

## Md. Ariful Azad

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- Objective** Want to participate in challenging and innovative projects in a dynamic and diversified work environment.
- Education**
- Department of Computer Science, Purdue University Aug 08 - Current  
PhD Student (Current GPA 3.94)
- Department of CSE, Bangladesh University of Engg & Tech Nov 2006  
BSc. in Computer Science and Engineering (GPA 3.85)
- Research Interests** High Performance Bioinformatics, Parallel Computing.
- Professional Experience**
- Summer Intern**, Pacific Northwest National Lab, Richland, WA Summer 10, 11
- Worked on parallel graph matching algorithms on multithreaded architectures.
- Research Assistant**, Department of CS, Purdue University Jan 09 - Current
- Currently working with Prof. Alex Pothén on multithreaded algorithms for matching in graphs with application to data analysis in flow cytometry.
- Teaching Assistant**, Mathematics Department, Purdue University Aug 08 - Dec 08
- Conducted two recitation classes on Differential Calculus.
- Member, R&D**, Commlink Infotech Ltd, Dhaka, Bangladesh Sep 06 - Jun 08
- Developed an Intelligent Network for telephone call routing and an Integrated Network Management System for managing optical routing devices.
- Publications**
- **A. Azad**, S. Pyne, and A. Pothén, *Matching phosphorylation response patterns of antigen-receptor-stimulated T cells via flow cytometry*, to appear in BMC Bioinformatics, 2012.
  - **A. Azad**, M. Halappanavar, S. Rajamanickam, E. Boman, A. Khan, and A. Pothén, *Multithreaded Algorithms for Maximum Matching in Bipartite Graphs*, to appear in the 26<sup>th</sup> IEEE International Parallel & Distributed Processing Symposium (IPDPS), Shanghai, China, 2012.
  - **A. Azad**, M. Halappanavar, F. Dobrian, and A. Pothén, *Computing Maximum Matching in Parallel on Bipartite Graphs: Worth the Effort?*, Supercomputing 2011, Workshop on Irregular Applications: Architectures & Algorithms, Seattle.
  - **A. Azad**, J. Langguth, Y. Fang, A. Qi and A. Pothén, *Identifying Common Rare Cell Populations in Comparative Flow Cytometry*, Algorithms in Bioinformatics, pp. 162-175, 2010.
  - P. J. Waddell and **A. Azad**, *Residual Resampling: Robust Estimators of Error and Fit for Evolutionary Trees and Phylogenomics*, ArXiv, Dec, 2009.
  - **A. Azad**, A.B.M. Islam, M. K. Alam and M. S. Alam, *Router oriented Traffic flow analysis for IP backbone network*, in International Conference on Information and Communication Technology (ICICT), Dhaka, March, 2007.
- Invited Talk** **A. Azad**, S. Pyne and A. Pothén, *flowMatch: A tool to create feature-preserving templates by population matching*, FlowCAP-II Summit at NIH, Bethesda, Sept, 2011.

**Awards  
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Honors**

- Research Fellowship, Purdue Research Foundation, 2009-2010.
- Travel award, College of Science, Purdue University, to present a paper at WABI 2010, Liverpool, U.K.
- Deans Merit Award, Bangladesh University of Engg & Tech, 2004 - 2006.
- 4<sup>th</sup> position in HSC (~ 12<sup>th</sup> grade public exam) and 8<sup>th</sup> position in SSC (~ 10<sup>th</sup> grade public exam) in the combined merit list at Rajshahi Public Education Board, Bangladesh (out of approx. 500,000 students).

**Graduate  
Courses**

Computer Networks, Algorithms, Compiler, Bioinformatics, Computing for Life Science, Machine Learning, Parallel Computing, Graph Theory, Cloud Computing.

**Skills**

Languages: C, C++, Java, R, Perl, Python, C#, SQL  
Framework: Matlab, Eclipse, JavaEE, .NET  
Database: Oracle, PgSQL, MySQL

**Professional  
Association**

Student Member, IEEE - Institute of Electrical and Electronics Engineers  
Student Member, ISCB - International Society for Computational Biology  
Student Member, SIAM - Society of Industrial and Applied Mathematics

**Community  
Involvements**

Webmaster, Purdue Graduate Student Government (PGSG) Aug 09 - April 11  
Webmaster, Purdue Bangladesh Student Association (BDSA) Aug 09 - Current

**Selected  
Projects**

**Population registration with consistency :** In current work, we are adapting the concept of consistency used in multiple sequence alignments to the population registration problems for clinical studies in leukemia, Alzheimers disease, and diabetes.

**Parallel Maximum Cardinality Matching:** We have developed three classes of multithreaded algorithms to compute maximum cardinality matchings in bipartite graphs, and evaluated their performance on an Intel Nehalem, an AMD Opteron, and the massively multithreaded Cray XMT.

**Detecting phosphorylation shifts:** We have applied two-stage Generalized Edge Cover to identify phosphorylation shifts in T cells due to stimulation with an antibody.

**Graph Algorithms using MapReduce on the Clouds:** In this project I designed and implemented efficient algorithms for shortest path and graph matching on large distributed graphs using MapReduce on Amazon EC2 cloud.

**Identifying leukemic states:** In this study we have applied Generalized Edge Cover to identify cell populations with differentially expressed markers in samples from mice with acute promyelocytic leukemia (APL) relative to samples from healthy mice.

**Residual Resampling in Phylogenomics:** We used residual resampling to evaluate the confidence of phylogenetic trees computed from DNA or Protein sequences.

**Performance Preserving Network downscaling:** In this study we partitioned a large communication network into small pieces, measured performance on the small parts and extrapolate the behavior of the whole network.

**References**

Alex Pothén  
Professor, Department of Computer Science, Purdue University  
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