitoba, Canada Supervisor: Dr. Muthucumaru Maheswaran [^{maheswar@cs.mcgill.ca}]
P-7	2002/08-2007/12 (full-time in 2002/08, on leave from 2002/09)	Assistant Professor <u>Computer Science & Engineering department, Bangladesh University of</u> <u>Engineering & Technology (CSE-BUET)</u> , Dhaka, Bangladesh Supervisor: Dr. Abul Kashem Mia [kashem@cse.buet.ac.bd]
P-6	1999/11-2002/08 (full-time)	Lecturer, <u>CSE-BUET</u> Supervisor: Dr. Chowdhury Mofizur Rahman [cmr@uiu.ac.bd]
P-5	1999/11-2002/08 (part-time)	Consultant Technical Expert At various government, commercial and academic organizations Bureau of Research testing and Consultation, BUET
P-4	2002/01-2002/04 (part-time)	Visiting Lecturer Military Institute of science and Technology, Dhaka, Bangladesh
P-3	2001/09-2001/12 (part-time)	Visiting Lecturer Ahsanullah University of Engineering and Technology, Dhaka, Bangladesh
P-2	2000/01-2001/04 (part-time)	Visiting Lecturer American International University, Dhaka, Bangladesh
P-1	2001/01-2002/08 (part-time)	Member of the Founding Team Information Engineers and Consultants, Bangladesh Ltd.