

Yanif Ahmad

Department of Computer Science
The Johns Hopkins University
3400 North Charles Street
Baltimore, MD 21218

Office: Shaffer Hall, 200A
Email: yanif@jhu.edu
Web: <http://cs.jhu.edu/~yanif>
Tel: (410)-516-6781, Fax: (410) 516-6134

Research Interests

Data management architectures and scalable data analysis.
Data streams, dynamic data processing, and incremental computation.
Declarative systems, domain-specific runtimes and languages, and autonomic computing.
Data-intensive scientific computing, with applications to biophysics, molecular dynamics and drug design.

Education

Ph.D. 2009 Brown University, Computer Science
M.S. 2004 Brown University, Computer Science
B.Eng. 2001 Imperial College London, Computing

Appointments

2010– Assistant Professor, Johns Hopkins University
2009–2010 Postdoctoral Associate, Cornell University
2008 Intern, Computer Science Group, IBM Almaden Research Center
2006 Intern, Networked Embedded Computing Group, Microsoft Research
2001-2009 Research Assistant, Brown University

Journal, Conference and Workshop Publications

- [1] Adaptive Multiscale Exploration for Large-Scale Protein Analysis in the Molecular Dynamics Database.
S. Nutanong, Y. Ahmad, A. Szalay, T. Woolf.
Demonstration submission to SIGMOD 2013.
- [2] Declarative Computing for Algorithmic Data Analysis.
N. W. Filardo, P. C. Shyamshankar, T. Vieira, Y. Ahmad, J. Eisner
Demonstration submission to SIGMOD 2013.
- [3] Continued Sampling: Using Data Aware Feedback And Control For Peptide Conformational Search.
T. Woolf, Y. Ahmad.
Biophysical Journal (to appear), 2013.
- [4] DBToaster: Higher-order Delta Processing for Dynamic, Frequently Fresh Views.
Y. Ahmad, O. Kennedy, C. Koch, M. Nikolic.
Proceedings of the VLDB Endowment, Volume 5(10): 968–979, 2012.
Selected for publication in the VLDB Journal Special Issue: Best of VLDB 2012.

- [5] K3: Language Design for Building Multi-Platform, Domain-Specific Runtimes.
P. C. Shyamshankar, Z. E. Palmer, Y. Ahmad.
Proceedings of the Intl. Workshop on Cross-model Language Design and Implementation (XLDI), 2012.
- [6] Incremental and Parallel Analytics on Astrophysical Data Streams.
D. Mishin, T. Budavari, A. Szalay, Y. Ahmad.
Proceedings of the 3rd Intl. Workshop on Data Intensive Computing in the Clouds (DataCloud), 2012.
- [7] DBToaster: Agile Views for a Dynamic Data Management System.
O. Kennedy, Y. Ahmad, C. Koch.
Proceedings of the 5th Conference on Innovative Data Systems Research (CIDR), pp. 284-295, 2011.
- [8] I/O Streaming Evaluation of Batch Queries for Data-Intensive Computational Turbulence.
K. Kanov, E. Perlman, R. Burns, Y. Ahmad, A. Szalay.
Proceedings of the ACM/IEEE Conference on High Performance Computing (SC), Article #29, 2011.
- [9] Scientific Data Management at the JHU Institute for Data-Intensive Engineering and Science.
Y. Ahmad, R. Burns, M. Kazhdan, C. Meneveau, A. Szalay, A. Terzis.
SIGMOD Record 39(3): 18-23 (2010)
- [10] DBToaster: A SQL Compiler for High-Performance Delta Processing in Main-Memory Databases.
Y. Ahmad, C. Koch.
Proceedings of the VLDB Endowment, Volume 2(2): 1566–1569, 2009.
- [11] Simultaneous Equation Systems for Query Processing on Continuous-Time Data Streams.
Y. Ahmad, O. Papaemmanouil, U. Çetintemel, J. Rogers.
Proceedings of the International Conference on Data Engineering (ICDE), pp. 666–675, 2008.
- [12] COLR-Tree: Communication Efficient Spatio-Temporal Index for a Sensor Data Web Portal.
Y. Ahmad, S. Nath.
Proceedings of the International Conference on Data Engineering (ICDE), pp. 784–793, 2008.
- [13] Declarative Temporal Data Models for Sensor-Driven Query Processing.
Y. Ahmad, U. Çetintemel.
Proceedings of the International Workshop on Data Management in Sensor Nets, pp. 37–42, 2007.
- [14] Extensible optimization in overlay dissemination trees.
O. Papaemmanouil, Y. Ahmad, U. Çetintemel, J. Jannotti, Y. Yildirim.
Proceedings of the ACM SIGMOD Conference on Management of Data, pp. 611–622, 2006.
- [15] XPORT: Extensible Profile-Drive Overlay Routing Trees.
O. Papaemmanouil, Y. Ahmad, U. Çetintemel, J. Jannotti.
Proceedings of the ACM SIGMOD Conference on Management of Data, pp. 769–771, 2006.
- [16] Application-aware Overlay Networks for Data Dissemination.
O. Papaemmanouil, Y. Ahmad, U. Çetintemel, J. Jannotti.
Proceedings of the International Workshop on Semantic Enabled Networks and Services, pp. 76, 2006.
- [17] Distributed Operation in the Borealis Stream Processing Engine.
Y. Ahmad, B. Berg, U. Çetintemel, M. Humphrey, J. Hwang, A. Jhingran, A. Maskey,
O. Papaemmanouil, A. Rasin, N. Tatbul, W. Xing, Y. Xing, S. Zdonik.
Proceedings of the ACM SIGMOD Conference on Management of Data, pp. 882–884, 2005.
- [18] Locality-Aware Networked Join Evaluation.
Y. Ahmad, U. Çetintemel, J. Jannotti, A. Zgolinski.
Proceedings of the IEEE International Workshop Networking Meets Databases, pp. 1183, 2005.

- [19] Network Awareness in Internet Scale Stream Processing.
Y. Ahmad, U. Çetintemel, J. Jannotti, A. Zgolinski, S. Zdonik.
IEEE Bulletin of the Technical Committee on Data Engineering, March 2005, Vol 28, No. 1.
- [20] The Design of the Borealis Stream Processing Engine.
D. Abadi, Y. Ahmad, M. Balazinska, U. Çetintemel, M. Cherniack, J. Hwang, W. Lindner, A. Maskey,
A. Rasin, E. Ryvkina, N. Tatbul, Y. Xing, S. Zdonik.
Proceedings of the 2nd Conference on Innovative Database Systems (CIDR), pp. 277–289, 2005.
- [21] Network-Aware Query Processing for Stream Based Applications.
Y. Ahmad, U. Çetintemel.
Proceedings of the International Conference on Very Large Data Bases (VLDB), pp. 456–467, 2004.
- [22] A Type System for Statically Detecting Spreadsheet Errors.
Y. Ahmad, T. Antoniu, S. Goldwater, S. Krishnamurthi.
Proceedings of the IEEE Conference on Automated Software Engineering (ASE), pp. 174–183, 2003.

Book Chapters and Articles

- [23] Data streams: Architectures and prototypes.
Data streams: Streaming applications.
Y. Ahmad, U. Çetintemel.
Encyclopedia of Database Systems. L. Liu, M. Tamer Ozsu (editors), Springer.
- [24] Load Management and High Availability in the Borealis Distributed Stream Processing Engine.
N. Tatbul, Y. Ahmad, U. Çetintemel, J. H. Hwang, Y. Xing, S. Zdonik.
Advances in Geosensor Networks.
S. Nittel, A. Labrinidis, A. Stefanidis (editors), LNCS, Springer-Verlag.
- [25] The Aurora and Borealis Stream Processing Engines.
The Borealis Team.
Data Stream Management: Processing High-Speed Data Streams.
M. Garofalakis, J. Gehrke, R. Rastogi (editors), Springer-Verlag, July 2006.

Patents

- [26] Incremental Query Evaluation.
Yanif Ahmad, Christoph Koch. US Patent Application, June 2010.
- [27] Slot-Cache for Caching Aggregates of Data with Different Expiry Times.
Yanif Ahmad, Suman Nath. US Patent No. 8,185,355, issued May 22, 2012.
- [28] Communication Efficient Spatial Search in a Sensor Data Web Portal.
Yanif Ahmad, Suman Nath. US Patent No. 7,555,412, issued June 30, 2009.

Honors and Awards

- 2008 IBM Ph.D. Fellowship
- 2008 Best Research Paper, International Conference on Data Engineering (ICDE)
- 2005 Best Demonstration Award, ACM International Conference on Management of Data (SIGMOD)
- 2002 Brown University Fellowship

Teaching and Course Development

CS 600.316/416: Database Systems (S2013, S2012). Enrollments: 14+28 (2013), 7+19 (2012).

CS 600.615: Big Data, Small Languages, Scalable Systems (F2012, F2011, F2010).
Enrollments: 11 (2012), 8 (2011), 7 (2010).

CS 600.417/617: Data Stream Processing (S2011). Enrollments: 7+4 (2011).

CS 600.504/505/809/810: Undergraduate and Graduate Independent Study.
Enrollments: 1+2 (F2012), 2+0 (S2012), 0+4 (F2011).

Student Mentoring and Collaboration Activities

Assistant Research Scientist: Sarana Nutanong (with Prof. T. Woolf, Nov. 2012).

PhD (current 2): Panchapakesan Shyamshankar (2011), Yotam Barnoy (2011).

Masters (current 5, graduated 2): Madhurima Roy (2013), Shuya Chu (2012), Lee Tacon (2012), Naveen Natarajan (2011), Xiaobei Wang (2011), Guangxishui Yang (2010-11, 1010data), Amit Saraff (2010-11).

Undergraduates (current 12): Kimberly Allan (freshman, 2012), Katherine Bolling (freshman, 2012), Katie Chang (freshman, 2012), Stephanie Chew (freshman, 2012), Shaquera Diggs (freshman, 2012), Kirk Trombly (freshman, 2012), Joon Choi (sophomore, 2012), Johnathan Rivera (sophomore, 2012), Ian Wilkes (sophomore, 2012), Anh Dang, (senior, 2012), Max Lee (sophomore, 2011), Roger Xu, (senior, 2011).

Collaborations (current 3, past 6): Nick Carey (MSE, 2012), Daniel Deutsch (senior, 2012), Parkavi Srithar (MSE, 2012), Preethi Jayaram (MSE, 2012), Varun Sharma (MSE, 2012), Dmitry Mishin (Postdoc, Physics and Astronomy, mentor Alex Szalay), Eli Sutton (BS/MSE, 2011). Tian Han (BS/MSE, 2011). Nathaniel Filardo (PhD, advisor Jason Eisner), Kalin Kanov (PhD, advisor Randal Burns), Oliver Kennedy (Postdoc, EPFL, mentor Christoph Koch).

Synergistic Activities and Scholarly Service

Associate Editor: SIGMOD Record (Research Papers, 2012-)

PC Member:

Proceedings of the VLDB Endowment (VLDB, 2013, 2012, 2011).

IEEE International Conference on Data Engineering (ICDE, 2013, 2012, 2011).

ACM International Conference on Distributed Event-based Systems (DEBS, 2013).

ACM International Conference on Information and Knowledge Management (CIKM, 2011).

VLDB PhD Workshop (2013, 2011).

Intl. Conference on Scientific and Statistical Database Management (SSDBM, 2013).

JHU APL Architectures for Uncertainties in Knowledge at Scale (AUKS, 2012).

Intl. Workshop on Database Programming Languages (DBPL, 2011).

Demo PC Member:

ACM SIGMOD International Conference on Management Data (2012, 2011).

NSF Panelist, 2009, 2011.

External Reviewer. Journals: ACM Transactions on Databases (TODS), VLDB Journal, IEEE Transactions on Knowledge and Data Engineering (TKDE), Distributed and Parallel Databases, ACM Computing Surveys. Conferences: SIGMOD (2010, 2009, 2008, 2004), VLDB (2010, 2009, 2007), ICDE (2010, 2008, 2006, 2004), ICDCS (2006, 2003), PEPM (2010), CIKM (2002).

Invited Talks

Oxford University, INQUEST Workshop, September 2012.
Language Design for Streams: Asynchrony, Concurrency and Granularity.

University of Copenhagen (DIKU), September 2012.
DBToaster: Higher-order Delta Processing for Dynamic, Frequently Fresh Views.

LogicBlox Inc., June 2012.
DBToaster: Higher-order Delta Processing for Dynamic, Frequently Fresh Views.

École Polytechnique Fédérale de Lausanne (EPFL), Summer Research Institute, June 2012.
Towards Domain-Specific Data Management.

JHU APL Architectures for Uncertainties in Knowledge at Scale, February 2012.
Systems Support for Scalable Inference.

JHU APL Streams Data Processing Workshop, October 2011.
DBToaster: Data Management for Large Evolving Datasets.

Brown University, Seminar, September 2011.
DBToaster: Data Management for Large Evolving Datasets.

University of Washington, Northwest Database Symposium, July 2011.
Agile Views and Multi-Level Maintenance in Dynamic Data Management Systems.

University of Edinburgh, Database Group Seminar, February 2011.
Agile Views and Multi-Level Maintenance in Dynamic Data Management Systems.

JHU APL Streams Data Processing Workshop, September 2010.
Data Streams Processing: A Systems Perspective (tutorial).

Greenplum (now part of EMC Corporation), July 2010.
Lightweight Incremental Query Processing for Update-Intensive Applications.

Yahoo Research, April 2010.
Lightweight Incremental Query Processing for Update-Intensive Applications.

Microsoft Research, March 2010.
Lightweight Incremental Query Processing for Update-Intensive Applications.

Oxford University, Database Group Seminar, November 2009.
DBToaster: Compiling Database Systems and Queries.

Cornell, CS Lunch Talk, October 2009.
DBToaster: Compiling Database Systems and Queries.

IBM Almaden, July 2008.
The Aurora and Borealis Stream Processing Engines.

Yahoo! Research, June 2008.
Query Optimization for Efficient Sensor Stream Processing.

Cornell University, April 2008.
Query Optimization for Efficient Sensor Stream Processing.

Microsoft Research, June 2006.
The Borealis Distributed Stream Processing Engine.

Departmental Service

Computer Science Industrial Affiliates Program Committee (2013).

Organizer, Computer Science Distinguished Lecture Series (2011).

Organizer, Computer Science Graduate Recruiting Weekend (2011).

Graduate Admissions Committee (2010-, Chair 2012).

Stephyn Butcher. GBO Exam Alternate Committee Member (advisor: John Sheppard).

Yin Chen. GBO Exam Alternate Committee Member (advisor: Andreas Terzis).