

# Thomas Huining Feng

Ph.D.

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## RESEARCH INTERESTS

- Modeling and simulation of distributed discrete-event systems
- Model transformation with graph grammars
- Higher-order composition languages
- Program analysis and optimization
- Software fault tolerance

## EDUCATION

- 2004 – 2009      Ph.D., Department of Electrical Engineering and Computer Sciences, U.C. Berkeley, USA.
- Dissertation: *Model Transformation with Hierarchical Discrete-Event Control*  
(Committee: Prof. Edward A. Lee, Prof. Ras Bodik, Prof. Lee W. Schruben)
- M.Sc., Department of Electrical Engineering and Computer Sciences, U.C. Berkeley, USA.
- Master's Thesis: *Engineering Structurally Configurable Models with Model Transformation*  
(Committee: Prof. Edward A. Lee, Prof. Sanjit A. Seshia)
- GPA: 4.0  
Advisor: Prof. Edward A. Lee
- 2002 – 2004      M.Sc., School of Computer Science, McGill University, Montréal, Canada.
- Master's Thesis: *DCharts, a Formalism for Modeling and Simulation Based Design of Reactive Software Systems* (McGill Dean's Honor List Award)
- GPA: 3.88  
Advisor: Prof. Hans Vangheluwe
- 1998 – 2002      B.Sc., Department of Computer Science and Technology, Nanjing University, Nanjing, China.
- Advisor: Prof. Qimei Chen

## WORK EXPERIENCE

- May 2007 – Aug 2007      Summer Research Intern in Sensor and Actuator Group in IBM T.J. Watson Research Center, Hawthorne, NY.
- Invented a dynamic redeployment algorithm with heuristics for a component-based distributed discrete-event system.
- Mentor: Norman H. Cohen  
Manager: Paul B. Chou

- Jun 2006 – Summer Research Intern in Distributed Messaging Group in IBM  
Sep 2006 T.J. Watson Research Center, Hawthorne, NY.
- Invented a distributed transparently fault-tolerant and highly-available middle-ware for component-oriented applications. (Patent pending)
- Mentor: Rob Strom  
Manager: Chitra Dorai

## RESEARCH EXPERIENCE

- 2004 – 2009 Graduate Student Researcher in Ptolemy Group, CHES (Center for Hybrid and Embedded Software Systems), U.C. Berkeley.
- *Model transformation.* Created a transformation tool for actor models in the Ptolemy II framework.
  - *Discrete-event simulation.* Created event relationship graphs (ERGs) for hierarchical discrete-event models.
  - *Optimistic execution of distributed systems with fault tolerance.* Created an incremental checkpointing and recovery mechanism with source code transformation.
  - *Execution strategy for real-time distributed discrete-event systems.* Created an execution strategy that leverages time-synchronized platforms to achieve out-of-order event processing.
  - *Higher-order language design.* Created a declarative language for higher-order model composition.
- Summer 2008 Google Summer of Code mentor in the Ptolemy II project.
- *Scalable model construction.* Applied model transformation on a distributed application using Google's MapReduce programming paradigm.
- 2002 – 2004 Research Assistant in MSDL (Modeling, Simulation and Design Lab), McGill University.
- *Model-based design.* Invented a visual formalism by extending UML Statecharts, and implemented a simulator and a code generator supporting multiple target languages.
- 2000 – 2002 Research Assistant in MPLS (Multi-Protocol Label Switching) network communication group, Nanjing University.

## SKILLS

- Computer languages: Java, C++, C, C#, Python, SQL, Common Lisp, Scheme, ML, MATLAB, L<sup>A</sup>T<sub>E</sub>X, Bash, Visual Basic, HTML, XSLT, JavaScript
- Operating systems: Windows, Solaris, Linux, FreeBSD
- Programming environments: Eclipse (plugin development), Visual Studio, JBuilder, VisualAge, Emacs

## FELLOWSHIPS AND AWARDS

- Dean's Honor List, McGill University, Canada, 2004.
- Differential Fee Waiver, McGill University, Canada, 2002 – 2003.

## PUBLICATIONS

- [1] Thomas Huining Feng. *Model Transformation with Hierarchical Discrete-Event Control*. PhD thesis, May 2009.
- [2] Rob Strom, Chitra Dorai, Thomas Huining Feng, and Wei Zheng. Deterministic replay for transparent recovery in component-oriented middleware. In *29th International Conference on Distributed Computing Systems (ICDCS 2009)*, Montreal, Quebec, Canada, Jun. 2009.
- [3] Jia Zou, Slobodan Matic, Edward A. Lee, Thomas Huining Feng, and Patricia Derler. Execution strategies for PTIDES, a programming model for distributed embedded systems. In *15th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2009)*, San Francisco, CA, USA, Apr. 2009.
- [4] Thomas Huining Feng. Engineering structurally configurable models with model transformation, Dec. 2008.
- [5] Christopher Brooks, Chihhong Cheng, Thomas Huining Feng, Edward A. Lee, and Reinhard von Hanxleden. Model engineering using multimodeling. In *1st International Workshop on Model Co-Evolution and Consistency Management (MCCM 2008)*, Toulouse, France, Sep. 2008.
- [6] Thomas Huining Feng and Edward A. Lee. Scalable models using model transformation. In *1st International Workshop on Model Based Architecting and Construction of Embedded Systems (ACES<sup>MB</sup> 2008)*, Toulouse, France, Sep. 2008.

- [7] Shamik Bandyopadhyay, Thomas Huining Feng, Hiren D. Patel, and Edward A. Lee. A scratchpad memory allocation scheme for dataflow models. Technical Report UCB/EECS-2008-104, EECS Department, University of California, Berkeley, Aug. 2008.
- [8] Patricia Derler, Thomas Huining Feng, Edward A. Lee, Slobodan Matic, Hiren D. Patel, Yang Zhao, and Jia Zou. PTIDES: A programming model for distributed real-time embedded systems. Technical Report UCB/EECS-2008-72, EECS Department, University of California, Berkeley, May 2008.
- [9] Thomas Huining Feng, Edward A. Lee, Hiren D. Patel, and Jia Zou. Toward an effective execution policy for distributed real-time embedded systems. In *14th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2008), Work-in-Progress Session*, St. Louis, MO, USA, Apr. 2008.
- [10] Thomas Huining Feng and Edward A. Lee. Real-time distributed discrete-event execution with fault tolerance. In *14th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2008)*, St. Louis, MO, USA, Apr. 2008.
- [11] Christopher Brooks, Thomas Huining Feng, Edward A. Lee, and Reinhard von Hanxleden. Multimodeling: A preliminary case study. Technical Report UCB/EECS-2008-7, EECS Department, University of California, Berkeley, Jan. 2008.
- [12] Thomas Huining Feng, Miriam Zia, and Hans Vangheluwe. Multi-formalism modelling and model transformation for the design of reactive systems. In *2007 Summer Computer Simulation Conference (SCSC 2007)*, San Diego, CA, USA, Jul. 2007.
- [13] Thomas Huining Feng, Lynn Wang, Wei Zheng, Sri Kanajan, and Sanjit A. Seshia. Automatic model generation for black box real-time systems. In *Design, Automation and Test in Europe (DATE) Conference*, Acropolis, Nice, France, 2007.
- [14] Adam Cataldo, Elaine Cheong, Thomas Huining Feng, Edward A. Lee, and Andrew Mihal. A formalism for higher-order composition languages that satisfies the Church-Rosser property. Technical Report UCB/EECS-2006-48, EECS Department, University of California, Berkeley, May 2006.
- [15] Thomas Huining Feng and Edward A. Lee. Incremental checkpointing with application to distributed discrete event simulation. In *Winter Simulation Conference (WSC 2006)*, Monterey, USA, 2006.
- [16] Thomas Huining Feng and Hans Vangheluwe. Modeling and simulation based design with DCharts. In *Conference on Conceptual Modeling and Simulation (CSM2004)*, Genoa, Italy, 2004.

- [17] Thomas Huining Feng. DCharts, a formalism for modeling and simulation based design of reactive software systems, Feb. 2004.
- [18] Thomas Huining Feng and Hans Vangheluwe. Case study: Consistency problems in a UML model of a chat room. In *Sixth International Conference on the Unified Modelling Language (UML 2003), Workshop on Consistency Problems in UML-based Software Development II*, San Francisco, USA, 2003.
- [19] Thomas Huining Feng. A virtual machine supporting multiple Statechart extensions. In *Summer Computer Simulation Conference (SCSC 2003), Student Workshop*, Montréal, Canada, 2003.
- [20] Thomas Huining Feng and Qimei Chen. Analyzing an improvement of MPLS-Net structures for the decrease of dialogue transmission delay. In *IEEE International Conference on Systems, Man and Cybernetics*, volume 4, Hammamet, Tunisia, 2002.
- [21] Thomas Huining Feng and Qimei Chen. A tree view of the MPLS FEC strategy. In *International Conference on Telecommunications (ICT 2002)*, Beijing, China, 2002.

## RELEVANT COURSEWORK

### U.C. Berkeley

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|          |  |
|----------|--|
| CS 294-5 | <i>Dynamic Program Analysis, Testing, and Debugging</i> by Prof. Koushik Sen   |
| CS 294-2 | <i>Software Synthesis</i> by Prof. Ras Bodik   |
| CS 264   | <i>Program Analysis</i> by Prof. Ras Bodik   |
| CS 263   | <i>Design and Analysis of Programming Languages</i> by Prof. George Necula   |
| CS 194   | <i>Distributed Systems</i> by Prof. Scott Shenker and Prof. Ion Stoica   |
| CS 164   | <i>Compilers and Programming Languages</i> by Prof. Ras Bodik  |
| EE 290N  | <i>Concurrent Models of Computation for Embedded Software</i> by Prof. Edward A. Lee                                 |
| EE 244   | <i>Introduction to Computer Aided Design of Integrated Circuits</i> by Prof. Kurt Keutzer and Prof. Sanjit A. Seshia |
| EE 219C  | <i>Computer-Aided Verification</i> by Prof. Sanjit A. Seshia   |
| IEOR 261 | <i>Experimenting with Simulated Systems</i> by Prof. Lee W. Schruben   |

### McGill University

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| 308-764 | <i>Software Fault Tolerance</i> by Prof. Jörg Kienzle                |
| 308-762 | <i>Modeling and Simulation based Design</i> by Prof. Hans Vangheluwe |