

# Curriculum Vitae

Amitabh Chaudhary

## Education

- Ph.D., Computer Science, Johns Hopkins University, Baltimore 2002  
Thesis: *Applied spatial data structures for large data sets.*  
Advisors: Michael T. Goodrich and Alexander S. Szalay.
- M.S., Computer Science, Johns Hopkins University, Baltimore 1998  
Thesis: *Parameterized Balanced Aspect Ratio Trees.*  
Advisor: Michael T. Goodrich.
- M.Tech., Computer Science, Indian Institute of Technology, 1996  
Mumbai, India  
Thesis: *Approximation algorithms for the achromatic number.*  
Advisor: Sundar Vishwanathan.
- B.Tech., Electrical Engineering, Indian Institute of Technology, 1992  
Kharagpur, India  
Thesis: *Analysis of digital signal processing algorithms on cache-coherent multi-processors.* Advisor: R. N. Mahapatra.

## Academic Appointments

- Assistant Professor, Computer Science and Engineering 2005–present  
University of Notre Dame
- Postdoctoral Research Associate, Computer Science and Engineering 2004  
University of Notre Dame
- Associate Specialist, School of Information and Computer Science 2002–2004  
University of California, Irvine
- Research and Teaching Assistant, Computer Science 1996–2002  
Johns Hopkins University, Baltimore
- Research and Teaching Assistant, 1994–1996  
Computer Science and Engineering  
Indian Institute of Technology, Mumbai, India

## Non-Academic Appointments

- Software Engineer 1992–1993  
CMC, Kolkata, India

## Honors and Awards

- Outstanding Teaching Award, Department of Computer Science and Engineering, University of Notre Dame, 2010.
- Employee Appreciation Award, CMC, Kolkata, India, 1993.
- National Talent Search Scholarship, awarded by National Council for Educational Research and Training, New Delhi, India, 1986. (Awarded yearly to about 150 students chosen nationwide.)

## Professional Memberships

- Association for Computing Machinery (ACM).
- Institute of Electrical and Electronics Engineers (IEEE).

## Book Chapter

1. I. Raicu, I. Foster, Y. Zhao, A. Szalay, P. Little, C. Moretti, A. Chaudhary, D. Thain. Towards Data Intensive Many-Task Computing. Book chapter in *Data Intensive Distributed Computing: Challenges and Solutions for Large-Scale Information Management*, IGI Global Publishers, 2009.

## Journal Publications

Authors of publications in theoretical computer science are listed alphabetically by convention.

2. A. Chaudhary and S. Vishwanathan. Approximation algorithms for the achromatic number. *J. Algorithms*, 41(2), pages 404–416, 2001. Impact factor (2 year 0.444, 5 year 1.674).
3. A. Bagchi, A. Chaudhary, and P. Kolman. Short length Menger’s theorem and reliable optical routing. *Theoretical Computer Science*, 339(2-3), pages 315–332, 2005. Impact factor (0.943, 1.103).
4. A. Bagchi, A. Bhargava, D. Eppstein, A. Chaudhary, and C. Scheideler. On the effects of faults on network expansion. *Theory of Computing Systems*, special issue devoted to the best theoretical papers from SPAA ’04, 39(6), pages 903–928, 2006. Impact factor (0.726, 0.868).
5. A. Bagchi, A. Chaudhary, M.T. Goodrich, C. Li, and M. Shmueli-Scheuer. Achieving communication efficiency through push-pull partitioning of semantic spaces to disseminate dynamic information. *IEEE Trans. on Knowledge and Data Engineering (TKDE)*, 18(10), pages 1352–1367, 2006. Impact factor (2.285, 3.691).
6. A. Bagchi, A. Chaudhary, P. Kolman, and C. Scheideler. Algorithms for fault-tolerant routing in circuit-switched networks. *SIAM J. on Discrete Mathematics*, 21(1), pages 141–157, 2007. Impact factor (0.668, 0.867).
7. A. Bagchi, A. Chaudhary, D. Eppstein, and M. T. Goodrich. Deterministic sampling and range counting in geometric data streams. *ACM Trans. on Algorithms*, 3(2), 2007. Impact factor not available.

8. A. Chaudhary, D.Z. Chen, X.S. Hu, M.T. Niemier, R. Ravichandran, and K. Whitton. Fabricatable interconnect and molecular QCA circuits. *IEEE Trans. on Computer-aided Design of Integrated Circuits and Systems*, 26(11), pages 1978–1991, 2007. Impact factor (1.230, 1.631).
9. H. Wang, A. Chaudhary, and D.Z. Chen. New algorithms for online rectangle filling with k-lookahead. *J. Combinatorial Optimization*, 2010, to appear. Impact factor (0.867, 1.134).
10. I. Raicu, I. Foster, M. Wilde, Z. Zhang, Y. Zhao, A. Szalay, P. Beckman, K. Iskra, P. Little, C. Moretti, A. Chaudhary, D. Thain. Middleware Support for Many-Task Computing. In *Cluster Computing*, 2010, to appear. Impact factor (0.695, not available).

### Refereed Conference Publications

11. A. Chaudhary and S. Vishwanathan. Approximation algorithms for the achromatic number. In *Proc. 8th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 558–563, New Orleans, Louisiana, 1997.
12. A. Chaudhary, B. F. de Medeiros, C. A. Duncan, M. T. Goodrich, and A. S. Szalay. Parameterized balanced aspect ratio trees. In *4th CGC Workshop on Computational Geometry*, Baltimore, Maryland, 1999.
13. A. Bagchi, A. Chaudhary, R. Garg, M. T. Goodrich, and V. Kumar. Seller-focused algorithms for online auctioning. In *Proc. 7th International Workshop on Algorithms and Data Structures (WADS)*, pages 135–147, Providence, Rhode Island, 2001.
14. A. Bagchi, A. Chaudhary, P. Kolman, and C. Scheideler. Algorithms for fault-tolerant routing in circuit switched networks. In *Proc. 14th ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 265–274, Winnipeg, Canada, 2002.
15. A. Chaudhary, A. S. Szalay, and A. W. Moore. Very fast outlier detection in large multidimensional data sets. In *ACM Special Interest Group on Management of Data (SIGMOD) 7th Workshop on Research Issues in Data Mining and Knowledge Discovery (DMKD)*, Madison, Wisconsin, 2002.
16. A. Bagchi, A. Chaudhary, and P. Kolman. Short length Menger’s theorem and reliable optical routing. In *Proc. 15th ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 246–247, San Diego, California, 2003.
17. A. Bagchi, A. Chaudhary, M. T. Goodrich, and S. Xu. Constructing disjoint paths for secure communication. In *Proc. 17th International Symposium on Distributed Computing (DISC)*, pages 181–195, Sorrento, Italy, 2003.
18. A. Bagchi, A. Chaudhary, D. Eppstein, and M. T. Goodrich. Deterministic sampling and range counting in geometric data streams. In *Proc. 12th ACM Annual Symposium on Computational Geometry (SoCG)*, pages 144–151, Brooklyn, New York, 2004.

19. A. Bagchi, A. Bhargava, D. Eppstein, A. Chaudhary, and C. Scheideler. On the effects of faults on network expansion. In *Proc. 16th ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 286–293, Barcelona, Spain, 2004.
20. T. Malik, R. Burns, and A. Chaudhary. Bypass Caching: Making scientific databases good network citizens. In *Proc. 21st IEEE International Conference on Data Engineering (ICDE)*, pages 94–105, Tokyo, Japan, 2005.
21. A. Chaudhary, M.T. Goodrich. Balanced aspect ratio trees revisited. In *Proc. 9th International Workshop on Algorithms and Data Structures (WADS)*, pages 73–85, Waterloo, Canada, 2005.
22. A. Pawling, N. Chawla, and A. Chaudhary. Computing Information Gain in Data Streams. In *IEEE International Conference of Data Mining (ICDM) Workshop on Temporal Data Mining: Algorithms, Theory, and Applications*, Houston, Texas, 2005.
23. A. Chaudhary, D.Z. Chen, X.S. Hu, M.T. Niemier, R. Ravichandran, and K. Whitton. Eliminating wire crossings for molecular quantum-dot cellular automata implementation. In *Proc. IEEE-ACM International Conf. of Computer Aided Design (ICCAD)*, pages 565–571, San Jose, California, 2005.
24. A. Pawling, N. Chawla, and A. Chaudhary. Evaluation of summarization schemes for learning in streams. In *Proc. 10th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD)*, pages 347–358, Berlin, Germany, 2006.
25. A. Chaudhary, D. Z. Chen, R. Fleischer, X. S. Hu, J. Li, M. T. Niemier, Z. Xie, and H. Zhu. Approximating the maximum sharing problem. In *Proc. 10th International Workshop on Algorithms and Data Structures (WADS)*, pages 52–63, Halifax, Canada, 2007.
26. M. Shmueli-Scheuer, A. Chaudhary, A. Gal, and C. Li. Communication-efficient query answering with quality guarantees in client-server applications. In *Proc. 10th International Conference on the Web and Databases (WebDB)*, Beijing, China, 2007.
27. H. Wang, A. Chaudhary, and D. Z. Chen. Online rectangle filling. In *Proc. 5th International Workshop on Approximation and Online Algorithms (WAOA)*, pages 274–287, Eilat, Israel, 2007.
28. S. O’Neil and A. Chaudhary. Comparing online learning algorithms to stochastic approaches for the multi-period newsvendor problem. In *Proc. ACM-SIAM Symposium on Discrete Algorithms (SODA) Workshop on Algorithm Engineering and Experiments (ALENEX)*, pages 49–63, San Francisco, California, 2008.
29. H. Wang, A. Chaudhary, and D. Z. Chen. New algorithms for online rectangle filling with  $k$ -lookahead. In *Proc. 14th Computing and Combinatorics Conference (COCOON)*, Dalian, China, pages 385–394, 2008.

30. I. Raicu, I.T. Foster, Y. Zhao, P. Little, C.M. Moretti, A. Chaudhary, and D. Thain. The quest for scalable support of data-intensive workloads in distributed systems. In *Proc. 18th ACM Symposium on High Performance Distributed Computing (HPDC)*, pages 207–216, Garching, Germany, 2009.
31. P. Little and A. Chaudhary. Object caching for queries and updates. In *Proc. 3rd International Workshop on Algorithms and Computation (WALCOM)*, pages 394–405, Kolkata, India, 2009.
32. T. Malik, X. Wang, D. Dash, A. Chaudhary, R. Burns, and A. Ailamaki. Adaptive physical design for curated archives. In *Proc. 21st Scientific and Statistical Database Management Systems (SSDBM)*, pages 148–166, New Orleans, Louisiana, 2009.
33. R. Prasad, S. Patil, T. Malik, A. Chaudhary, and V. Venkatasubramanian. Providing scalable data services in ubiquitous networks. In *Proc. Database Systems for Advanced Applications (DASFAA) Workshop on Ubiquitous Data Management (UMD)*, pages 445–457, Tokyo, Japan, 2010.
34. P. Sempolinski and A. Chaudhary. Online algorithms for the newsvendor problems with and without censored demands. In *Proc. 4th International Frontiers of Algorithmics Workshop (FAW)*, pages 234–249, Wuhan, China, 2010.
35. T. Malik, A. Chaudhary, P. Little, X. Wang, and A. Thakar. A dynamic data middleware system for rapidly-growing scientific repositories. In *Proc. ACM/IFIP/USENIX 11th International Middleware Conference (MIDDLEWARE)*, Bangalore, India, 2010, to appear.

### Unpublished Manuscript

36. A. Bagchi, A. Chaudhary, P. Kolman, and J. Sgall. A simple combinatorial proof of duality of multiroute flows and cuts.

### Invited Presentations

37. Data partitioning for efficient communication in distributed databases. IBM India Research Laboratory, New Delhi, 2005.
38. Dynamic data caching. Indian Institute of Information Technology, Hyderabad, 2006.
39. Competitive analysis for decision making under uncertainty. The 2007 Notre Dame Series on Quantitative Methodology, *Statistical Methods for Modeling Human Dynamics: An Interdisciplinary Dialogue*, Department of Psychology, University of Notre Dame, South Bend, May, 2007.
40. Memory-efficient dynamic data caching. Indiana University, Bloomington, November, 2007.
41. Shipping queries and updates in dynamic data caches. Purdue University, West Lafayette, April, 2008.

42. Expert advice for the multi-period newsvendor problem. SRI International, Menlo Park, January, 2009.
43. Online learning. Purdue University, West Lafayette, May, 2009.
44. Caching for scientific repositories. University of Illinois at Chicago, Chicago, July, 2009.

## **Research Grants**

45. National Science Foundation. Course, Curriculum, and Laboratory Improvement (CCLI) Program. “Curriculum and laboratory development through 3-D interfacing via the Nintendo Wiimote,” Principal Investigator (along with A. Striegel and C. Crowell), \$170,000, 2009.
46. National Science Foundation. Algorithmic Foundations (AF) Program. “Online inventory planning,” sole Principal Investigator, \$119,195, 2010.

## **Students**

### **Current Graduate**

1. Philip Little. Algorithms for dynamic data caching, Masters Thesis, 2008. Ph.D. expected 2011.

### **Past Graduate**

2. Peter Sempolinski. Online algorithms for the newsvendor problems with and without censored demands, 2010.
3. Shawn O’Neil. Online supply chain planning for short life-cycle products, Masters Thesis, 2009.
4. Alec Pawling. Data stream summarization for machine learning, Masters Thesis, 2006.

### **Current ESTEEM Student**

5. Kristopher Priemer.

### **Past Undergraduate**

6. Daniel Moeller. Using randomized online algorithms for the newsvendor Problem, Senior Honors Thesis, 2010.
7. Michelle Maurin. Empirical evaluation of algorithms for the newsvendor problem, 2009.
8. Brian Sullivan. Co-advised with Dr. T. Cosimano. Modeling monetary and fiscal policy games, 2008.
9. Joshua Entz. Client-side caching of dynamic content in databases, 2006.

## Service

### Internal

- Department committee member: Current: Assessment Committee. Past: Awards and honesty Committee, WWW Committee.
- College committee member: Past: Elections Committee.
- Examination committee member: Masters defense 8, Oral candidacy examination 10, Ph.D. defense 10, Chair 6.
- Mentor, *Building Bridges Mentoring Program*, Multicultural Student Programs and Services: Jose Saenz (2006), Alvin Mwangi (2007), Alison Olmstead (2008), Antwane Mason (2009), Magan Ngoto (2010).

### External

- Conference Organizer, Midwest Theory Day, University of Notre Dame, 2007.
- Conference Technical Program Committee Member:
  - 25th IEEE International Parallel and Distributed Processing Symposium (IPDPS), Anchorage, Alaska, 2011.
  - 4th International Frontiers of Algorithmics Workshop (FAW), Wuhan, China, 2010
  - 21st International Conference on Database and Expert Systems Applications (DEXA), Bilbao, Spain, 2010.
  - 23rd IEEE International Parallel and Distributed Processing Symposium (IPDPS), Rome, Italy, 2009.
  - 20th International Conference on Database and Expert Systems Applications (DEXA), Bilbao, Spain, 2009.
  - 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS), Seattle, Washington, 2009.
  - 16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS), Irvine, California, 2008.
  - International Computing and Combinatorics Conference (COCOON), Taipei, Taiwan, 2006.
- Reviewer for Journals:
  - *Algorithmica*.
  - *Theoretical Computer Science*.
  - *Discrete Applied Mathematics*.
  - *Knowledge and Information Systems*.
  - *Computer Communications*.
- Panelist for NSF:
  - Computing Research Infrastructure (CRI).