Ali Ebnenasir

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Education

Michigan State University, Michigan, U.S.A.
PhD in Computer Science — May 2005
Dissertation title: Automatic Synthesis of Fault Tolerance
(*Nominated for the ACM Doctoral Dissertation Award*)

Iran University of Science and Technology, Tehran, IRAN.
M.S. degree in Software Engineering — February 1998
Thesis title: Design and Implementation of a Java-Based Distributed Virtual Machine

The University of Isfahan, Isfahan, IRAN.
B.S. degree in Computer Engineering — September 1994
First-rank graduate amongst 60 students
Thesis title: An Intelligent Controller for D.C. Motors

Research Interest

Automated Software Design, Software Fault Tolerance, Design of Multicore/Multithreaded Programs, Dependable and High Assurance Systems, Distributed Computing

Professional Experiences

Assistant Professor (Aug. 2006 – present)
Department of Computer Science, Michigan Technological University.

Postdoctoral Research Associate (Aug. 2005 – Aug. 2006)
Software Engineering and Network Systems Laboratory
Computer Science and Engineering Department, Michigan State University.
Supervisor: Professor Betty H.C. Cheng
Research problem. Practical methods for modeling and analyzing fault-tolerance
Contributions. Designed a methodology for modeling faults and fault-tolerance in UML towards developing a roundtrip software engineering framework for fault-tolerance.

Graduate Research Assistant (Feb. 2001 – Jul. 2005)
Software Engineering and Network Systems Laboratory
Computer Science and Engineering Department, Michigan State University.

Advisor: Dr. Sandeep S. Kulkarni
Research problem. Automatic addition of fault-tolerance concerns to software systems
Contributions. Developed a theory for automatic addition of fault-tolerance concerns. Developed an extensible software framework, called Fault-Tolerance Synthesizer (FTSyn). FTSyn is being used and extended for pedagogical and research purposes at MSU and at the University of Aachen (RWTH) in Germany.

Chairperson (Jun. 2000 – Dec. 2000)

Computer Science Department, Islamic Azad University, Majlesi Town, Isfahan, IRAN.
Contributions. Managed a department with 8 faculty members, 280 undergraduate students. Developed and taught new courses such as System Software, Analysis and Design of Software Systems, Development of Commercial Software.

Manager of Hardware-Software Integration Team (Jul. 1999 – Mar. 2000)

Electronic and Computer Research Center, The University of Isfahan, Isfahan, IRAN.
Contributions. Managed a team of 7 engineers in the design and implementation of industrial automation systems.

R&D Engineer (Sep. 1994 – Jan. 1997)

FARAJAST Electronic and Computer Research Group, Isfahan, IRAN.
Contributions. Designed and implemented several industrial automation systems.

Honors and Awards

Nominated for the ACM Doctoral Dissertation Award 2005

Dissertation Completion Fellowship 2004
Graduate School, Michigan State University.

Graduate Office Fellowship, Michigan State University. 2004

IEEE Computer Society travel grant for attending ICDCS 2003 2003

Departmental Fellowship 2001
Computer Science and Engineering Department, Michigan State University.

Honorary Admission to Graduate Program 1996
Computer Engineering Department, Iran University of Science and Technology, Tehran.

First-rank Graduate Amongst 60 Students 1994
Computer Engineering Department at the University of Isfahan, Isfahan, IRAN.

Publications

Journal papers:

- **Ali Ebnenasir** and Sandeep S. Kulkarni. Feasibility of Stepwise Design of Multitolerant Programs. To appear in the *ACM Transactions on Software Engineering and Methodology (TOSEM)*, 2010.
- B. Bonakdarpour, **Ali Ebnenasir**, and S. S. Kulkarni. Complexity Results in Revising UNITY Programs. *ACM Transactions on Autonomous and Adaptive Systems*, Vol. 4, Issue 1, Article No. 5, January 2009.
- **Ali Ebnenasir**, S. S. Kulkarni and Anish Arora. FTSyn: A Framework for Automatic Synthesis of Fault-Tolerance. *International Journal on Software Tools for Technology Transfer*, 10(5):455-471, 2008.
- S. S. Kulkarni and **Ali Ebnenasir**. The Effect of the Specification Model on the Complexity of Adding Masking Fault-Tolerance. *IEEE Transactions on Dependable and Secure Computing*, 2(4): 348-355, October-December 2005.
- S. S. Kulkarni and **Ali Ebnenasir**. Complexity Issues in Automated Synthesis of Failsafe Fault-Tolerance. *IEEE Transactions on Dependable and Secure Computing*, 2(3):201-215, July-September 2005.

Refereed book chapters:

- **Ali Ebnenasir** and Betty H.C. Cheng. A Pattern-Based Approach for Modeling and Analysis of Error Recovery. Book chapter in the *Architecting Dependable Systems (Book IV)*, Lecture Notes in Computer Science, 2007.
- S. S. Kulkarni, Anish Arora and **Ali Ebnenasir**. Adding Fault-Tolerance to State Machine-Based Designs. *Software Engineering and Fault-Tolerance (SEFT)* book, World Scientific Publishing Co. Pte. Ltd, Series on Software Engineering and Knowledge Engineering, 2007.

Refereed conference papers:

- **Ali Ebnenasir** and Aly Farahat. A Lightweight Method for Automated Design of Convergence, To appear in the Proceedings of the 25th IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2011 (**Acceptance Rate = 19.6% amongst 571 submitted papers**).
- **Ali Ebnenasir**. DiConic Addition of Failsafe Fault-Tolerance, 22nd IEEE/ACM *International Conference on Automated Software Engineering (ASE'07)*, Atlanta, Georgia, November 5-9, 2007 (**Acceptance Rate = 12% amongst 312 submitted papers**).
- **Ali Ebnenasir** and Betty H.C. Cheng. Pattern-Based Modeling and Analysis of Failsafe Fault-Tolerance, *IEEE International Symposium on High Assurance System Engineering (HASE)*, Dallas, Texas, November 14-16, 2007 (**Acceptance Rate = 33% amongst 100 submitted papers**).

- **Ali Ebnenasir**. Designing Run-Time Fault-Tolerance Using Dynamic Updates. *IEEE/ACM International Conference on Software Engineering - Workshop on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, 2007.

- **Ali Ebnenasir**, S. S. Kulkarni and B. Bonakdarpour. Revising UNITY Programs: Possibilities and Limitations. *International Conference on Principles of Distributed Systems (OPODIS)*, 2005.

- S. S. Kulkarni and **Ali Ebnenasir**. Adding Fault-Tolerance Using Presynthesized Components. *European Dependable Computing Conference (EDCC-5)*, 2005, LNCS, Vol. 3463, p. 72.

- S. S. Kulkarni and **Ali Ebnenasir**. Automated Synthesis of Multitolerance. *IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)*, Florence, Italy, 2004.

- S. S. Kulkarni, B. Bonakdarpour and **Ali Ebnenasir**. Mechanical Verification of Automatic Synthesis of Fault-Tolerance. *International Symposium on Logic-based Program Synthesis and Transformation (LOPSTR)*, Verona, Italy, LNCS, Vol. 3573, Page 36-50, 2004.

- **Ali Ebnenasir** and S. S. Kulkarni. Hierarchical Presynthesized Component for Automatic Addition of Fault-Tolerance. In the poster abstracts of the 12th *ACM SIGSOFT Workshop on Specification and Verification of Component-Based Systems (SAVCBS)*, Newport Beach, California, USA, 2004.

- S. S. Kulkarni and **Ali Ebnenasir**. Enhancing the Fault-Tolerance of Nonmasking Programs. *IEEE International Conference on Distributed Computing Systems (ICDCS)* 2003 - Providence, Rhode Island, USA (**Acceptance Rate = 18% amongst 407 submitted papers**).

- S. S. Kulkarni and **Ali Ebnenasir**. The Complexity of Adding Failsafe Fault-Tolerance. *IEEE International Conference on Distributed Computing Systems (ICDCS)* 2002 - Vienna, Austria.

- **Ali Ebnenasir** and M. Sharifi. A Java-Based Distributed Virtual Machine. *International Conference of Computer Society of Iran*, 23-25 Dec., 1997 - Tehran, Iran.

Refereed workshop papers:

- **Ali Ebnenasir** and Rasoul Beik. Developing Parallel Programs: A Design-Oriented Perspective. In the Proceedings of the Workshop on Multicore Software Engineering (IWMSE09) in conjunction with the 31st International Conference on Software Engineering (ICSE) 2009, Pages 1-8, May 16-24, 2009, Vancouver, Canada.

- **Ali Ebnenasir**, Betty H.C. Cheng and Sascha Konrad. Use Case-Based Modeling and Analysis of Failsafe Fault-Tolerance. Poster and abstract appeared in *International Conference on Requirements Engineering*, Minneapolis, 2006.

- **Ali Ebnenasir** and Betty H.C. Cheng. Pattern-Based Modeling and Analysis of Failsafe Fault-Tolerance. Abstract appeared in *International Conference on Dependable and Network Systems (DSN)*, Philadelphia, 2006.

- **Ali Ebnenasir** and S. S. Kulkarni. SAT-Based Synthesis of Fault-Tolerance. In the Fast Abstracts of the *International Conference on Dependable Systems and Networks (DSN)*, Florence, Italy, June 28 - July 1, 2004.

- **Ali Ebnenasir**. Algorithmic Synthesis of Fault-Tolerant Distributed Programs. *Doctoral Symposium of the 23rd IEEE International Conference on Distributed Computing Systems (ICDCS)*, May 19-22, 2003, Providence, USA.

Technical reports:

- **Ali Ebnenasir** and Aly Farahat, Towards an Extensible Framework for Automated Design of Self-Stabilization, *Technical Report CS-TR-10-03, Michigan Technological University*, Houghton Michigan 49931, USA, May 2010.
- **Ali Ebnenasir** and Mohammad Amin Alipour, Identifying Satisfying Subsets: A Method for Algorithmic Correction of Inter-Thread Synchronization Mechanisms, *Technical Report CS-TR-10-01, Michigan Technological University*, Houghton Michigan 49931, USA, March 2010.
- **Ali Ebnenasir**, How Hard Is Aspect-Oriented Programming?, *Technical Report CS-TR-08-04, Michigan Technological University*, Houghton Michigan 49931, USA, December 2008.
- **Ali Ebnenasir**, and Sandeep S. Kulkarni. Feasibility of Stepwise Addition of Multitolerance to High Atomicity Programs, *Technical Report CS-TR-08-03, Michigan Technological University*, Houghton Michigan 49931, USA, October 2008.
- **Ali Ebnenasir**, Action-Level Addition of Leads-To Properties to Shared Memory Parallel Programs, *Technical Report CS-TR-08-01, Michigan Technological University*, Houghton Michigan 49931, USA, March 2008.
- **Ali Ebnenasir**, DiConic Addition of Failsafe Fault-Tolerance, *Technical Report CS-TR-07-03, Michigan Technological University*, Houghton Michigan 49931, USA, June 2007.
- **Ali Ebnenasir** and Betty H.C. Cheng, A Framework for Modeling and Analyzing Fault-Tolerance, *Technical Report MSU-CSE-06-05, Michigan State University*, East Lansing, Michigan, January 2006.
- **Ali Ebnenasir** and S. S. Kulkarni. Efficient Synthesis of Failsafe Fault-Tolerant Distributed Programs. Technical report MSU-CSE-05-13, *Department of Computer Science, Michigan State University*, East Lansing, Michigan, USA.
- **Ali Ebnenasir** and S. S. Kulkarni. Automatic Addition of Liveness. Technical report MSU-CSE-04-22, *Department of Computer Science, Michigan State University*, East Lansing, Michigan, USA.
- S. S. Kulkarni, B. Bonakdarpour and **Ali Ebnenasir**. Mechanical Verification of Automatic Synthesis of Failsafe Fault-Tolerance. In the emerging trends of TPHOL 2004, a technical report of the *Computer Science Department, the University of Utah.*

Research Grants

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1) *Title*: Towards the Model Checking of Partitioned Global Address Space (PGAS) Applications
Principal Investigator (PI): Ali Ebnenasir, Co-PI: Steve S. Seidel
Sponsor: National Science Foundation (NSF)
Funding: $106K, PI's share: $106K
Duration: Aug. 2009 - Jan. 2011

2) *Title*: Towards a Large-Scale Framework for Action-Level Addition of Nonmasking Fault Tolerance
PI: Ali Ebnenasir
Sponsor: Michigan Tech Research Excellence Fund, 2008.
Funding: $24.5K
Duration: Aug. 2007 - Aug. 2008

Professional Activities

Member of Technical Program Committee, 2nd International Workshop on Logical Aspects of Fault Tolerance (LAFT)	2011
Member of Technical Program Committee, 23rd International Conference on Software Engineering and Knowledge Engineering (SEKE)	2011
Reviewer: ACM Transactions on Autonomous and Adaptive Systems	2010
Reviewer: NSF panel on Distributed and Parallel Algorithms	2009
Reviewer: IEEE Transactions on Software Engineering (TSE)	2009
Member of Technical Program Committee (Formal Methods track): 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems.	2009
Co-Chair: Poster session of the 10th International Symposium on Stabilization, Safety, and Security of Distributed Systems	2008
Reviewer: ACM Computing Surveys	2008
Reviewer: ACM Transactions on Autonomous and Adaptive Systems	2007
Reviewer: ACM Transactions on Software Engineering and Methodology	2007
Reviewer: 15th IEEE International Conference on Requirements Engineering	2007
Program Committee member: International Workshop on Engineering of Fault-Tolerant Systems, in conjunction with the 6th European Software Engineering Conference and the ACM SIGSOFT FSE, 2007.	2007
Chair: A technical session on Engineering of Software Fault-Tolerance A joint event with the International Conference on Software Engineering Research and Practice (SERP07)	2007
Program Committee member: International Conference on Software Engineering Research and Practice (SERP07) in conjunction with the 2007 World Congress in Computer Science, Computer Engineering, & Applied Computing.	2007
Reviewer: Software Engineering and Fault-Tolerance - Book I	2007
Reviewer: Architecting Dependable Systems - Book IV	2007
Reviewer (Journals): Iranian Journal of Electrical and Computer Engineering	2006
Program Committee member: Emerging Results of ICSE 2006	2005 - 2006
Reviewer (Journals): Journal of Distributed Computing	2003 - 2005
Reviewer (Journals): Iranian Journal of Electrical and Computer Engineering	2005
Reviewer (Conferences): IEEE ICDCS, DSN	2004
Reviewer (Conferences): IEEE ICDCS	2003

Course Developments/Upgrades

- Course Upgrade: Software Dependability, Graduate-level advanced topic
  Michigan Technological University — Fall 2010

- Course Upgrade: Team Software Project, Undergraduate
  Michigan Technological University — Spring 2010
  Description: added new material on Java Modeling Language

- New Course: Model-Driven Software Development, Senior Undergraduate
  Michigan Technological University — Fall 2009

- New Course: Software Fault Tolerance, Advanced Topics - Graduate
  Michigan Technological University — Spring 2008

- Course Upgrade: Team Software Project, Undergraduate
  Michigan Technological University — Spring 2008
  Description: upgraded this course by adding new material on the Design-By-Contract methodology.

- Course Upgrade: Team Software Project, Undergraduate
  Michigan Technological University — Spring 2007
  Description: upgraded this course by adding new material on rigorous use of the Unified Modeling Language in software development.

Teaching Experience

Assistant Professor: Team Software Project, Michigan Technological University — Spring 2011

Assistant Professor: Advanced Topics on Software Dependability
Michigan Technological University — Fall 2010

Assistant Professor: Advanced Algorithms, Michigan Technological University — Fall 2010

Assistant Professor: Team Software Project, Michigan Technological University — Spring 2010

Assistant Professor: Model-Driven Software Development
Michigan Technological University — Fall 2009

Assistant Professor: Advanced Algorithms, Michigan Technological University — Fall 2009

Assistant Professor: Software Fault Tolerance, Michigan Technological University — Spring 2009

Assistant Professor: Team Software Project, Michigan Technological University — Spring 2009

Assistant Professor: Advanced Algorithms, Michigan Technological University Fall 2008

Assistant Professor: Team Software Project, Michigan Technological University Spring 2008

Assistant Professor: Software Fault Tolerance, Michigan Technological University Spring 2008

Assistant Professor: Advanced Algorithms, Michigan Technological University Fall 2007

Assistant Professor: Team Software Project, Michigan Technological University Spring 2007

Assistant Professor: Advanced Algorithms, Michigan Technological University Fall 2006

Teaching assistant for CSE870 (Advanced Software Engineering) Spring 2005
Computer Science and Engineering Department, Michigan State University.

Substitute instructor for CSE870 (Advanced Software Engineering) Spring 2005
Computer Science and Engineering Department, Michigan State University.

Teaching assistant for CSE410 (Operating Systems). Fall 2004
Computer Science and Engineering Department, Michigan State University.

Substitute instructor for CSE260 (Discrete Math.) March 2004
Computer Science and Engineering Department, Michigan State University.

Lecturer in Computer Science (June 2000 - Dec. 2000)
Computer Science Department, Islamic Azad University, Majlesi Town, Isfahan, IRAN.

Lecturer in Computer Science (Sep. 1996 - June 1998)
Computer Science Department, Islamic Azad University, Majlesi Town, Isfahan, IRAN.
Taught the following undergraduate courses: System Software, Assembly Language, Principles of Operating Systems, and Basic and Advanced Programming.

Instructor and developer of microprocessor laboratory (Jan. 1996 - June. 1996)
Computer Engineering Department, the University of Isfahan, Isfahan, IRAN.

Technical Presentations

DiConic Addition of Failsafe Fault Tolerance.
IEEE/ACM International Conference on Automated Software Engineering,
Atlanta GA, USA. Nov. 2007

Designing Run-Time Fault-Tolerance Using Dynamic Updates.
IEEE ICSE SEAMS, Minneapolis, USA. May 2007

Dependability: from Requirements to Code.
Michigan Technological University, USA. Sep. 2006

Use Case-Based Modeling and Analysis of Failsafe Fault-Tolerance (poster presentation).
International Conference on Requirements Engineering, Minneapolis, USA. Sep. 2006

Automated Design of Fault-Tolerance.
University of Missouri - Rolla, USA. 2005

Hierarchical Presynthesized Component for Automatic Addition of Fault-Tolerance.
Poster workshop of the 12th ACM SIGSOFT SAVCBS Workshop, Newport Beach, California, USA. 2004

Mechanical Verification of Automatic Synthesis of Failsafe Fault-Tolerance
Poster talk in TPHOL, Park City, Utah, USA. 2004

Automated Synthesis of Fault-Tolerance
Poster workshop at the Computer Science and Engineering Department, Michigan State University, Michigan, USA. 2004

Enhancing the Fault-Tolerance of Nonmasking Programs
IEEE ICDCS, May 19-22, Providence, Rhode Island, USA. 2003

Algorithmic Synthesis of Fault-Tolerant Distributed Programs
Doctoral Symposium of IEEE ICDCS, May 19-22, Providence, USA. 2003

References: upon request