MAHESH BALKRISHNA CHAUDHARI

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Research Interests

Incremental View Maintenance & Condition Monitoring over distributed heterogeneous data sources; Multiple Query Optimization; Dataspaces; Grid Computing & Web Services; Events & Stream processing; Enterprise Integration.

Teaching Interests

Database Systems, Query Languages, Object-Relational and Object-Oriented databases, Web databases, Distributed databases, XML databases.

Qualifications

- Successfully converted my Ph.D. proposal into a 3-year NSF funded research grant [CSR # 0915325] to support my Ph.D. dissertation and an undergraduate student
- Mentoring an undergraduate student in database research and motivated the student to pursue graduate studies
- 3+ years of experience in teaching undergraduate courses and assisting professors in their classes as teaching assistant
- Certification of the 2-year Preparing Future Faculty (PFF) program

Education

- **Ph.D. in Computer Science and Engineering** (GPA: 3.74) 08/2004 – 05/2011
  Arizona State University, Tempe, AZ
  Dissertation: "Materialized Views over Heterogeneous Structured Data Sources in a Distributed Event Stream Processing Environment"
  Committee Members: Dr. Suzanne W. Dietrich (**Chair**), Dr. Susan D. Urban, Dr. Hasan Davulcu, and Dr. Yi Chen
- **M.S. in Computer Science and Engineering** (GPA: 3.81) 08/2001 – 08/2003
  Mississippi State University, Starkville, MS
  Project: "Conversion of Legacy Genealogy Index into XML Database"
  Committee Members: Dr. Edward Allen (**Chair**), Dr. Thomas Philip, and Dr. Lynne Mueller
- **Post Graduate Diploma in Advanced Computing** (Grade A) 02/2001 – 07/2001
  Centre for Development of Advanced Computing (C-DAC) Mumbai, India
  Project: "Online Shopping Cart" using ASP and Oracle 8*i*
- **Bachelor of Engineering in Computer Engineering (62/100)** 06/1995 – 05/1999

University of Mumbai, Mumbai, India
Project: "Inventory Control Systems" using Visual Basic 6.0 and Oracle 8*i*
Project Supervisor: Assistant Professor Merly Thomas

Professional Experience

- **Postdoctoral Research Associate** 06/2011 – Present
  [Supported by NSF Grant CSR #0915325]
  Division of Mathematical and Natural Sciences, ASU, Phoenix, AZ
  - Submitted a supplemental research proposal to NSF to explore the design and use of benchmarks in assessing the Distributed Event Stream Processing Environment and to introduce benchmarks in database curriculum (recently awarded)
  - Designing a benchmark for evaluating the performance of a distributed environment with access to heterogeneous data sources
  - Exploring research opportunities in multiple query optimization and materialized views in the cloud environment and object-relational mapped (ORM) databases
  - Enhancing the CS2 course (ACO 102) with the introduction of Java programming using Android SDK and providing hands-on experience in deploying the programs onto an android-based smartphone
- **Research Assistant [Supported by NSF Grant CSR #0915325]** 07/2009 – 05/2011
  Division of Mathematical and Natural Sciences, ASU, Phoenix, AZ
  - Submitted a restructured version of my PhD proposal to NSF as a research grant to support my dissertation and to support an undergraduate student [awarded as CSR #0915325, 08/2009-08/2012]
  - Focused on investigating research issues related to defining and maintaining hybrid materialized views over heterogeneous data sources in a distributed event stream processing environment
  - Created a mixed multigraph model to represent heterogeneous query expressions over relational and XML data sources in a common graph for multiple query optimization
  - Implemented a heuristics-based algorithm to detect common subexpressions using the mixed multigraph model
  - Designed an algorithm to define and incrementally maintain hybrid materialized views over relational and XML data sources using Magic Sets optimization technique
  - Mentored an undergraduate student in the upcoming areas of events and stream processing, ORM, LINQ, XML and database benchmarks
  - Supervised an undergraduate student to develop "Object Manager" application that works with object data stored either in the main memory or db4o, an object-oriented database
- **Research Assistant [Partially supported by NSF Grant ITR #0312849]** 08/2004 – 08/2007
  PRISM, Department of Computer Science and Engineering, ASU, Tempe, AZ
  3D Face Authentication
  - Lead database developer for the NSF funded 3DFace authentication and recognition research project
  - Designed a large-scale object-relational database to work in coordination with XML and binary data regarding 3D face scans using Oracle 10g

- Developed web-based application for the demonstration of 3D face authentication and recognition project and the web application was recognized by National Science Foundation (NSF) as a "Nugget"
- Analyzed the performance issues related to storing XML and binary data in relational databases and chose file pointers as an efficient way to point to the data files

Cumulus Photogrammetric, In-Situ and Doppler Observations (CuPIDO)

- Implemented a graph plotting tool using VC++ for representing sounding data along with other geothermal parameters
- Developed programs for volumetric visualization of cloud data using Interactive Data Language (IDL) software

I³DEA and ATIC websites

- Designed a database framework to store information related to ATIC such as faculty, staff and students profiles, projects and publications details using MySQL
- Developed I³DEA and ATIC websites using ASP.NET and MySQL database

- **Software Engineer** 09/2003 – 06/2004

  Department of Plant and Soil Sciences, Mississippi State University, Starkville, MS
  - Conducted analysis for optimal performance of the Real-time data acquisition and control system (SPAR) to process streaming sensor data over 180 incoming channels
  - Redesigned the data acquisition and control system to communicate over six new HP Agilent 34970A data acquisition/switch unites for processing incoming streams on 180 channels and outgoing streams on 300 channels within a time frame of 10 seconds
  - Developed graphs-based reporting software for analyzing the collected data at real-time

- **Research Assistant** 09/2001 – 08/2003

  Mitchell Memorial Library, Mississippi State University, Starkville, MS
  - Designed and developed software for automatic conversion and indexing of Genealogical references from WordPerfect documents into an XML database
  - Developed a web-based search engine to retrieve records from this XML database efficiently using SAX, XPath and XSLT
  - Presented the genealogy search engine at the Regional Genealogy Fair on June 14, 2003
  - Enhanced Web-based Time and Task management application (TimeClock) that manages time sheets for student workers to allow supervisors to assign and maintain tasks for the student workers and to allow students to enter and maintain their class schedule for each semester
  - Created report generation feature for supervisors to report money that was spent per department per student, reports on tasks, and web-based project tracking and to provide project status reports to external/internal funding agencies
  - Analyzed and enhanced the efficiency of large databases at the library using normalization techniques and query optimization
  - Developed an integration framework to collaborate library databases with university level databases especially for authentication purposes using LDAP
  - Transformed new ideas into successful web-based database-driven projects such as "MSU Authors",

and "Books Order Online"

- **Software Engineer** 07/1999 – 02/2001
  Indian Institute of Technology (IIT), Mumbai, India
  - Conducted a detailed requirements analysis for Illustrated Parts Catalogue (IPC) project designed for automating aircraft spare parts maintenance
  - Developed the multimedia-based object-relational database in Oracle 8.0 to maintain information about different parts of the aircraft in various formats such as text, jpeg, audio, VRML and animation
  - Was an integral part of the project team to deliver the developed software to Aeronautical Development Agency, Bangalore
  - Integrated the IPC project with Aircraft Systems Maintenance Simulator (ASMS) project so that the ASMS project can retrieve information from the common object-relational database for simulation purpose

Teaching Experience

- **Instructor** 08/2011 – Present
  Division of Mathematical and Natural Sciences, ASU, Phoenix, AZ 08/2008 – 05/2009
  Responsibilities:
  - Designing the course curriculum, preparing instructional material and assignments
  - Enhancing the course curriculum by introducing new topics:
    - Java programming using Android SDK for smartphones
    - C# programming using Visual Studio 2008
  - Using the assessment tool WileyPlus for additional practice and assignments on Java programming

  Courses:
  - ACO 102: Principles of Computer Science (Spring 2012, Fall 2011, Spring 2009, Fall 2008)

- **Teaching Assistant** 08/2007 – 05/2009
  Division of Mathematical and Natural Sciences, ASU, Phoenix, AZ
  Responsibilities:
  - Assisted professors in designing assignments and the associated rubrics, and the assessment of the assignments for the undergraduate courses
  - Held office hours to guide student learning on assignments in a professional manner
  - Delivered lectures to the students in the absence of the professors

  Courses:
  - ACO 100: Overview of Applied Computing (Fall 2007)
  - ACO 101: Introduction to Computer Science (Spring 2009, Fall 2008, Spring 2008, Fall 2007)
  - ACO 102: Principles of Computer Science (Spring 2008, Fall 2007)
  - ACO 320: Database Systems and Transaction Processing (Fall 2007)
  - ACO 420: Object Databases (Spring 2008)

Publications

Book Chapters

- Anshuman Razdan, Gerald Farin, Myung Soo-Bae and **Mahesh Chaudhari**, State of 3DFace Biometrics for Homeland Security Applications, Book chapter *in National Security (Part of the Elsevier Publishing Handbooks on Information Systems),* Eds Hsinchun Chen, T. S. Raghu, Ram Ramesh, Ajay Vinze and Daniel Zeng, 26 April 2007, pp. 73-99.

Referred Conference Proceedings

- Jennifer Ortiz, Suzanne W. Dietrich and **Mahesh B. Chaudhari**, Learning from Database Performance Benchmarks, Accepted in *the 5th Annual Conference of the Southwestern Region of the Consortium for Computing Sciences in Colleges*, Stockton, CA, March 2012.
- Suzanne W. Dietrich and **Mahesh Chaudhari**, LINQ ROX! Integrating LINQ into the Database Curriculum, In *Proceedings of ACM SIGCSE International Conference on Computer Science Education,* Dallas, Texas, March 2011, pp. 293-298.
- **Mahesh B. Chaudhari**, A Distributed Event Stream Processing Framework for Materialized Views over Heterogeneous Data Sources, *VLDB 2010 Ph.D. Workshop,* Singapore, September 13-17, 2010.
- **Mahesh B. Chaudhari** and Suzanne W. Dietrich, Metadata Services for Distributed Event Stream Processing Agents, In *the 19th International Conference on Software Engineering and Data Engineering (SEDE2010),* San Francisco, June 16-18, 2010, pp. 307-312.
- Suzanne W. Dietrich and **Mahesh Chaudhari**, The LINQ between XML and databases: a gentle introduction, *Journal of Computing Sciences in Colleges,* 25, 4 (Apr. 2010), 158-164 (In Proceedings of Consortium for Computing Sciences in Colleges, Southwestern Region, Thousand Oaks, CA, March 2010).
- Suzanne W. Dietrich and **Mahesh Chaudhari**, The Missing LINQ between Databases and Object-Oriented Programming Languages: LINQ as an Object Query Language for a Database Course, *Journal of Computing Sciences in Colleges,* 24, 4 (Apr. 2009), 282-288 (In Proceedings of Consortium for Computing Sciences in Colleges, Southwestern Region, San Diego, CA, April 2009).

Manuscripts

- **Mahesh B. Chaudhari** and Suzanne W. Dietrich, Detecting Common Subexpressions for Multiple Query Optimization over Heterogeneous Data Sources, *manuscript under revision for a journal submission,* 2011.
- **Mahesh B. Chaudhari** and Suzanne W. Dietrich, Maintaining Materialized Views over Distributed Heterogeneous Data Sources, *manuscript in preparation for a journal,* 2011.

Poster Presentation

- **Mahesh B. Chaudhari**, Combining Teaching, Research, Learning & Service, *at the Preparing Future Faculty Capstone Fair,* April 24, 2009.

Invited Talks (Guest Lectures)

- "Minimal Functional Dependencies and Synthesis", ACO 320: Database Systems and Transaction Processing, Arizona State University, 11/29/2011
- "Dependency Preservation and Normal Forms", ACO 320: Database Systems and Transaction Processing, Arizona State University, 10/27/2009
- "Recursion in Java", ACO 102: Principles of Computer Science, Arizona State University, 10/27/2009
- "Overview of Object Manager and DB4O Open source OODB", ACO 420: Object Databases, Arizona State University, 03/25/2008
- "Programming web-based application with ASP.NET (C#) and SQL Server 2005", ACO 320: Database Systems and Transaction Processing, Arizona State University, 10/11/2007
- "Tools for memory: Semantic content (XML)", CPI 101: Introduction to Informatics, Arizona State University, 09/04/2007

Honors and Awards

- Received Travel Grant from Graduate College at Arizona State University for presenting the paper at VLDB 2010 - 36th International Conference on Very Large Data Bases ($350)
- Received Travel Grant from Graduate and Professional Student Association (GPSA) at Arizona State University for presenting the paper at VLDB 2010 - 36th International Conference on Very Large Data Bases ($300)
- Recognized as the PFF Emeriti Fellow for the academic year of 2009-2010 ($1000)
- Received Travel Grant from PFF for presenting the paper at the Second Annual Consortium for Computing Sciences in Colleges Southwestern Regional Conference ($300)
- Selected as 1 of the 80 students for the competitive Preparing Future Faculty (PFF) program at Arizona State University

Professional Development

Successfully completed the 2-year Preparing Future Faculty (PFF) program at Arizona State University. Preparing Future Faculty (PFF) is a nationally recognized professional development program for doctoral and MFA students, as well as postdocs, interested in pursuing a faculty position upon graduation.

Activities:

- Understanding and implementing strategies and techniques for effective teaching and classroom assessment
- Preparing for first academic job, balancing life and academia, and understanding promotion and tenure
- Attended seminars on CV writing, Grant writing, and Diversity in academia
- Created Professional Portfolio for Probationary Review/Promotion and Tenure Packet, and Individualized Self-Development Plan
- Participated in organizing interactive discussion groups, and mock interviews

Workshops:

- Preparing a Teaching Portfolio, School of Applied Arts and Sciences, 02/01/2008
- Creating Rubrics for Easier Grading, Center for Learning and Teaching Excellence, 10/02/2007
- Library Training for Research Assistants (Advanced), Center for Learning and Teaching Excellence, 09/28/2007
- Classroom Assessment Techniques, Center for Learning and Teaching Excellence, 09/21/2007
- Workshops on Blackboard, Applied Learning Technologies Institute, 7/17/2008, 7/16/2008, 09/14/2007

Professional Memberships

- Member of The Upsilon Pi Epsilon Honorary Society
- Member of Association for Computing Machinery (ACM)
- Member of Institute of Electrical and Electronics Engineers (IEEE)

Service

Department

Participated in the following events as an exhibitor.

- School of Computing and Informatics Opening 2006: held on September 29, 2006 at Brickyard, Arizona State University, Tempe Arizona
- SIAM Conference on Geometric Design and Computing 2005: held on October 31 - November 3, 2005 in Phoenix, Arizona
- Decision Theatre Opening 2005: held on May 23 2005 at Arizona State University, Tempe Arizona

Institutional

Participated in the following events as an exhibitor.

- 10th Anniversary Celebration of Arizona State University Polytechnic Campus: held on November 03, 2006 at Arizona State University, Polytechnic Campus
- Homecoming Event 2006: held on October 21, 2006 at Arizona State University, Tempe Arizona
- Homecoming Event 2005: held on October 28, 29, 2005 at Arizona State University, Tempe Arizona
- ASU Technology Expo 2005: held on September 28, 2005 at Arizona State University, Tempe Arizona
- Homecoming Event 2004: held on November 2004 at Arizona State University, Tempe Arizona

Community

Participated in the following events as an exhibitor.

- Will be serving as a judge in the Arizona Science Fair on April 2-4, 2012 at Phoenix, Arizona
- "SEE ASU" Event 2006 for school kids: held on March 23 and 24, 2006 at Arizona State University, Tempe Arizona
- Intel International Science and Engineering Fair 2005: held on May 8-14 2005 at Phoenix, Arizona

References

- Dr. Suzanne W. Dietrich, Associate Professor, Division of Mathematical and Natural Sciences, Arizona State University, P O BOX 37100, Phoenix, AZ 85609-7100; (602) 543-5628; dietrich@asu.edu
- Dr. Susan D. Urban, Professor, Department of Industrial Engineering, Texas Tech University, P O Box 43061, Lubbock, TX 79409-33061; (806) 742-3527 (ext: 285); susan.urban@ttu.edu
- Dr. Roger Berger, Professor and Director, Division of Mathematical and Natural Sciences, Arizona State University, P O BOX 37100, Phoenix, AZ 85609-7100; (602) 543-8545; roger.berger@asu.edu