

September 11, 2008

# CURRICULUM VITAE

Grigore Roşu

Born on 12 December 1971, Bucharest, Romania.

Married (Luisa Maria Roşu), two children (Ana Cătălina Roşu and Dan Ilie Roşu).

*Current Position:* Associate Professor

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## **Research Interests**

Design, semantics and implementation of programming and specification languages. Automated software engineering and formal methods, especially “push-button” techniques for certification, monitoring, synthesis and modularization. Automated reasoning about computer systems, applications of logics, theorem proving. Algorithms, (co)algebra, category theory.

## **Education**

Ph.D. in Computer Science	University of California at San Diego, 2000
M.S. in Fundamentals of Computing	University of Bucharest, Romania, 1996
B.A. in Mathematics	University of Bucharest, Romania, 1995

## **Professional and Academic Experience**

- 2008 to present. Associate Professor. Department of Computer Science, University of Illinois at Urbana-Champaign, USA.
- 2008, August to December. Microsoft Research, Redmond, Washington. Visiting researcher on sabbatical leave from the University of Illinois.
- 2002-2008. Assistant Professor. Department of Computer Science, University of Illinois at Urbana-Champaign, USA.

- 2000-2002. Research Scientist. NASA Ames Research Center, California, USA. Automated Software Engineering Group, hired by the Research Institute for Advanced Computer Science of the Universities Space Research Association.
- Summer 2000. Instructor for “Data Structures & Algorithms”. Department of Computer Science & Engineering, University of California at San Diego, USA.
- 1996-2000. Research assistant, teaching assistant and Ph.D. student. Department of Computer Science & Engineering, University of California at San Diego, USA. Ph.D. and research adviser: Joseph Goguen.
- 1998-2002. Assistant Professor. Chair of Fundamentals of Computer Science, Department of Mathematics at the University of Bucharest, Romania.
- 1996-1998. Preparator. Chair of Fundamentals of Computer Science, Department of Mathematics at the University of Bucharest, Romania.
- 1995-1996. Teaching assistant, research assistant and M.S. student in Fundamentals of Computer Science, Department of Mathematics at the University of Bucharest, Romania. M.S. and research adviser: Virgil Emil Căzănescu.
- 1994-1996. Consultant to Automation Research Institute IPA, Romania. Working on European Community projects. Adviser and coordinator: Gheorghe Săndulescu.

## **Awards and Distinctions**

Reverse chronological order:

- UIUC’s “Spring 2008 List of Teachers Ranked as Excellent by Their Students”.
- “C.W. Gear Outstanding Junior Faculty Award”, 2005, offered by the Department of Computer Science of the University of Illinois at Urbana-Champaign for research and teaching accomplishments.
- “CAREER” award, under the program “Software Engineering and Languages” 2005, offered by the National Science Foundation (NSF).
- UIUC’s “Fall 2004 List of Teachers Ranked as Excellent by Their Students”.
- “European Association for the Study of Science and Technology” award winner for the best software science paper at ETAPS 2002.
- “Irina Gorun-Bercovici memorial prize”, 22 December 1997, offered by the Society of Mathematicians from Romania (once a year to a young researcher in computer science).
- 1<sup>st</sup> place, National Symposium “Info-Junior”, Iași 1995, Romania, with *Inclusive Equational Logics*.
- 2<sup>nd</sup> place, National Symposium “Info-Junior”, Iași 1993, Romania, with *Knuth-Bendix Completion in Prolog*.

## Grants

PI = Principal Investigator

co-PI = co-Principal Investigator

- (PI) “An Integrated Tool-Supported Framework for IVHM Monitoring, Control and Verification”. National Aeronautics and Space Administration (NASA) ARMD safety Program, Proposal number NNL08AA23C. \$500,000 for 2008 (Qualtech Systems, Inc., is a 50% subcontractor).
- (co-PI) “CSR-EHS: Monitor and Control: Towards Dependable COTS-based Real-Time Embedded Systems”, with Marco Caccamo (PI). National Science Foundation (NSF), Proposal Number CNS-0720512. \$400,000 for the period 2007-2010.
- (PI) “Scalable Formal Methods for Distributed Systems”. Air Force / Small Business Technology Transfer (STTR), phase I award, Topic Number AF07-T019, Proposal Number F074-019-0162. Small business partner: Qualtech Systems, Inc. \$40,000 for the period 2007-2008.
- (PI) UIUC Campus Research Board Award, 2007, \$9,350.
- (PI) Microsoft grant, 2007. \$35,000 as unrestricted gift (Recommended by James Larus).
- (PI) Microsoft grant, 2007. \$15,000 as unrestricted gift (Recommended by Tom Ball).
- (PI) Microsoft grant, 2005. \$10,000 as unrestricted gift (Recommended by Wolfram Schulte).
- (PI) C.W. Gear Outstanding Junior Faculty award. Department of Computer Science, University of Illinois at Urbana-Champaign. \$5,000 as unrestricted gift.
- (co-PI) “CSR—SMA: Dynamic Analysis and Control for Robust Scalable Open Distributed Systems”, with Gul Agha (PI) and Mahesh Viswanathan (co-PI). National Science Foundation (NSF), Proposal Number CNS-0509321. \$700,000 for the period 2005-2009.
- (PI) “CAREER: Runtime Verification and Monitoring”. National Science Foundation (NSF), Proposal Number CCF-0448501. \$400,000 for the period 2005-2010.
- (PI) “Scalable Formal Methods for Multidimensional Components”, with José Meseguer (co-PI). National Aeronautics and Space Administration (NASA), cooperative agreement NNA04CI49A, \$80,000 for the period 2003-2004.
- (PI) “Scalable Formal Methods for Multidimensional Components”, with José Meseguer (co-PI). National Science Foundation (NSF), Proposal Number CCF-0234524. \$400,000 for the period 2002-2006.

## Visiting Positions

- August - December (5 months) 2008  
Microsoft Research, Redmond, hosted by Wolfram Schulte.
- 7-17 December 2001  
University of Illinois at Urbana-Champaign, hosted by José Meseguer.

## **Publications**

All papers are available on line from <http://fsl.cs.uiuc.edu/grosu>.

### **Journal Papers**

- 1) “A Semantic Approach to Interpolation”, with Andrei Popescu and Traian Florin Șerbănuță. *Theoretical Computer Science*, to appear 2008 or 2009.
- 2) “A Rewriting Logic Approach to Operational Semantics”, with Traian Florin Șerbănuță and José Meseguer. *Information and Computation*, to appear 2007 or 2008.
- 3) “The Rewriting Logic Semantics Project”, with José Meseguer. *Theoretical Computer Science*, Volume 373, Number 3, 2007, pages 213-237.
- 4) “An Instrumentation Technique for Online Analysis of Multithreaded Systems”, with Koushik Sen. *Concurrency and Computation: Practice and Experience*, Volume 19, Number 3, March 2007, pages 311-325.
- 5) “Online Efficient Predictive Safety Analysis of Multithreaded Programs”, with Koushik Sen and Gul Agha. *Software Tools and Technology Transfer*, Volume 8, Number 3, June 2006, pages 248-260.
- 6) “An Equational Specification for the Scheme Language”, with Marcelo d’Amorim. *Universal Computer Science*, Volume 11, Number 7, 2005, pages 1327-1348.
- 7) “Combining Test Case Generation and Runtime Verification”, with Cyrille Artho, Howard Barringer, Allen Goldberg, Klaus Havelund, Sarfraz Khurshid, Mike Lowry, Corina Păsăreanu, Koushik Sen, Willem Visser, Rich Washington. *Theoretical Computer Science*, Volume 336, Numbers 2-3, 26 May 2005, pages 209-234.
- 8) “Rewriting-based Techniques for Runtime Verification”, with Klaus Havelund. *Automated Software Engineering*, Volume 12, Number 2, 2005, pages 151-197. Parts of this paper have been published as “Synthesizing Dynamic Programming Algorithms from Linear Temporal Logic Formulae”, *RIACS Technical Report TR 01-15*, May 2001, and as “Testing Linear Temporal Logic Formulae on Finite Execution Traces”, *RIACS Technical Report TR 01-08*, May 2001.
- 9) “Behavioral Abstraction is Hiding Information”. *Theoretical Computer Science*, Volume 327, Number 1-2, 2004, pages 197-221.
- 10) “Efficient Monitoring of Safety Properties”, with Klaus Havelund. *Software Tools and Technology Transfer*, Volume 6, Number 2, 2004, pages 158-173.
- 11) “An Overview of the Runtime Verification Tool Java PathExplorer”, with Klaus Havelund. *Formal Methods in System Design*, Volume 24, Number 2, 2004, pages 189-215.
- 12) “Institution Morphisms”, with Joseph Goguen. *Formal Aspects of Computing*, Volume 13, Numbers 3-5, 2002, pages 274-307.
- 13) “Axiomatizability in Inclusive Equational Logic”. *Mathematical Structures in Computer Science*, Volume 12, Number 5, 2002.

- 14) “Equational Axiomatizability for Coalgebra”. *Theoretical Computer Science*, Volume 260, Numbers 1-2, 2001, pages 229-247.
- 15) “Weak Inclusion Systems; Part Two”, with Virgil Emil Căzănescu. *Journal of Universal Computer Science*, Volume 6, Number 1, 2000, pages 5-21.
- 16) “On Equational Craig Interpolation”, with Joseph Goguen. *Journal of Universal Computer Science*, Volume 6, Number 1, 2000, pages 194-200.
- 17) “Kan Extensions of Institutions”. *Journal of Universal Computer Science*, Volume 5, Number 8, 1999, pages 482-493.
- 18) “Weak Inclusion Systems”, with Virgil Emil Căzănescu. *Mathematical Structures in Computer Science*, Volume 7, Number 2, 1997, pages 195-206.

### **Editing: Proceedings Books, Special Issues of Journals**

- 19) “Algebraic Methodology and Software Technology”, proceedings book of the 12<sup>th</sup> International AMAST Conference, AMAST’08, held on 28-31 July 2008, Urbana, Illinois, USA, edited with José Meseguer. *Lecture Notes in Computer Science*, Volume 5140, 2008.
- 20) “Rewriting Logic and its Applications”, proceedings book of the 7<sup>th</sup> International Workshop on Rewriting Logic and its Applications (WRLA’08), a satellite workshop to ETAPS’08 held on 29-30 March 2008, Budapest, Hungary. *Electronic Notes in Theoretical Computer Science*, to appear 2008 or 2009.
- 21) “Rewriting Logic and its Applications”, with Narciso Marti-Oliet and Carolyn Talcott. Special issue of the International Journal on *Higher-Order and Symbolic Computation*, by Springer, Volume 20, issue 1/2, 2007. Dedicated to the 6<sup>th</sup> International Workshop on Rewriting Logic and its Applications held in Vienna, Austria, 1-2 April, 2006. Satellite event to ETAPS’06.
- 22) “Formal Aspects of Testing and Runtime Verification (FATES/RV’06)”, proceedings book of a satellite workshop to FLOC’04 held on 15-16 August 2006, Seattle, USA, edited with Klaus Havelund, Manuel Nunez, and Burkhart Wolff. *Lecture Notes in Computer Science*, Volume 4262, 2006.
- 23) “Runtime Verification 2004 (RV’04)”, proceedings book of a satellite workshop to TACAS’04 at ETAPS’04 held on 3 April 2004, Barcelona, Spain, edited with Klaus Havelund. *Electronic Notes in Theoretical Computer Science*, Volume 113, 2005.
- 24) “Runtime Verification”, with Klaus Havelund. Special issue of the International Journal on *Formal Methods in System Design*, by Kluwer Academic Publishers, Volume 27, Number 3, 2005. Dedicated to the 2<sup>nd</sup> Runtime Verification Workshop held in Copenhagen, Denmark, 26 July 2002. Satellite event to CAV’02.
- 25) “Runtime Verification 2002 (RV’02)”, proceedings book of a satellite workshop to CAV’02 held on 26 July 2002, Copenhagen, Denmark, edited with Klaus Havelund. *Electronic Notes in Theoretical Computer Science*, Volume 70.4, 2002.

- 26) “Runtime Verification”, with Klaus Havelund. Special issue of the International Journal on *Formal Methods in System Design*, by Kluwer Academic Publishers, Volume 24, Number 2, 2004. Dedicated to the First Runtime Verification Workshop held in Paris, France, 23 July 2001. Satellite event to CAV’01.
- 27) “Runtime Verification 2001 (RV’01)”, proceedings book of a satellite workshop to CAV’01 held on 23 July 2001, Paris, France, edited with Klaus Havelund. *Electronic Notes in Theoretical Computer Science*, Volume 55.2, 2001.

### Invited Book Contributions

- 28) “Complete Categorical Deduction for Satisfaction as Injectivity”. In *Algebra, Meaning, and Computation: A Festschrift Symposium in Honor of Joseph Goguen, 2006*. Edited by Kokichi Futatsugi, Jean-Pierre Jouannaud, José Meseguer. *Lecture Notes in Computer Science*, Volume 4060, pages 157-172. Springer 2006.
- 29) “Composing Hidden Information Modules over Inclusive Institutions”, with Joseph Goguen. In *Essays in Memory of Ole-Johan Dahl, 2004*. Edited by O. Owe, S. Krogdahl and T. Lyche. *Lecture Notes in Computer Science*, Volume 2635, pages 96-123. Springer 2004.
- 30) “An Overview of the Tatami Project”, with Joseph Goguen, Kai Lin, Akira Mori and Bogdan Warinschi. Chapter 3 of *Cafe: An Industrial-Strength Algebraic Formal Method*, pages 61-78. Edited by Kokichi Futatsugi, Tetsuo Tamai and Ataru Nakagawa. Elsevier, 2000.

### Invited Papers

- 31) “The Rewriting Logic Semantics Project”, with José Meseguer. Proceedings of the 2<sup>nd</sup> Workshop on *Structural Operational Semantics, SOS’05*, Lisbon, Portugal, 10 July 2005. *Electronic Notes in Theoretical Computer Science*, Volume 156.1, 15 May 2006, pages 27-56. Acceptance rate 7/18 (39%).
- 32) “Rewriting Logic Semantics: From Language Specifications to Formal Analysis Tools”, with José Meseguer. Proceedings of the <sup>nd</sup> *International Joint Conference on Automated Reasoning, IJCAR’04*, Cork, Ireland, 4-8 July 2004. *Lecture Notes in Computer Science*, Volume 3097, 2004, pages 1–44. Acceptance rate 26/74 (35%).
- 33) “Experiments with Test Case Generation and Runtime Analysis”, with Cyrille Artho, Doron Drusinski, Allen Goldberg, Klaus Havelund, Mike Lowry, Corina Păsăreanu, Willem Visser. Proceedings of the 10th International Workshop on *Abstract State Machines, ASM’03*, Taormina, Italy, 3-7 March 2003. *Lecture Notes in Computer Science*, Volume 2589, 2004, pages 87-107.
- 34) “An Instrumentation Technique for Online Analysis of Multithreaded Programs”, with Koushik Sen. Proceedings of *Parallel and Distributed Systems: Testing and Debugging PADTAD’04*, Santa Fe, New Mexico, USA, 26-30 April, 2004. *IEEE Digital Library*.
- 35) “Towards Behavioral Maude: Behavioral Membership Equational Logic”, with José Meseguer. Proceedings of *Coalgebraic Methods in Computer Science, CMCS’02*, Grenoble, France, 6-7 April 2002. *Electronic Notes in Theoretical Computer Science*, Volume 65.1, 2002.

- 36) “Behavioral and Coinductive Rewriting”, with Joseph Goguen and Kai Lin. Proceedings of the 3<sup>rd</sup> *Workshop on Rewriting Logic and its Applications, WRLA’00*, Kanazawa, Japan, 19 September 2000. *Electronic Notes in Theoretical Computer Science*, Volume 36, 2001.
- 37) “A Protocol for Distributed Cooperative Work”, with Joseph Goguen. Proceedings of *Workshop on Distributed Systems, WDS’99*, Iași, Romania, 2 September 1999. *Electronic Notes in Theoretical Computer Science*, Volume 28, 1999.

### Conference, Workshop and Symposium Papers

- 38) “Efficient Monitoring of Parametric Context-Free Patterns”, with Patrick Meredith, Feng Chen and Dongyun Jin. Proceedings of the *IEEE/ACM International Conference on Automated Software Engineering, ASE’08*, L’Aquila, Italy, 15-19 September 2008. To appear in IEEE, 2008. Acceptance rate 34/280 (12%).
- 39) “Monitoring IVHM Systems using a Monitor-Oriented Programming Framework”, with Sudipto Ghoshal, Solaiappan Manimaran, Traian Serbanuta, and Gheorghe Stefanescu. Proceedings of the 6<sup>th</sup> *NASA Langley Formal Methods Workshop, LFM’08*, 30 April - 2 May, 2008, NASA Langley, Virginia, USA, 2008.
- 40) “jPredictor: A Predictive Runtime Analysis Tool for Java”, with Feng Chen and Traian Florin Serbanuta. Proceedings of the 30<sup>th</sup> *International Conference on Software Engineering, ICSE’08*, 10-18 May 2008, Leipzig, Germany, ACM, 2008. Acceptance rate 56/371 (15%).
- 41) “Synthesizing Monitors for Safety Properties – This Time With Calls and Returns”, with Feng Chen and Thomas Ball. Proceedings of the 8<sup>th</sup> *Workshop on Runtime Verification, RV’08*, 30 March 2008, Budapest, Hungary, *Lecture Notes in Computer Science*, to appear 2008. Acceptance rate 9/27 (33%).
- 42) “An Executable Rewriting Logic Semantics of K-Scheme”, with Patrick Meredith and Mark Hills. Proceedings of the 8<sup>th</sup> *Workshop on Scheme and Functional Programming*, 30 September 2007, Freiburg, Germany, Université Laval 2007 Technical Report DIUL-RT-0701, pp. 91-103.
- 43) “A Rewriting Logic Approach to Operational Semantics – Extended Abstract”, with Traian Florin Serbanuta and Jose Meseguer. Proceedings of the 4<sup>nd</sup> *International Workshop on Structural Operational Semantics, SOS’07*, 9 July 2007, Wroclaw, Poland, *Electronic Notes in Theoretical Computer Science*, Volume 192(1), 2007, pages 125-141.
- 44) “CIRC: A Circular Coinductive Prover”, with Dorel Lucanu. Proceedings of the 2<sup>nd</sup> *International Conference on Algebra and Coalgebra in Computer Science, CALCO’07*, Bergen, Norway, 20-24 August 2007, *Lecture Notes in Computer Science*, Volume 4624, 2007, pages 372-378. Acceptance rate 26/57 (46%).
- 45) “MOP: A Generic and Efficient Runtime Verification Framework”, with Feng Chen. Proceedings of the 22<sup>nd</sup> *SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages and Applications, OOPSLA’07*, Montreal, Canada, 21-25 October 2007, ACM, pages 569-588. Acceptance rate 33/156 (21%).
- 46) “Parametric and Sliced Causality”, with Feng Chen. Proceedings of the 19<sup>th</sup> *International Conference on Computer Aided Verification, CAV’07*, Berlin, Germany, 3-7 July, 2007. *Lecture Notes in Computer Science*, Volume 4590, 2007, pages 240-253. Acceptance rate 47/174 (27%).

- 47) “KOOL: An Application of Rewriting Logic to Language Prototyping and Analysis”, with Mark Hills. Proceedings of the 18<sup>th</sup> International Conference on *Rewriting Techniques and Applications, RTA’07*, Paris, France, 26-28 June 2007. *Lecture Notes in Computer Science*, Volume 4533, 2007, pages 246-256. Acceptance rate 27/69 (39%).
- 48) “On Formal Analysis of OO Languages using Rewriting Logic: Designing for Performance”, with Mark Hills. Proceedings of the 9<sup>th</sup> IFIP International Conference on *Formal Methods for Open Object-Based Distributed Systems, FMOODS’07*, Paphos, Cyprus, June 5-8, 2007. *Lecture Notes in Computer Science*, Volume 4468, 2007, pages 107-121. Acceptance rate 17/45 (37.7%).
- 49) “An Effective Algorithm for the Membership Problem for Extended Regular Expressions”. Proceedings of *Foundations of Software Science and Computation Structures, FOSSACS’07*, Braga, Portugal, March 24 - April 1, 2007. *Lecture Notes in Computer Science*, Volume 4423, 2007, pages 332-345. Acceptance rate 25/103 (24.3%).
- 50) “Parametric and Termination-Sensitive Control Dependence”, with Feng Chen. Proceedings of *Static Analysis Symposium, SAS’06*, Seoul, Korea, 29-31 August 2006. *Lecture Notes in Computer Science*, Volume 4134, 2006, pages 487-404. Acceptance rate 23/80 (28.7%).
- 51) “Equality of Streams is a  $\Pi_2^0$ -Complete Problem”. Proceedings of the *International Conference on Functional Programming, ICFP’06*, Portland, Oregon, USA, 18-20 September 2006. *ACM*, 2006, pages 184-191. Acceptance rate 24/76 (32%).
- 52) “Computationally Equivalent Elimination of Conditions – extended abstract”, with Traian Florin Şerbănuţa. Proceedings of *Rewriting Techniques and Applications, RTA’06*, Seattle, USA, 12-14 August 2006. *Lecture Notes in Computer Science*, Volume 4098, 2006, pages 19-34. Acceptance rate 23/52 (44%).
- 53) “Allen Linear (Interval) Temporal Logic – Translation to LTL and Monitor Synthesis”, with Saddek Bensalem. Proceedings of *Computer Aided Verification, CAV’06*, Seattle, USA, 17-20 August 2006. *Lecture Notes in Computer Science*, Volume 4144, 2006, pages 263-277. Acceptance rate 35/121 (29%).
- 54) “Static Analysis to Enforce Safe Value Flow in Embedded Control Systems”, with Sumant Kowshik and Lui Sha. Proceedings of the *International Conference on Dependable Systems and Networks, DSN’06*, Philadelphia, PA, USA, 25-28 June 2006. *IEEE Computer Society*, pages 23-34. Acceptance rate 34/187 (18%).
- 55) “A Semantic Approach to Interpolation”, with Andrei Popescu and Traian Florin Şerbănuţa. Proceedings of *Foundations of Software Science and Computation Structures, FOSSACS’06*, Vienna, Austria, 25-31 March 2006. *Lecture Notes in Computer Science*, Volume 3921, 2006, pages 307-321. Acceptance rate 28/107 (26%).
- 56) “A Rewrite Framework for Language Definitions and for Generation of Efficient Interpreters”, with Mark Hills and Traian Florin Şerbănuţa. Proceedings of the 6<sup>th</sup> International *Workshop on Rewriting Logic and its Applications, WRLA’06*, Vienna, Austria, 1-2 April 2006. *Electronic Notes in Theoretical Computer Science*, Volume 176.4, 28 July 2007, pages 215-231. Acceptance rate 13/20 (65%).



- 57) “Checking and Correcting Behaviors of Java Programs at Runtime with Java-MOP”, with Feng Chen and Marcelo d’Amorim. Proceedings of the *International Workshop on Runtime Verification, RV’05*, Edinburgh, Scotland, UK, 12 July 2005. *Electronic Notes in Theoretical Computer Science*, Volume 144.4, 26 May 2006, pages 3-20. Acceptance rate 8/14 (57%).
- 58) “Towards Formally Defining and Verifying Master/Slave Speculative Parallelization”, with Pierre Salverda and Craig Zilles. Proceedings of the *International Conference on Formal Methods, FM’05*, University of Newcastle upon Tyne, UK, 18-22 July 2005. *Lecture Notes in Computer Science*, Volume 3582, 2005, pages 123-138. Acceptance rate 31/129 (24%).
- 59) “Behavioral Extensions of Institutions”, with Andrei Popescu. Proceedings of the 1<sup>st</sup> *Conference on Algebra and Coalgebra in Computer Science, CALCO’05*, University of Wales Swansea, UK, 3-6 September 2005. *Lecture Notes in Computer Science*, Volume 3629, 2005, pages 331-347. Acceptance rate 25/62 (40%).
- 60) “Efficient Monitoring of Omega-Languages”, with Marcelo D’Amorim. Proceedings of the 17<sup>th</sup> *International Conference on Computer Aided Verification, CAV’05*, Edinburgh, Scotland, UK, 6-10 July 2005. *Lecture Notes in Computer Science*, Volume 3576, 2005, pages 364-378. Acceptance rate 32/125 (26%).
- 61) “Detecting Errors in Multithreaded Programs by Generalized Predictive Analysis of Executions”, with Koushik Sen, Gul Agha. Proceedings of the 7<sup>th</sup> *International Conference on Formal Methods for Open Object-based Distributed Systems, FMOODS’05*, Athens, Greece, 15-17 June 2005. *Lecture Notes in Computer Science*, Volume 3535, 2005, pages 211-226. Acceptance rate 19/42 (45%).
- 62) “A Tree Based Router Search Engine Architecture with Single Port Memories”, with Florin Baboescu, Dean M. Tullsen, Sumeet Singh. Proceedings of the 32<sup>nd</sup> *International Symposium on Computer Architecture, ISCA’05*, Madison, Wisconsin, USA, 4-8 June 2005. *IEEE*, pages 123-133. Acceptance rate 45/194 (23%).
- 63) “An Equational Specification for the Scheme Language”, with Marcelo d’Amorim. Proceedings of the 9<sup>th</sup> *Brazilian Symposium on Programming Languages, SBLP’05*, Recife, PE, Brazil, 23-25 May 2005.
- 64) “Java-MOP: A Monitoring Oriented Programming Environment for Java”, with Feng Chen. Proceedings of the 11<sup>th</sup> *International Conference on Tools and Algorithm for the Construction and Analysis of Systems, TACAS’05*, Edinburgh, U.K., 4-8 April 2005. *Lecture Notes in Computer Science*, Volume 3440, 2005, pages 546-550. Tool paper. Acceptance rate for tool papers 8/20 (40%).
- 65) “A Formal Monitoring-based Framework for Software Development and Analysis”, with Feng Chen, Marcelo D’Amorim. Proceedings of the 6<sup>th</sup> *International Conference on Formal Engineering Methods, ICFEM’04*, Seattle, USA, 8-12 November 2004. *Lecture Notes in Computer Science*, Volume 3308, 2004, pages 357-372. Acceptance rate 30/110 (27%).
- 66) “Extensional Theories and Rewriting”. Proceeding of the 31<sup>st</sup> *International Colloquium on Automata, Languages and Programming, ICALP’04*, Turku, Finland, 12-16 July 2004. *Lecture Notes in Computer Science*, Volume 3142, 2004, pages 1066-1079. Acceptance rate 28/107 (26%).

- 67) “Formal Analysis of Java Programs in JavaFAN”, with Azadeh Farzan, Feng Chen, and José Meseguer. Proceedings of the 16<sup>th</sup> International Conference on Computer Aided Verification, CAV’04, Boston, Massachusetts, USA, 13-17 July 2004. *Lecture Notes in Computer Science*, Volume 3114, 2004, pages 501-505. Acceptance rate 48/144 (33%).
- 68) “On Specifying and Monitoring Epistemic Properties of Distributed Systems”, with Koushik Sen, Abhay Vardan, Gul Agha. Proceedings of the 2<sup>nd</sup> International Workshop on Dynamic Analysis, WODA’04, Edinburgh, Scotland, UK, 25 May 2004. *British Institution of Electrical Engineers (IEE)*, 2004. Acceptance rate 11/22 (50%).
- 69) “Formal JVM Code Analysis in JavaFAN”, with Azadeh Farzan and José Meseguer. Proceedings of 10<sup>th</sup> International Conference on Algebraic Methodology And Software Technology, AMAST’04, Stirling, Scotland, UK, 12-16 July 2004. *Lecture Notes in Computer Science*, Volume 3116, 2004, pages 132-147. Acceptance rate 35/63 (55%).
- 70) “Monitoring Algorithms for Metric Temporal Logic Specifications”, with Prasanna Thati. Proceedings of the 4<sup>th</sup> International Workshop on Runtime Verification, RV’04, Barcelona, Spain, 3 April 2004. *Electronic Notes in Theoretical Computer Science*, Volume 113, 2005, pages 145-162.
- 71) “Efficient Decentralized Monitoring of Safety in Distributed Systems”, with Koushik Sen, Abhay Vardhan, and Gul Agha. Proceedings of the 26<sup>th</sup> International Conference on Software Engineering, ICSE’04, Edinburgh, Scotland, UK, 23-28 May 2004. *IEEE*, 2004, pages 418-427. Acceptance rate 58/436 (13%).
- 72) “Online Efficient Predictive Safety Analysis of Multithreaded Programs”, with Koushik Sen and Gul Agha. Proceedings of the 10<sup>th</sup> International Conference on Tools and Algorithm for the Construction and Analysis of Systems, TACAS’04, Barcelona, Spain, 29 March - 2 April, 2004. *Lecture Notes in Computer Science*, Volume 2988, 2004, pages 123-138. Acceptance rate 37/145 (26%).
- 73) “From Conditional to Unconditional Rewriting”. *Recent Trends in Algebraic Development Techniques; Proceedings with selected papers presented at WADT’04*, Barcelona, Spain, 27-29 March 2004. *Lecture Notes in Computer Science*, Volume 3423, 2004, pages 218-233. Acceptance rate 14/33 (42%).
- 74) “Generating Optimal Linear Temporal Logic Monitors by Coinduction”, with Koushik Sen and Gul Agha. Proceedings of the 8<sup>th</sup> Asian Computing Science Conference, ASIAN’03, Mumbai, India, 10-13 December 2003. *Lecture Notes in Computer Science*, Volume 2896, 2003, pages 260-275. Acceptance rate 16/53 (30%).
- 75) “Certifying Measurement Unit Safety Policy”, with Feng Chen. Proceedings of the *IEEE International Conference on Automated Software Engineering, ASE’03*, Helsinki, Finland, September 2003. *IEEE*, 2003, pages 304-309. Short paper. Acceptance rate 48/170 (28%).
- 76) “Generating Optimal Monitors for Extended Regular Expressions”, with Koushik Sen. Proceedings of the 3<sup>rd</sup> International Workshop on Runtime Verification, RV’03, Boulder, Colorado, USA, 13 July 2003. *Electronic Notes in Theoretical Computer Science*, Volume 89.2, 2003.
- 77) “Towards Monitoring-Oriented Programming: A Paradigm Combining Specification and Implementation”, with Feng Chen. Proceedings of the 3<sup>rd</sup> International Workshop on Runtime Verification,

- RV'03, Boulder, Colorado, USA, 13 July 2003. *Electronic Notes in Theoretical Computer Science*, Volume 89.2, 2003.
- 78) “Certifying and Synthesizing Membership Equational Proofs”, with Steven Eker, Patrick Lincoln and José Meseguer. Proceedings of the 12<sup>th</sup> International *Formal Methods* Symposium, FME'03, Pisa, Italy, 8-14 September 2003. *Lecture Notes in Computer Science*, Volume 2805, 2003, pages 359-380. Acceptance rate 44/144 (31%).
  - 79) “Runtime Safety Analysis of Multithreaded Programs”, with Koushik Sen and Gul Agha. Proceedings of *European Software Engineering Conference* and ACM SIGSOFT Symposium on the *Foundations of Software Engineering*, ESEC/FSE'03, Helsinki, Finland, 1-5 September 2003. *ACM*, 2003, pages 337-346. Acceptance rate 42/168 (25%).
  - 80) “Certifying Optimality of State Estimation Programs”, with Ram Prasad Venkatesan, Jon Whittle, Laurentiu Leustean. Proceedings of the 15<sup>th</sup> International conference on *Computer Aided Verification*, CAV'03, Boulder, Colorado, USA, 8-12 July 2003. *Lecture Notes in Computer Science*, Volume 2725, 2003, pages 301-314. Parts of this paper have been also published as “Certifying Kalman Filters”, with L. Leuştean, *RIACS Technical Report TR 03-02*, January 2003. Acceptance rate 32/87 (37%).
  - 81) “Testing Extended Regular Language Membership Incrementally by Rewriting”, with Mahesh Viswanathan. Proceedings of the 14<sup>th</sup> International Conference on *Rewriting Techniques and Applications*, RTA'03, Valencia, Spain, 9-11 June 2003. *Lecture Notes in Computer Science*, Volume 2706, 2003, pages 499-514. Acceptance rate 32/61 (52%).
  - 82) “Rule-Based Analysis of Dimensional Safety”, with Feng Chen and Ram Prasad Venkatesan. Proceedings of the 14<sup>th</sup> International Conference on *Rewriting Techniques and Applications*, RTA'03, Valencia, Spain, 9-11 June 2003. *Lecture Notes in Computer Science*, Volume 2706, 2003, pages 197-207. Acceptance rate 32/61 (52%).
  - 83) “Inductive Behavioral Proofs by Unhiding”. Proceedings of the 6<sup>th</sup> International Workshop on *Coalgebraic Methods in Computer Science*, CMCS'03, Warsaw, Poland, 5-6 April 2003. *Electronic Notes in Theoretical Computer Science*, Volume 86, 2003.
  - 84) “On Implementing Behavioral Rewriting”. Proceedings of the 3<sup>rd</sup> ACM SIGPLAN International Workshop on *Rule Based Programming*, RULE'02, Pittsburgh, Pennsylvania, USA, 5 October 2002. *ACM Digital Library*. Acceptance rate 8/13 (62%).
  - 85) “Towards Certifying Domain-Specific Properties of Synthesized Code”, with Jon Whittle. Proceedings of the 3<sup>rd</sup> ACM International Workshop on *Verification and Computational Logic*, VCL'02, Pittsburgh, Pennsylvania, USA, 5 October 2002.
  - 86) “Conditional Circular Coinductive Rewriting with Case Analysis”, with Joseph Goguen. *Recent Trends in Algebraic Development Techniques; Proceedings with selected papers presented at WADT'02*, Frauenchiemsee, Germany, 24-27 September 2002. *Lecture Notes in Computer Science*, Volume 2755, 2003, pages 216-232. Acceptance rate 20/44 (45%).
  - 87) “Towards Certifying Domain-Specific Properties of Synthesized Code - Extended Abstract”, with Jonathan Whittle. Proceedings of the 17<sup>th</sup> IEEE International Conference on *Automated Software Engineering*, ASE'02, Edinburgh, UK, 23-27 September 2002. *IEEE Computer Society*, pages 289-194. Acceptance rate 38/94 (40%).

- 88) “A Total Approach to Partial Algebraic Specification”, with José Meseguer. Proceedings of the 29<sup>th</sup> *International Colloquium on Automata, Languages, and Programming, ICALP’02*, Málaga, Spain, 8-13 July 2002. *Lecture Notes in Computer Science*, Volume 2380, 2002, pages 572-584. Acceptance rate 19/65 (29%).
- 89) “Synthesizing Monitors for Safety Properties”, with Klaus Havelund. Proceedings of the 8<sup>th</sup> International Conference on *Tools and Algorithms for Construction and Analysis of Systems, TACAS’02*, Grenoble, France, 8-12 April 2002. *Lecture Notes in Computer Science*, Volume 2280, 2002, pages 342-356. **EASST best paper award** at ETAPS’02. Acceptance rate 29/95 (31%).
- 90) “Certifying Domain Specific Policies”, with Michael Lowry and Thomas Pressburger. Proceedings of the 16<sup>th</sup> IEEE International Conference on *Automated Software Engineering, ASE’01*, San Diego, California, USA, 26-29 November 2001. *IEEE Computer Society*, pages 81-90. Acceptance rate 32/164 (20%).
- 91) “Monitoring Programs using Rewriting”, with Klaus Havelund. Proceedings of the 16<sup>th</sup> IEEE International Conference on *Automated Software Engineering, ASE’01*, San Diego, California, USA, 26-29 November 2001. *IEEE Computer Society*, pages 135-143. Also *RIACS Technical Report TR 01-19*, June 2001. Acceptance rate 32/164 (20%).
- 92) “Specification and Error Pattern Based Program Monitoring”, with Klaus Havelund. Proceedings of the 1<sup>st</sup> *European Space Agency Workshop on On-Board Autonomy ESA-ESTEC*, Noordwijk, The Netherlands, 17-19 October 2001.
- 93) “Complete Categorical Equational Deduction”. Proceedings of the 10<sup>th</sup> Annual Conference of the European Association for *Computer Science Logic, CSL’01*, Paris, France, 10-13 September 2001. *Lecture Notes in Computer Science*, Volume 2142, 2001, pages 528-538. Acceptance rate 39/91 (43%).
- 94) “Interpreting Abstract Interpretations in Membership Equational Logic”, with Bernd Fischer. Proceedings of the 2<sup>nd</sup> International Workshop on *Rule-Based Programming, RULE’01*, Florence, Italy, 4 September 2001. *Electronic Notes in Theoretical Computer Science*, Volume 59, Number 4. Also *RIACS TR 01-16*, May 2001.
- 95) “Monitoring Java programs with Java PathExplorer”, with Klaus Havelund. Proceedings of *Runtime Verification, RV’01*, Paris, France, 23 July 2001. *Electronic Notes in Theoretical Computer Science*, Volume 55, Number 2, pages 97-114. Acceptance rate 11/20 (55%).
- 96) “Circular Coinduction”, with Joseph Goguen. Proceedings of short papers at the *International Joint Conference on Automated Reasoning, IJCAR’01*, Siena, Italy, 18-23 June 2001, pages 140-149. Refines *UCSD TR CS-647*, March 2000.
- 97) “The AutoBayes Program Synthesis System - System Description”, with Bernd Fischer, Tom Pressburger, Johann Schumann. Proceedings of the 9<sup>th</sup> Symposium on the Integration of Symbolic Computation and Mechanized Reasoning, *CALCULEMUS’01*, Siena, Italy, 21-22 June 2001. Also *RIACS TR 01-18*, 2001.
- 98) “Java PathExplorer - A Runtime Verification Tool”, with Klaus Havelund. Proceedings of the 6<sup>th</sup> International *Symposium on Artificial Intelligence, Robotics and Automation in Space: A New Space Odyssey, ISAIRAS’01*, Montreal, Canada, 18-22 June 2001.

- 99) “Circular Coinductive Rewriting”, with Joseph Goguen and Kai Lin. Proceedings of *Automated Software Engineering, ASE’00*, Grenoble, France, 11-15 September 2000. *IEEE*. Acceptance rate 23/100 (23%).
- 100) “Incompleteness of Behavioral Logics”, with Samuel Buss. Proceedings of *Coalgebraic Methods in Computer Science, CMCS’00*, Berlin, Germany, 25-26 March 2000. *Electronic Notes in Theoretical Computer Science*, Volume 33, 2000, pages 61-79.
- 101) “Hiding More of Hidden Algebra”, with Joseph Goguen. Proceedings of *World Congress on Formal Methods, FM’99*, Toulouse, France, 20-24 September 1999. *Lecture Notes in Computer Science*, Volume 1709, 1999, pages 1704-1719. Acceptance rate 92/259 (36%).
- 102) “Behavioral Coinductive Rewriting”. Proceedings of the *OBJ/CafeOBJ/Maude Workshop at FM’99*, Toulouse, France, 20-22 September 1999.
- 103) “Hidden Congruent Deduction”, with Joseph Goguen. Proceedings of *First Order Theorem Proving, FTP’99*, Vienna, Austria, 23-25 November 1998. *Lecture Notes in Artificial Intelligence*, Volume 1761, 2000, pages 252-266, *Automated Deduction in Classical and Non-Classical Logics*.
- 104) “Tools for Distributed Cooperative Design and Validation”, with Joseph Goguen, Kai Lin, Akira Mori, Akiyoshi Sato. Proceedings of *CafeOBJ Symposium*, Numazu, Japan, 26-29 April 1998.
- 105) “A Birkhoff-like Axiomatizability Result for Hidden Algebra and Coalgebra”. Proceedings of *Coalgebraic Methods in Computer Science, CMCS’98*, Lisbon, Portugal, 28-29 March 1998. *Electronic Notes in Theoretical Computer Science*, Volume 11, 1998.
- 106) “Distributed Cooperative Formal Methods Tools”, with Joseph Goguen, Kai Lin, Akira Mori and Akiyoshi Sato. Proceedings of *Automated Software Engineering, ASE’97*, Lake Tahoe, Nevada, USA, 3-5 November 1997. *IEEE*, pages 55-62. Acceptance rate 32/108 (30%).

### **Unpublished Technical Reports, Bulletin Papers.**

- 107) “Abstract Semantics for Module Composition”. *University of California at San Diego*, Technical Report CS2000-0653, May 2000. Written in August 1997.
- 108) “Proofs of Safety for Untrusted Code”, with Nathan Segerlind. *University of California at San Diego*, Technical Report CS1999-633, 1999.
- 109) “The Institution of Order-Sorted Equational Logic”. *Bulletin of the European Association of Theoretical Computer Science*, Number 53, 1994, pages 250-255.

### **PhD Thesis**

- 110) “Hidden Logic”. *Department of Computer Science and Engineering, University of California at San Diego*, 4 September 2000.

## Presentations

- “K: the Concurrent Rewrite Abstract Machine”, the IFIP WG1.3 meeting, Urbana, Illinois, 2 August 2008.
- “Term Logic”, the 19<sup>th</sup> International Workshop on Algebraic Development Techniques (WADT’08), Pisa, Italy, 14 June 2008.
- “A Rewriting Approach to Type Inference”, the 19<sup>th</sup> International Workshop on Algebraic Development Techniques (WADT’08), Pisa, Italy, 14 June 2008.
- “Monitoring IVHM Systems using a Monitor-Oriented Programming Framework”, NASA Langley Formal Methods Workshop (LFM’08), NASA Langley, Virginia, USA, 30 April 2008.
- “Synthesizing Monitors for Safety Properties - This Time With Calls and Returns”, the 8<sup>th</sup> Workshop on Runtime Verification (RV’08), Budapest, Hungary, 30 March 2008.
- “MOP: An Efficient and Generic Runtime Verification Framework”, the 22<sup>nd</sup> SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages and Applications (OOPSLA’07), Montreal, Canada, 25 October 2007.
- “MOP: A Generic and Efficient Runtime Verification Framework”, Microsoft Research, Redmond, Seattle, USA, 27 April 2007.
- “MOP: A Generic and Efficient Runtime Verification Framework”, Carnegie Mellon University, Pittsburgh, USA, 23 April 2007.
- “Monitoring-based Programming and Analysis”, Stanford Research Institute, Menlo Park, USA, 7 March 2007.
- “Monitoring-based Programming and Analysis”, Stanford University, Stanford, USA, 6 March 2007.
- “Monitoring-based Programming and Analysis”, University of California at Berkeley, Berkeley, USA, 5 March 2007.
- “Monitoring-based Programming and Analysis”, University of Texas at Austin, Texas, USA, 1 February 2007.
- “MOP: A Monitoring-based Framework for Reliable Software Development”, Dagstuhl, Germany, 5 January 2007.
- “Monitoring-Oriented Programming and Analysis”, VERIMAG, Grenoble, France, 21 December 2006.
- “Equality of Streams is a  $\Pi_2^0$ -Complete Problem”, FM Seminar at UIUC, Urbana, 22 September 2006.
- “Equality of Streams is a  $\Pi_2^0$ -Complete Problem”, International Conference on Functional Programming (ICFP’06), Portland, Oregon, 19 September 2006.
- “Allen Linear Temporal Logic – Translation to LTL and Monitor Synthesis”, Computer-Aided Verification (CAV’06), Seattle, Washington, USA, 18 August 2006.

- “Computationally Equivalent Elimination of Conditions”, Rewriting Techniques and Applications (RTA’06), Seattle, Washington, USA, 11 August 2006.
- “K: A Rewrite-based Framework for Modular Language Design, Semantics, Analysis and Implementation”, IFIP W.G.1.3, San Diego, California, USA, 30 June 2006.
- “Complete Categorical Deduction for Satisfaction as Injectivity”, Algebra, Meaning, and Computation: A Festschrift Symposium in Honor of Joseph Goguen, San Diego, California, USA, 27 June 2006.
- “It’s Not Too Much To Ask: Ensuring software reliability through Formal Methods”, Panel presentation jointly with Byron Cook, Darko Marinov, Dan Morris, and Ben Watson, moderator José Meseguer, Urbana, Illinois, USA, 28 April 2006.
- “Rewrite Engines Competition”, Workshop on Rewriting Logic and its Applications (WRLA’06), Vienna, Austria, 2 April 2006.
- “A Rewrite Framework for Language Definitions and for Generation of Efficient Interpreters”, Workshop on Rewriting Logic and its Applications (WRLA’06), Vienna, Austria, 1 April 2006.
- “Computational Logical Frameworks and Generic Program Analysis Technologies”, Verified Software: Theories, Tools, Experiments (VSTTE’05), ETH Zurich, 12 October 2005. A meeting to address a challenge by Tony Hoare, based on invitations only.
- “Design and Semantics of Programming Languages using Rewriting Logic”, IFIP W.G.1.3, Swansea, Wales, UK, 7 September 2005.
- “Behavioral Extensions of Institutions”, 1<sup>st</sup> Conference on Algebra and Coalgebra in Computer Science (CALCO’05) Swansea, Wales, UK, 5 September 2005.
- “Runtime Verification and Monitoring”, IRISA, Rennes, France, 13 July 2005.
- “Checking and Correcting Behaviors of Java Programs at Runtime with Java-MOP”, the 5<sup>th</sup> Workshop on Runtime Verification (RV’05), Edinburgh, Scotland, UK, 12 July 2005.
- “Efficient Monitoring of  $\Omega$ -Languages”, the 17<sup>th</sup> International Conference on Computer Aided Verification (CAV’05), Edinburgh, Scotland, UK, 9 July 2005.
- “Runtime Verification and Monitoring”, ETH Zurich, Switzerland, 21 June 2005.
- “Detecting Errors in Multithreaded Programs by Generalized Predictive Analysis of Executions”, the 7<sup>th</sup> International Conference on Formal Methods for Open Object-based Distributed Systems (FMOODS’05), Athens, Greece, 16 June 2005.
- “A Formal Monitoring-based Framework for Software Development and Analysis”, the 6<sup>th</sup> International Conference on Formal Engineering Methods (ICFEM’04), Seattle, USA, 12 November 2004.
- “Formal Systems and Tools”, Lockheed-Martin & UIUC Workshop on System Integration, Urbana, Illinois, USA, 13 April 2004.
- “Monitoring Algorithms for Metric Temporal Logic Specifications”, Runtime Verification (RV’04), Barcelona, Spain, 3 April 2004.

- “Towards Eliminating Conditional Rewrite Rules”, Workshop on Algebraic Development Techniques (WADT’04), Barcelona, Spain, 27 March 2004.
- “Formal Methods Research at UIUC”, with José Meseguer, Microsoft Research, Redmond, USA, 20 January 2004.
- “Generating Optimal Monitors for Extended Regular Expressions”, Runtime Verification (RV’03), Boulder, Colorado, USA, 13 July 2003.
- “Towards Monitoring-Oriented Programming: A Paradigm Combining Specification and Implementation”, Runtime Verification (RV’03), Boulder, Colorado, USA, 13 July 2003.
- “Certifying Optimality of State Estimation Programs”, Computer Aided Verification (CAV’03), Boulder, Colorado, USA, 8-12 July 2003.
- “Runtime Analysis of Multithreaded Programs”, Laboratoire Spécification et Vérification, Ecole Normale Supérieure de Cachan, France, 24 June 2003.
- “Domain Specific Certification”, Université de Paris-Sud, Paris, France, 23 June 2003.
- “Runtime Analysis of Multithreaded Programs”, VERIMAG, Grenoble, France, 17 June 2003.
- “On Scalable Software Formal Analysis Techniques”, Departament de Llenguatges i Sistemes Informàtics and Universitat Politècnica de Catalunya, Barcelona, Spain, 13 June 2003.
- “Testing Extended Regular Language Membership Incrementally by Rewriting”, Rewriting Techniques and Applications (RTA’03), Valencia, Spain, 11 June 2003.
- “Rule-based Analysis of Dimensional Safety”, Rewriting Techniques and Applications (RTA’03), Valencia, Spain, 9 June 2003.
- “Monitoring Extended Regular Expressions”, IFIP W.G.1.3, Menorca Island, Spain, 4 June 2003.
- “On Scalable Software Formal Analysis Techniques”, Universidad Complutense Madrid, Spain, 30 May 2003.
- “On Scalable Formal Methods”, University of Illinois at Urbana-Champaign, USA, 31 March 2003.
- “Hidden Logic - Circular Coinductive Rewriting -”, Indiana University, USA, 24 October 2002.
- “Increasing Mission Critical Software Reliability using Algebraic Specification”, Indiana University, USA, 23 October 2002.
- “Towards Certifying Domain-Specific Properties of Synthesized Code”, Verification and Computational Logic (VCL’02), Pittsburgh, PA, USA, 5 October 2002.
- “On Implementing Behavioral Rewriting”, ACM SIGPLAN Workshop on Rule-Based Programming (RULE’02), Pittsburgh, PA, USA, 5 October 2002.
- “On Lightweight Formal Methods in System Specification and Verification”, IFIP W.G.1.3, 16<sup>th</sup> International Workshop on Algebraic Development Techniques, Frauenchiemsee, Germany, 23 September 2002.



- “Experiments and Methods in Dynamic Analysis of Programs”, Los Alamos National Laboratory, USA, 23 May 2002.
- “Synthesizing Monitors for Safety Properties”, Tools and Algorithms for Construction and Analysis of Systems (TACAS’02), Grenoble, France, 10 April 2002. Best software science presentation award winner at ETAPS’02 (offered by EASST).
- “Experiments and Methods in Dynamic Analysis of Programs”, University of Illinois at Urbana-Champaign, USA, 28 February 2002.
- “Monitoring Programs using Rewriting”, with Klaus Havelund, Automated Software Engineering (ASE’01), San Diego, California, USA. 28 November 2001.
- “Certifying Domain-Specific Policies”, with Michael Lowry, Automated Software Engineering (ASE’01), San Diego, California, USA. 27 November 2001.
- “Behavioral Verification with BOBJ and Kumo”, with Joseph Goguen and Kai Lin, Automated Software Engineering (ASE’01), San Diego, California, USA. 26 November 2001. Tutorial.
- “Complete Categorical Equational Deduction”, Annual Conference on Computer Science Logic (CSL’01), Paris, France, 10-13 September 2001.
- “Interpreting Abstract Interpretations in Membership Equational Logic”, Workshop on Rule-Based Programming (RULE’01), Florence, Italy, 4 September 2001.
- “Monitoring Java programs with Java PathExplorer”, with Klaus Havelund, Runtime Verification (RV’01), Paris, France, 23 July 2001.
- “Hidden Logic”, Stanford University, California, USA, 19 January 2001.
- “BOBJ Behavioral Specification and Reasoning System”, Formal Methods for Open Object-Based Distributed Systems (FMOODS’00), Stanford University, California, USA, 7 September 2000.
- “Recent Results in Hidden Logic”, University of Bucharest, 29 August 2000.
- “Hidden Logic”, University of California at San Diego, California, USA, 8 June 2000. PhD Thesis Defense.
- “Some Hidden Logic Gems”, SRI International, California, USA, 18 May 2000.
- “Some Hidden Logic Gems”, National University of Singapore, 4 April 2000.
- “Incompleteness of Behavioral Logics”, Workshop on Coalgebraic Methods in Computer Science (CMCS’00), Berlin, Germany, 26 March 2000.
- “Hidden Logic Gems”, Microsoft Research, Seattle, USA, 28 February 2000.
- “Hidden Logic Gems”, NASA Ames, California, USA, 23 February 2000.
- “Hiding More of Hidden Algebra”, with Joseph Goguen, World Congress on Formal Methods (FM’99), Toulouse, France, 23 September 1999.

- “Behavioral Coinductive Rewriting”, OBJ/CafeOBJ/Maude Workshop at Formal Methods 1999 (FM’99), Toulouse, France, 22 September 1999.
- “Abstract Semantics for Module Composition”, 14<sup>th</sup> International Workshop on Algebraic Development Techniques (WADT’99), Bonas, France, 17 Sept 1999.
- “A Protocol for Distributed Cooperative Work”, with Joseph Goguen, Workshop on Distributed Systems, Iași, Romania, 2 September 1999. Invited lecture.
- “Injectivity and Projectivity in Axiomatizability and Co-Axiomatizability”, 9<sup>th</sup> Workshop on Foundational Methods in Computer Science (FMCS’99), University of Alberta, Calgary, Canada, 5 June 1999.
- “Hidden Congruent Deduction”, Hidden Algebra Day in Bucharest (HADIB’98), Bucharest, Romania, 17 December 1998.
- “Institution-based Semantics for Horizontal Module Composition”, 8<sup>th</sup> Workshop on Foundational Methods in Computer Science (FMCS’98), Portland, Oregon, USA, 30 May 1998.
- “Support for Distributed Cooperative Software Engineering”, 13<sup>th</sup> Workshop on Algebraic Development Techniques (WADT’98), Lisbon, Portugal, 4 April 1998.
- “A Birkhoff-like Axiomatizability Result for Hidden Algebra and Coalgebra”, First Workshop on Coalgebraic Methods in Computer Science (CMCS’98), Lisbon, Portugal, 19 March 1998.
- “Inclusive Equational Logics”, National Symposium “Info-Junior”, Iași, Romania, 1995.
- “Knuth-Bendix Completion in Prolog”, National Symposium “Info-Junior”, Iași, Romania, 1993.

## Software Systems Work

**jPredictor.** With Feng Chen at UIUC. A predictive runtime analysis tool for Java.

**JavaFAN.** With F. Chen, A. Farzan, and J. Meseguer at UIUC. A model checker for Java and the JVM based on rewriting logic definitions.

**Dame.** With Koushik Sen, Abhay Vardan and Gul Agha at UIUC. A decentralized monitoring system for multithreaded applications.

**MoP.** With Feng Chen and Marcelo D’Amorim. A monitoring-oriented programming environment, aiming at combining specification and implementation by synthesizing configurable monitors from specifications.

**Diana.** With Koushik Sen, Abhay Vardan and Gul Agha at UIUC. A decentralized monitoring system, based on a synthesis algorithm for efficient monitors from epistemic formulae.

**Java MultiPathExplorer.** With Koushik Sen and Gul Agha at UIUC. An extension of Java PathExplorer with distributed systems techniques to extract a partial order from a flat execution. Runtime verification is then performed on that partial order, so it covers multiple paths.

**Java PathExplorer.** With Klaus Havelund at NASA Ames, Automated Software Engineering Group. A runtime verification environment for monitoring programs.

**AutoBayes.** With Bernd Fischer and Johann Schumann at NASA Ames, Automated Software Engineering Group. A data analysis software synthesis system.

**Tatami.** With Joseph Goguen and Kai Lin at UCSD. System aims to produce an industrial strength library of formal methods examples, with tool support, for distributed cooperative proofs of concurrent object systems on the web.

**BOBJ.** With Joseph Goguen and Kai Lin at UCSD. Specification language in the OBJ family whose underlying logic is behavioral logic. Intended for specification and verification of object-oriented, concurrent and distributed systems.

**Neural Network Library.** Implemented library of known (in 1995) neural networks and tested them on wind speed forecasting as a consultant to IPA, Romania.

## **Mentored Students**

Patrick Meredith. UIUC. 2007-.

Dongyun Jin. UIUC. 2007-.

Chucky Ellison. UIUC. 2007-.

Yaniv Eitani. UIUC. 2006-2008.

Traian-Florin Șerbănuță. UIUC. 2004-.

Popescu Andrei. UIUC. 2004-2006. Advised by Elsa Gunter after 2006.

Sanjit Saluja. UIUC. 2004-2005.

Mark Hills. UIUC. 2004-.

Sophie Quinton. ENS Cachan. UIUC 2004 summer internship.

Marcelo D'Amorim. UIUC. 2004-2005. Advised by Darko Marinov after 2005.

Koushik Sen. UIUC. 2002-2006. Main advisor: Gul Agha. Now at UC Berkely.

Feng Chen. UIUC. 2002-.

Ram Prasad Venkatesan. UIUC. 2002 - 2004. M.S. Now at Microsoft.

Laurențiu Leuștean. University of Bucharest. NASA 2002 summer internship.

Scott Johnson. University of Wyoming. NASA 2001 summer internship.

PhD Thesis Committee Member for:

Azadeh Farzan. UIUC. 2006. Postdoc CMU.

Hui Ding. UIUC. 2006.

Ajay Sudarshan Tirumala. UIUC. 2006. Hired by NVIDIA.

Sumant Kowshik. UIUC. 2006. Hired by Coverty, Inc.

Clemens Kupke. Amsterdam. 2006. Postdoc CWI.

Abhay Vardhan. UIUC. 2005. Hired by Google.

Hong-Seok Kim. UIUC. 2004.

Yixin Chen. UIUC. 2005. Hired by Washington University.

Girish Baliga. UIUC. 2005. Hired by Google.

## **Professional Activities**

- ***Organizer***

- 12<sup>th</sup> International Conference on Algebraic Methodology and Software Technology, AMAST '08, 28-31 July 2008. With Mark Hills, José Meseguer, and Ralf Sasse.
- 7<sup>th</sup> International Workshop on Rewriting Logic and its Applications, WRLA'08, 29-30 March 2008, Budapest, Hungary. Satellite to European Joint Conferences on Theory and Practice of Software 2008 (ETAPS'08).
- CALCO'07 Tools Day, 20 August 2007, Bergen, Norway. With Narciso Marti-Oliet.
- Dagstuhl seminar on Runtime Verification, 2-6 January 2007. With Bernd Finkbeiner, Klaus Havelund, and Oleg Sokolsky.
- 1<sup>st</sup> Joint International Workshop on Formal Aspects of Testing and Runtime Verification, FATES/RV 2006, 16 August 2006, Seattle, Washington, USA. With Klaus Havelund, Manuel Nunez, and Burkhart Wolff. Held in conjunction with the 2006 Federated Logic Conference (FLoC 2006).
- Rewrite engine competition at WRLA'06, 2 April 2006, Vienna, Austria. WRLA'06 was a satellite workshop to the European Joint Conferences on Theory and Practice of Software 2006 (ETAPS'06).
- 4<sup>th</sup> Runtime Verification workshop, RV'04, 3 April 2004, Barcelona, Spain. With Klaus Havelund. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2004 (ETAPS'04).
- 2<sup>nd</sup> Runtime Verification workshop, RV'02, 26 July 2002, Copenhagen, Denmark. With Klaus Havelund. Satellite workshop to Computer Aided Verification 2002 (CAV'02).
- 1<sup>st</sup> Runtime Verification workshop, RV'01, 23 July 2001, Paris, France. With Klaus Havelund. Satellite workshop to Computer Aided Verification 2001 (CAV'01).

- ***Steering Committee*** member

- 7<sup>th</sup> Runtime Verification workshop, RV'07, 13 March 2007, Vancouver, Canada. Satellite workshop to the International Conference on Aspect-Oriented System Development 2007 (AOSD'07).
- 5<sup>th</sup> Runtime Verification workshop, RV'05, 12 July 2005, Edinburgh, Scotland, UK. Satellite workshop to Computer Aided Verification 2005 (CAV'05).
- 4<sup>th</sup> Runtime Verification workshop, RV'04, 3 April 2004, Barcelona, Spain. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2004 (ETAPS'04).
- 3<sup>rd</sup> Runtime Verification workshop, RV'03, 13 July 2003, Boulder, Colorado, USA. Satellite workshop to Computer Aided Verification 2003 (CAV'03).

- ***Program Chair***

- 12<sup>th</sup> International Conference on Algebraic Methodology and Software Technology, AMAST '08, 28-31 July 2008. With José Meseguer.
- 7<sup>th</sup> International Workshop on Rewriting Logic and its Applications, WRLA'08, 29-30 March 2008, Budapest, Hungary. Satellite to European Joint Conferences on Theory and Practice of Software 2008 (ETAPS'08).

- 1<sup>st</sup> Joint International Workshop on Formal Aspects of Testing and Runtime Verification, FATES/RV 2006, 16 August 2006, Seattle, Washington, USA. With Klaus Havelund, Manuel Nunez, and Burkhart Wolff. Held in conjunction with the 2006 Federated Logic Conference (FLoC 2006).
- 4<sup>th</sup> Runtime Verification workshop, RV'04, 3 April 2004, Barcelona, Spain. With Klaus Havelund. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2004 (ETAPS'04).
- 2<sup>nd</sup> Runtime Verification workshop, RV'02, 26 July 2002, Copenhagen, Denmark. With Klaus Havelund. Satellite workshop to Computer Aided Verification 2002 (CAV'02).
- 1<sup>st</sup> Runtime Verification workshop, RV'01, 23 July 2001, Paris, France. With Klaus Havelund. Satellite workshop to Computer Aided Verification 2001 (CAV'01).

- **Program Committee member**

- ICDCN'09
- FOSSACS'09
- CALCO'09
- AMAST'08
- The 10<sup>th</sup> IFIP International Conference on Formal Methods for Open Object-Based Distributed Systems, FMOODS'08, June 2007, Oslo, Norway.
- The 1<sup>st</sup> workshop on Run Time Enforcement for Mobile and Distributed Systems (REM2007), 26-27 September 2007, Dresden, Germany.
- The 4<sup>th</sup> workshop on Structural Operational Semantics, SOS'07, 9 July 2007, Wroclaw, Poland.
- The 2<sup>nd</sup> Conference on Algebra and Coalgebra in Computer Science, CALCO'07, 20-24 August 2007, Bergen, Norway.
- CALCO'07 Tools Day, 20 August 2007, Bergen, Norway.
- The 5<sup>th</sup> workshop on Parallel and Distributed Systems: Testing and Debugging, PADTAD'06, 9 July 2007, London, England. Satellite workshop to the International Symposium on Software Testing and Analysis (ISSTA'07).
- The 9<sup>th</sup> IFIP International Conference on Formal Methods for Open Object-Based Distributed Systems, FMOODS'07, 6-8 June 2007, Paphos, Cyprus.
- The 7<sup>th</sup> Runtime Verification workshop, RV'07, 13 March 2007, Vancouver, Canada. Satellite workshop to the International Conference on Aspect-Oriented System Development 2007 (AOSD'07).
- The IEEE 2<sup>nd</sup> International Conference on Intelligent Computer Communication and Processing, ICCP'06, 1-2 September 2006, Cluj-Napoca, Romania.
- 1<sup>st</sup> Joint International Workshop on Formal Aspects of Testing and Runtime Verification, FATES/RV 2006, 16 August 2006, Seattle, Washington, USA. Held in conjunction with the 2006 Federated Logic Conference (FLoC 2006).
- The International Multi-Conference on Computing in the Global Information Technology –Challenges for the Next Generation of IT & C–, ICCGI'06, 1-3 August 2006, Bucharest, Romania.
- The 4<sup>th</sup> workshop on Parallel and Distributed Systems: Testing and Debugging, PADTAD'06, 17 July 2006, Portland, Maine, USA. Satellite workshop to the International Symposium on Software Testing and Analysis (ISSTA'06).

- The International Symposium on Logic-based Program Synthesis and Transformation, LOPSTR'06, 12-14 July 2006, Venice, Italy.
- 6<sup>th</sup> Workshop on Rewriting Logic and its Applications, WRLA'06, 1-2 April 2006, Vienna, Austria. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2006 (ETAPS'06).
- The IBM Verification Conference 2005, November 13 - 16, 2005. Organized by IBM Research Lab in Haifa, Israel.
- 5<sup>th</sup> Runtime Verification workshop, RV'05, 12 July 2005, Edinburgh, Scotland, UK. Satellite workshop to Computer Aided Verification 2005 (CAV'05).
- 7<sup>th</sup> Coalgebraic Methods in Computer Science workshop, CMCS'04, 27 - 29 March, 2004, Barcelona, Spain. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2004 (ETAPS'04).
- 5<sup>th</sup> Workshop on Rewriting Logic and its Applications, WRLA'04, Barcelona, Spain. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2004 (ETAPS'04).
- 6<sup>th</sup> Coalgebraic Methods in Computer Science workshop, CMCS'03, 5-6 April 2003, Warsaw, Poland. Satellite workshop to European Joint Conferences on Theory and Practice of Software 2003 (ETAPS'03).
- 2<sup>nd</sup> Runtime Verification workshop, RV'02, 26 July 2002, Copenhagen, Denmark. Satellite workshop to Computer Aided Verification 2002 (CAV'02).
- 1<sup>st</sup> Runtime Verification workshop, RV'01, 23 July 2001, Paris, France. Satellite workshop to Computer Aided Verification 2001 (CAV'01).
- Initiator and moderator of the following discussion lists:  
 RUNTIME VERIFICATION: <http://mail.cs.uiuc.edu/mailman/listinfo/rv>  
 PROGRAMMING LANGUAGES: <http://mail.cs.uiuc.edu/mailman/listinfo/prog-lang>  
 BEHAVIOR: <http://www.cs.ucsd.edu/groups/tatami/behavior>
- Member of:  
 IFIP W.G. 1.3  
 Association for Computing Machinery (ACM)  
 IEEE Computer Society.

## **Hobbies**

Flying (private pilot). Go (1 Dan - amatory; 2k on IGS, username Luta). Outdoors. Fishing.