

# **Bruce M. McMillin**

## *Full Curriculum Vita*

Department of Computer Science  
University of Missouri-Rolla  
Rolla, MO 65409-0350

### **Research Interests**

Fault Tolerance, Security, Cyber-Physical Systems, Formal Methods in Software Engineering, Embedded Systems, and Distributed Systems Theory

### **Education**

**9/85-7/88** Michigan State University, East Lansing, MI

Ph.D. in Computer Science while employed half time as a graduate assistant.  
Thesis title is *Reliable Parallel Processing - The Application-Oriented Paradigm*,  
Advisor - Lionel M. Ni.

**12/82-8/85** Michigan Technological University, Houghton, MI

Master of Science in Computer Science - obtained while employed full time.

**9/76-11/79** Michigan Technological University, Houghton, MI

Bachelor of Science in Computer Engineering with Honor.

### **Academic Experience**

**8/88-** University of Missouri-Rolla, Rolla, MO

11/08 – **Director, Center for Information Assurance**

11/07- **Senior Research Investigator - Intelligent Systems Center – Leading  
Cyber-Physical Systems Emphasis Area**

9/01- **Professor of Computer Science,**

9/01- 8/11 **Computer Science Graduate Coordinator**

9/93-8/01 **Associate Professor of Computer Science & Director of  
Experimental Computation Laboratory**

8/88-8/93 **Assistant Professor of Computer Science & Director of  
Experimental Computation Laboratory**

7/90- **Research Investigator - Intelligent Systems Center - Engaged in  
interdisciplinary research activities**

**8/94-5/95** State University of New York at Stony Brook, Stony Brook, NY

8/94-5/95 **Visiting Associate Professor of Computer Science**

### **Summary of Major Accomplishments**

- Led the effort to establish Missouri S&T as an NSA Center of Academic Excellence in Information Assurance Education (CAE) and in Research (CAE-R).
- Founded the Experimental Computation Laboratory (ECL) which is dedicated to parallel and distributed computation research in formal methods and security for distributed computing. The ECL funding includes, and has included grants from NSF, AFOSR, DOE/Sandia, State, and Industry.
- Built interdisciplinary research teams investigating distributed fault tolerance and secure control of Flexible AC Transmission System (FACTS) devices and Distribution-level power electronics devices. Past work has investigated novel parallel methods for computational fluid dynamics problems, developed stochastic algorithms for composite materials cutting, and developed graduate education in cyber-physical systems.
- Six-time winner of the UMR Faculty Excellence Award recognizing excellence in teaching, research, and service.
- Led the departmental assessment process (ABET/HLC)

### **Professional Societies**

Senior Member, IEEE, Member IFIP WG 11.10 on Critical Infrastructure Protection, Member, EWICS – European Workshop on Industrial Computer Systems Reliability, Safety, and Security, Golden Core Member, IEEE Computer Society, National Institute of Standards Cyber Security Working Group

<b>Grant Tabulation</b>							
Research Grants							
Duration	Title	Agency	Amount	PI/co-PI	Shared Credit	Shared Amount	Co-Investigators
2011-2011	Information and System Assurance for Critical Infrastructures	DOE	\$131,265	co-PI	20%	\$26,257	S. Sedigh, A. Hurson
2010-2011	FREEDM – ERC	NSF	\$586,692	Co-PI	18%	\$105,604.6	M. Crow, M. Ferdowsi, Jonathan Kimball, K. Corzine, B. Chowdhury
2010-2011	Common Correctness for Protecting Confidentiality of Critical Infrastructure Systems	DoD	\$115,133	PI	55%	\$63,323.15	D. Tauritz, A. Miller, S. Sedigh
2010-2011	Smart Grid Capability for Forward Operating Base Camps	LWI	\$315,343	Co-PI	33%	\$104,063.2	M. Crow, C. Elmore
2009-2010	FREEDM – ERC	NSF	\$422,210	Co-PI	18%	\$75,998	M. Crow, M. Ferdowsi, Jonathan Kimball, K. Corzine, B. Chowdhury
2009-2012	Advanced Military Installations that Integrate Renewable Energy and Advanced Energy Storage Technologies	DoD	\$7,050,005	Co-PI	3%	\$211,500	M. Crow, C. Elmore
2009-2010	Common Correctness for Protecting Confidentiality of Critical Infrastructure Systems	DoD	\$33,000	PI	55%	\$13,200	D. Tauritz, A. Miller, S. Sedigh
2008-2009	FREEDM – ERC	NSF	\$378,049	Co-PI	18%	\$68,049	M. Crow, M. Ferdowsi, Jonathan Kimball, K. Corzine, B. Chowdhury
2008-2009	Development and validation of advance energy management control algorithms for short or long term energy storage II	DOE	\$369,659.51	Co-PI	35%	\$129,380	M. Crow, M. Ferdowsi
2008-2009	Common Correctness for Protecting Confidentiality of Critical Infrastructure Systems	DoD	\$29,058	PI	55%	\$13,200	D. Tauritz, A. Miller, S. Sedigh

2007-2008	Development and validation of advance energy management control algorithms for short or long term energy storage	DOE	\$205,080	Co-PI	25%	\$51,265	M. Crow, M. Ferdowski
2006-2010	Collaborative Research: CSR---EHS: Semantic Domain Integration for Embedded and Hybrid Systems (Award + REU supplement)	NSF	\$112,000	PI	50%	\$56,000	M. Crow
2006-2007	Study and Reduction of the Deleterious Effects of Interaction Power Electronics Devices	DOE	\$680,859	co-PI	28%	\$190,641	M. Crow, J. Sarangapani, D. Tauritz, B. Chowdhury, and F. Liu
2005-2006	Continued FACTS Technology Development	DOE	1,270,391	co-PI	28.00%	\$355,709	M. Crow, J. Sarangapani, D. Tauritz, B. Chowdhury, and F. Liu
2004-2009	Construction of a Laboratory to Study FACTS Device Interactions	NSF	300,000	PI	34.00%	\$102,000	M. Crow and F. Liu
2004-2005	Advances in FACTS and Energy Storage (Task 2A-C) Subcontract	DOE	244,600	co-PI	30.00%	\$73,380	M. Crow, J. Sarangapani and F. Liu
2004-2005	Advances in FACTS and Energy Storage (Task 2A-C)	DOE	303,363	co-PI	34.00%	\$103,143	M. Crow, J. Sarangapani and F. Liu
2003-2004	Development of a Mobile Wireless Infrastructure UMRB	UM Research Board	16,500	co-PI	20.00%	\$3,300	S. Madria, F. Ercal, S. Subramanya, J. Sarangapani
2003-2004	Development of a Mobile Wireless Infrastructure	NSF	66,666	co-PI	20.00%	\$13,333	S. Madria, F. Ercal, S. Subramanya, J. Sarangapani
2003-2005	Development of a Parallel Machine Tool for Research and Education in Advanced Manufacturing	NSF	166,058	co-PI	10.00%	\$16,606	R. Landers, F. Liou, A. Okafor, and M. Leu
2003-2004	Variable Speed Electromechanical Drive Systems IGERT	NSF	1,349,071	co-PI	13.00%	\$175,379	M. Crow, J. Drewniak, F. Liu, W. Eversman, M. O'Keefe

2003-2004	Variable Speed Electromechanical Drive Systems IGERT Supplement	NSF	55,000	co-PI	13.00%	\$7,150	M. Crow, J. Drewniak, F. Liu, W. Eversman, M. O'Keefe
2001-2003	Capacity Building: Institutional Development Proposal in Trustworthy Computer Systems	NSF	196,616	co-PI	20.00%	\$39,323	A. Miller, K. Erickson, S. Subramanya
2001-2002	Insider Threat Detection for Robust Security	UM Research Board	32,250	PI	34.00%	\$10,965	J. Stanley and A. Miller
2000-2001	Fault Tolerance and Security for Power Transmission System Configuration with FACTS Devices	NSF	100,000	PI	50.00%	\$50,000	M. Crow
1998-1999	Prototype Fault-Tolerant and Secure IVHS	UM Research Board	12,000	PI	100.00%	\$12,000	
1997-1998	Formal Methods for Dependable Distributed Transportation Control Software	Mid America Transportation Center	20,572	PI	100.00%	\$20,572	
1997	VHLC Tool Set (contract extension)	Harmon Electronics, Grain Valley, MO and MRTC	37,250	PI	100.00%	\$37,250	
1995-1996	VHLC Tool Set	Harmon Electronics, Grain Valley, MO and MRTC	186,557	PI	50.00%	\$93,279	R. Wilkerson
1994-1995	Real Time Dynamic Simulation and Display of Mechanical Assemblies	Army STTR and Software Systems Specialists	100,000	co-PI	50.00%	\$50,000	F. Liou
1993-1994	CISE Instrumentation	NSF	100,000	PI	25.00%	\$25,000	

1992-1995	Intelligent Control of Cutting Force in Three Dimensional End Milling Operations Using Neural Networks	NSF, MRTC, EPRI	391,031	co-PI	33.00%	\$129,040	W. Lu and K. Krishnamurthy
1995	Intelligent Control of Cutting Force in Three Dimensional End Milling Operations Using Neural Networks (contract extension)	EPRI	20,000	co-PI	33.00%	\$6,600	W. Lu and K. Krishnamurthy
1993-1996	Run-Time Assurance for Distributed Computing Systems	AFOSR	80,000	PI	100.00%	\$80,000	
1992-1995	Formal Methods for Dependable Distributed Software	AFOSR	215,961	PI	100.00%	\$215,961	
1994	Modeling of Supersonic Combustor Flows With Parallel Computing	UM Research Board	25,000	co-PI	50.00%	\$12,500	D. Riggins
1993-1994	Responsive Software Through Mathematical Modeling	UM Research Board	22,000	co-PI	50.00%	\$11,000	M. Insall
1990-1991	Determination of Optimal Multicast Trees in the k-ary n-cube Topology	UM Inter-Campus Competition	15,000	PI	34.00%	\$5,100	B. Gillett and Y. Lan
1989-1991	The Application-Oriented Fault Tolerance Paradigm for Multicomputers	NSF - Research Initiation Award	58,022	PI	100.00%	\$58,022	
1989	Parallelism in Hierarchical Relaxation	McDonnell Douglas Corporation	30,000	PI	100.00%	\$30,000	
1989-1990	Parallel Architectures for Composite Stock Cutting Pattern Classification	Manufacturing Research and Training Center	17,787	co-PI	30.00%	\$5,336	C. Dagli, G. Leininger, and R. Ashouri
1989-1990	Parallel Architectures for Real-Time Process Control	Manufacturing Research and Training Center	26,518	co-PI	50.00%	\$13,259	K. Krishnamurthy, G. Leininger, and R. Ashouri
1989	CISE Research Instrumentation	National Science Foundation	80,000	PI	50.00%	\$40,000	A. DeKock, J. Manning, and R. Wilkerson
1989	Multicomputer Research Instrumentation	Intel Scientific Computers	127,820	PI	40.00%	\$51,128	A. DeKock, J. Manning, and R. Wilkerson

Software Grants							
1990-1992	University Partners in Computer Science Research	Intel Scientific Computers	60,220	PI	25.00%	\$15,055	F. Ercal, B. Gillett, Y. Kwon, K. Krishnamurthy, and G. Leininger
1990-1992	University Partners in Parallel Programming Education	Intel Scientific Computers	29,725	co-PI	30.00%	\$8,918	F. Ercal and B. Gillett
			\$89,945			\$23,973	
Education Grants							
1991-1992	Parallel Processing: Design, Analysis, and Implementation of Parallel Algorithms	NSF	55,731	co-PI	25.00%	\$13,933	B. Gillett
1990-1991	Parallel Processing: Design, Analysis, and Implementation of Parallel Algorithms	NSF	43,860	co-PI	10.00%	\$4,386	B. Gillett
			\$99,591			\$18,319	

### Donations Obtained

Funding for Undergraduate Research Activities, *John Deere Foundation*, \$15,000, 1996.

### Travel Grants

Travel Grant for Trip to Attend the 1st Workshop on Cyber-Physical Systems (part of ICDCS) Beijing, CHINA, 2008, *NSF*, \$1,000.

Travel Grant for Trip to Attend the 15th Annual COMPSAC in Tokyo Japan, 1991, *NSF*, (co-PI), \$6,000, (with B. Cheng).

Travel Grant for Trip to Speak at the International Summer Institute on Parallel Computer Architectures, Languages, and Algorithms in Prague, Czech Republic, 1993, \$1,000.

Travel Grant to Attend and Present at the Teaching Formal Methods: Curriculum Development Workshop, Hamilton College, Clinton, N.Y., 1994, *NSF*, \$300.

**Publication Record***Refereed Journal Publications*

Gerry Howser and Bruce McMillin, "Modeling and reasoning about the security of drive-by-wire automobile systems," *International Journal of Critical Infrastructure Protection*, Volume 5, Issues 3–4, December 2012, Elsevier 2012, Pages 127-134, DOI: [10.1016/j.ijcip.2012.09.001](https://doi.org/10.1016/j.ijcip.2012.09.001).

Thoshitha Gamage, Thomas Roth, Bruce McMillin and Mariesa Crow, "Mitigating Event Confidentiality Violations in Smart Grids: An Information Flow Security-based Approach," *IEEE Transactions on Smart Grid* (accepted, 2012).

Ravi Akella, Han Tang, Bruce M. McMillin, "Analysis of Information Flow Security in Cyber-Physical Systems," *International Journal of Critical Infrastructure Protection*, Elsevier, Vol 3-4, pp. 157-173, December 2010, DOI: <http://dx.doi.org/10.1016/j.ijcip.2010.09.001>.

Keyou Wang, Mariesa Crow, Bruce McMillin, and Stan Attcity "A Novel Real-Time Approach to Unified Power Flow Controller Validation," *IEEE Transactions on Power Systems*, Vol 25, Issue 4, pp. 1892-1901. DOI: [10.1109/TPWRS.2010.2045664](https://doi.org/10.1109/TPWRS.2010.2045664).

Bill Siever, Daniel Tauritz, Ann Miller, Mariesa Crow, and Bruce McMillin "Symbolic Reduction for High-Speed Power System Simulation," *Simulation: Transactions of the Society for Modeling and Simulation International*, Vol. 84, No. 6, pp. 297-310 (), DOI: [10.1177/0037549708094046](https://doi.org/10.1177/0037549708094046).

Martina Schollmeyer and Bruce McMillin "Efficient Run-Time Assurance in Distributed Systems Through Selection of Executable Assertions," *Journal of Systems and Software*, May, 2000, pp. 33-54, DOI: [10.1016/S0164-1212\(99\)00131-4](https://doi.org/10.1016/S0164-1212(99)00131-4)

"A Neural Network Approach for Force and Contour Error Control in Multi-Dimensional End Milling Operations," *Journal of Machine Tools and Manufacture*, Vol. 38, pp. 1343-1359, 1998, (with T. Luo, W. Lu, and K. Krishnamurthy).

"A General Method for Maximizing the Error-Detecting Ability of Distributed Algorithms," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 8, No. 2, February, 1997, pp. 164-172, (with M. Schollmeyer) (A shortened version appears in *PARLE '94 Parallel Architectures and Languages Europe*)

"CCSP - A Formal System for Distributed Program Debugging," *Programming and Computer Software*, Plenum Publishers, Vol. 21. No. 1, 1995, pp. 45-50 (with E. Arrowsmith).



- "Relaxing Synchronization in Distributed Simulated Annealing," *IEEE Transactions on Parallel and Distributed Systems* (with C. Hong), Vol. 6, No. 2, February, 1995, pp. 189-195.
- "Modeling of Supersonic Combustor Flows Using Parallel Computing," *Computer Systems in Engineering*, Pergamon Press Ltd., Great Britain, Vol. 3, Nos 1-4, pp. 217-229, 1992, (with D. Riggins, M. Underwood, L. Reeves, and E. Lu).
- "DAWGS: A Distributed Compute Server Utilizing Idle Workstations," *Journal of Parallel and Distributed Computing* (with H. Clark) Vol. 14, pp 175-186, 1992. Also appeared in *Proceedings of the Fifth Distributed Memory Computing Conference*, 1990.
- "SMILI - Visualization of Asynchronous Massively Parallel Programs", *J. of Systems and Software*, Elsevier North Holland, New York, Vol. 19, No. 3, November 1992, pp. 261-275, (with R. Khanna) (Also as UMR Department of Computer Science Technical Report Number CSC 91-8).
- "Reliable Parallel Sorting Through the Application-Oriented Fault Tolerance Paradigm" *IEEE Transactions on Parallel and Distributed Computing*, Vol. 3, No. 4, pp. 411-420, (with L. Ni). (also appeared in *Proceedings of the 9th International DCS*, 1989).
- "Composite Stock Cutting Through Simulated Annealing," *Journal of Mathematical and Computer Modeling*, Pergamon Press, New York, Vol. 16, No. 1, pp. 57-74, (with H. Lutfiyya, P. Poshyanonda, C. Dagli). Also as UMR Intelligent Systems Center Technical Report ISC-TR-91-004.
- "Parallel Implementation of a Recursive Least Squares Neural Network Training Method on the Intel iPSC/2," *Journal of Parallel and Distributed Computing*, Vol. 18(1993), pp. 89-93 (with J. Steck, K. Krishnamurthy, M. Ashouri, and G. Leininger). (Also appeared in *Proceedings of International Joint Conference on Neural Networks*, 1990).

#### *Refereed Conference Publications*

- Ravi Akella; Bruce McMillin, Modeling and Verification of Security Properties for Critical Infrastructure Protection, In *Proceedings of the Eighth Annual Workshop on Cyber Security and Information Intelligence Research (CSIIRW '12)* (to appear)
- Dale Fitch, Sahra Sedigh, Bruce McMillin, and Ravi Akella "CPS-CSH Cyber-Physical Analysis and Design," *Seventh CRITIS Conference on Critical Information*

- Infrastructures Security*, Lillehammer, Norway, September 17-18, 2012 (to appear)
- Thomas Roth and Bruce McMillin, "Breaking Nondeducible Attacks on the Smart Grid," *Seventh CRITIS Conference on Critical Information Infrastructures Security*, Lillehammer, Norway, September 17-18, 2012 (to appear)
- Stephen Jackson and Bruce McMillin, "The Effects of Network Link Unreliability For Leader Election Algorithm in a Smart Grid System," *Seventh CRITIS Conference on Critical Information Infrastructures Security*, Lillehammer, Norway, September 17-18, 2012 (to appear)
- Michael Gosnell and Bruce McMillin, "Multidimensional Sparse Space-Time," *Seventh CRITIS Conference on Critical Information Infrastructures Security*, Lillehammer, Norway, September 17-18, 2012 (to appear)
- Michael Gosnell and Bruce McMillin, "Sparse Space-Time Specification of the Generalized Railroad Crossing," Proceedings of the Sixth IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Washington, DC, March 18-21, 2012 (to appear).
- Michael Gosnell and Bruce McMillin, "Sparse Space-Time Specification of the Generalized Railroad Crossing," Proceedings of the Sixth IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Washington, DC, March 18-21, 2012 (to appear).
- Hu Chun, Wei Jiang and Bruce McMillin, "Privacy-Preserving Power Usage Control in the Smart Grid," Proceedings of the Sixth IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Washington, DC, March 18-21, 2012 (to appear).
- Tamal Paul, Jonathan W. Kimball, Maciej Zawodniok, Thomas P. Roth and Bruce McMillin, "Invariants as a Unified Knowledge Model for Cyber-Physical Systems," *Proceedings of the 2011 IEEE International Conference on Service Oriented Computing and Applications (SOCA 11), in the International Workshop on Knowledge and Service Technology for Life, Environment, and Sustainability (KASTLES)*, to appear, December 2011.
- Thoshitha Gamage, Ravi Akella, Thomas Roth, and Bruce McMillin. 2011." Information flow security in cyber-physical systems," In *Proceedings of the Seventh Annual Workshop on Cyber Security and Information Intelligence Research (CSIIRW '11)*, Frederick T. Sheldon, Robert Abercrombie, and Axel Krings (Eds.). ACM, New York, NY, USA, Article 52, DOI: [10.1145/2179298.2179356](https://doi.org/10.1145/2179298.2179356)

- Ravi Akella and Bruce McMillin, "Verification and Protection of Confidentiality in an Advanced Smart Grid," *Proceedings of the 45<sup>th</sup> Hawaii Conference on System Sciences*, pp 2169 – 2175, January, 2012, DOI: [10.1109/HICSS.2012.634](https://doi.org/10.1109/HICSS.2012.634),
- Thoshitha Gamage, Tom Roth, and Bruce McMillin, "Confidentiality Preserving Security Properties for Cyber-Physical Systems," *Proceedings of the 2011 Computers, Software, and Applications Conference*, , pp. 28-37, DOI: [10.1109/COMPSAC.2011.13](https://doi.org/10.1109/COMPSAC.2011.13)
- Nguyen, T.A.; Xin Qiu; Gamage, T.T.; Crow, M.L.; McMillin, B.M.; Elmore, A.C.; , "Microgrid application with computer models and power management integrated using PSCAD/EMTDC," *North American Power Symposium (NAPS), 2011* , vol., no., pp.1-7, 4-6 Aug. 2011, DOI: [10.1109/NAPS.2011.6024882](https://doi.org/10.1109/NAPS.2011.6024882).
- FanJun Meng; Akella, R.; Crow, M.L.; McMillin, B.; , "Distributed Grid Intelligence for future microgrid with renewable sources and storage," *North American Power Symposium (NAPS), 2010* , vol., no., pp.1-6, 26-28 Sept. 2010 DOI: [10.1109/NAPS.2010.5618963](https://doi.org/10.1109/NAPS.2010.5618963).
- Ravi C Akella, Derek Ditch, FanJun Meng, Bruce McMillin, and Mariesa Crow, "Distributed Power Balancing for the FREEDM System," *The 1<sup>st</sup> Smart Grid Computing Conference*, Gaithersburg, MD, Oct 3-6, 2010 pp. 7-12, [10.1109/SMARTGRID.2010.5622003](https://doi.org/10.1109/SMARTGRID.2010.5622003).
- Ravi Akella and Bruce McMillin, "Information Flow Analysis of Energy Management in a Smart Grid," *The 29th International Conference on Computer Safety, Reliability and Security (SAFECOMP '10)*, Vienna, Austria, (technical report version at [http://filpower.mst.edu/documents/Akella-DGI\\_Security.pdf](http://filpower.mst.edu/documents/Akella-DGI_Security.pdf)), pp. 263-276.
- Ayman Faza, Sahra Sedigh, and Bruce McMillin. 2010. Integrated cyber-physical fault injection for reliability analysis of the smart grid. In *Proceedings of the 29th international conference on Computer safety, reliability, and security (SAFECOMP'10)*, Erwin Schoitsch (Ed.). Springer-Verlag, Berlin, Heidelberg, 277-290, ACMID: [1886301.1886329](https://doi.org/10.1109/SAFECOMP.2010.1886329)
- David A. Cape, Stephen C. Jackson, Bruce M. McMillin, "Dihomotopic Deadlock Detection via Progress Shell Decomposition," 2010 Second International Conference on Advances in System Testing and Validation Lifecycle, Nice, France, August 2010, pp. 20-25.
- Jason Madden and Bruce McMillin, "Environmental Obfuscation of a Cyber-Physical System - Vehicle Example," *34rd Annual IEEE International Computer Software and Applications Conference*, Seoul, KOREA, pp. 176 – 181, July, 2010, DOI: [10.1109/COMPSACW.2010.39](https://doi.org/10.1109/COMPSACW.2010.39).
- Thoshitha Gamage and Bruce McMillin, "Enforcing Information Flow Security Properties in Cyber-Physical Systems: A Generalized Framework Based on

- Compensation Environmental,” *34rd Annual IEEE International Computer Software and Applications Conference*, , pp. 158-163, July, 2010, Seoul, KOREA, DOI: [10.1109/COMPSACW.2010.36](https://doi.org/10.1109/COMPSACW.2010.36).
- Derek P. Ditch and Bruce M. McMillin, “The Security Implication of Multiple Observers in a Distributed System,” *33rd Annual IEEE International Computer Software and Applications Conference*, July, 2009, Seattle, WA, pp. 341-346, DOI: [10.1109/COMPSAC.2009.157](https://doi.org/10.1109/COMPSAC.2009.157).
- Ayman Z. Faza, Sahra Sedigh, and Bruce M. McMillin, “Reliability analysis for the advanced electric power grid: from cyber control and communication to physical manifestations of failure,” *The 28th International Conference on Computer Safety, Reliability and Security (SAFECOMP '09)*, (Hamburg, Germany, September 15 - 18, 2009). B. Buth, G. Rabe, and T. Seyfarth, Eds. Lecture Notes In Computer Science, vol. 5775. Springer-Verlag, Berlin, Heidelberg, pp. 257-269 (Best Paper Award), DOI: [10.1007/978-3-642-04468-7\\_21](https://doi.org/10.1007/978-3-642-04468-7_21).
- David A. Cape, Bruce M. McMillin, Benjamin W. Passer, Mayur Thakur, "Recursive Decomposition of Progress Graphs," *Secure System Integration and Reliability Improvement*, , 2009 Third IEEE International Conference on Secure Software Integration and Reliability Improvement, 2009, pp. 23-31, DOI: [10.1109/SSIRI.2009.19](https://doi.org/10.1109/SSIRI.2009.19).
- Keyou Wang; Crow, M.L.; Cheng Ying; McMillin, B.M.; , "A hardware-in-loop FACTS control system design for real-time power system simulation," *Power & Energy Society General Meeting, 2009. PES '09. IEEE* , vol., no., pp.1-10, 26-30 July 2009, DOI: [10.1109/PES.2009.5275945](https://doi.org/10.1109/PES.2009.5275945).
- T. Gamage and B. McMillin, “Non-Deducibility Based Analysis of Cyber-Physical Systems,” Proceedings of the Third IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Dartmouth, NH, March 22-25, 2009, pp169-183, DOI: [10.1007/978-3-642-04798-5\\_12](https://doi.org/10.1007/978-3-642-04798-5_12).
- Gamage, T.T.; McMillin, B.M.; , "EM Enforcing Information Flow Properties using Compensating Events," *System Sciences, 2009. HICSS '09. 42nd Hawaii International Conference on* , vol., no., pp.1-7, 5-8 Jan. 2009, DOI: [10.1109/HICSS.2009.181](https://doi.org/10.1109/HICSS.2009.181).
- S. Markose, F. Liu, and B. McMillin, “A Systematic Framework for Structured Object-Oriented Security Requirements Analysis in Embedded Systems,” *IEEE/IFIP International Conference On Embedded and Ubiquitous Computing (EUC 2008)* , December, 2008, Shanghai, Vol. 1, pp. 75-81.
- Ayman Z. Faza, Sahra Sedigh, and Bruce McMillin, “The Advanced Electric Power Grid: Reliability Modeling and Complexity Reduction Techniques,” *The 27th International Conference on Computer Safety, Reliability and Security (SAFECOMP '08)*}, 2008, pp. 429-439.

Ryan C. Underwood, Bruce M. McMillin, M. L. Crow, "An Open Framework for Highly Concurrent Real-Time Hardware-in-the-Loop Simulation," *Computer Software and Applications Conference, Annual International*, pp. 44-51, 2008 32nd Annual IEEE International Computer Software and Applications Conference, 2008.

H. Tang and B. McMillin, "Security Property Violation in CPS through Timing," The 28th International Conference on Distributed Computing Systems Workshop on Cyber Physical Systems, Beijing, CHINA, pp. 519-524.

R. Akella, T. Service, and B. McMillin, "Teaching of Security in Cyber-Physical Systems," Proceedings of the 12<sup>th</sup> Colloquium for Information Systems Security Education, University of Texas, Dallas, TX, June 2 - 4, 2008.

Y. Sun, B. McMillin, X. Liu and D. Cape, "Verifying Noninterference in a Cyber-Physical System – The Advanced Electric Power Grid", *The Seventh International Conference on Quality Software (QSIC)*, October 11--12, Portland, Oregon, USA, 2007, pp. 363-369.

"Reliability Modeling of the Advanced Electric Power Grid," *The 26th International Conference on Computer Safety, Reliability and Security (SAFECOMP '07)*, Nuremberg, Germany, Sept. 2007, pp. 370-383 (with Ayman Z. Faza, Sahra Sedigh).

"Analysis of the security of information flow in the Advanced Electric Power Grid using FACTS," Proceedings of the First IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Dartmouth, NH, March 19-21, 2007, *Critical Infrastructure Protection: Issues and Solutions (Springer, 2007)*, pp. 43-56 (with H. Tang).

"An Instance-based Structured Object Oriented Method for Co-analysis/Co-design of Concurrent Embedded Systems," *30th Annual IEEE International Computers Software and Applications Conference*. September 2006, Chicago, IL, pp. 273-280 (with Matthew Ryan, Sule Simsek, Xiaoqing (Frank) Liu, and Ying Cheng).

"A Methodology for Structured Object-Oriented Elicitation and Analysis of Temporal Constraints in Hardware/Software Co-analysis and Co-design of Real-Time Systems," *30th Annual IEEE International Computers Software and Applications Conference*. September 2006, Chicago, IL, pp. 281-290 (with Yan Sun and Xiaoqing (Frank) Liu).

"Model Checking Control Communication of a FACTS Device," Proceedings of the 3rd International Workshop on Embedded Computing (EC-06), Columbus, OH, August 14, 2006, pp. 391-396 (with David Cape and James Townsend).

["The Maximum Flow Algorithm Applied to the Placement and Steady State Control of FACTS Devices,"](#) *Proceedings of the 2005 North American Power Symposium*

- October, 2005, Ames, IA, pp. 77-83 (with Austin Armbruster, Mike Gosnell, and Mariesa Crow)
- [“Power Transmission Control Using Max-Flow,”](#) *29th Annual IEEE International Computers Software and Applications Conference*, Edinburgh, U.K., July 26-28, 2005, pp. 256-263 (with Austin Armbruster, Mike Gosnell, and Mariesa Crow).
- ”Structured Object-oriented Co-analysis/Co-design of Hardware/Software for the FACTS Powers System ,” *29th Annual IEEE International Computers Software and Applications Conference*, Edinburgh, U.K., July 26-28, 2005, pp. 396-402 (with M. Ryan, S. Markose, Y. Cheng, and F. Liu).
- “Energy Balanced Broadcasting Through Delayed Intelligence,” *Information Technology: Coding and Computing, 2005. ITCC 2005*. 2005, Las Vegas, NV, Vol 2., pp. 627 – 632 (with M.R. Gosnell, R. Albarelli, and M. X. Cheng).
- “Evolutionary Optimization of Flexible AC Transmission System Device Placement for Increasing Power Grid Reliability,” *FEA 2005, 6th International Workshop on Frontiers in Evolutionary Algorithms*, Salt Lake City, Utah, July 21-26, 2005, pp. 516-519, (with John Chaloupek, Daniel R. Tauritz, and M.L. Crow).
- [“Controlling Power Using FACTs Devices and the Maximum Flow Algorithm,”](#) *Proc. 5<sup>th</sup> International Conference on Power Systems Operation and Planning, ICPSOP-2002*, Abuja, Nigeria December 16-18, 2002, pp. 158-163 ( with Mariesa Crow, Austin Armbruster)
- [“Runtime Assertion Checking of Temporal Specifications in a Mobile Environment - AHS,”](#) *Proceedings of the 2001 Workshop on Mobile Computing as part of the 2001 Symposium on Reliable Distributed Systems*, (with C. Sreerambhatla) (to appear).
- [“Fault Tolerance and Security for Power Transmission System Configuration with FACTS Devices,”](#) *Proceedings of the 32<sup>nd</sup> North American Power Symposium*, pp. 5.1-5.9, October, 2000 (with M. Crow).
- [“History Clipping in Event-Driven Distributed Systems,”](#) *Proceedings of the ISCA 13th International Conference on Parallel and Distributed Computing Systems*, Las Vegas, NV, August 8-10, 2000, pp. 460-465 (with M. Chittajulu).
- “Effective Octree Generation of Parts for Virtual Prototyping,” *Proceedings of the 3rd ASME Design for Manufacturing Conference*, Paper No. DETC98/DFM-5716, September 13-16, 1998, Atlanta, GA, pp. 1-6 (with T. Chou, F. Liou, L. Reeves, and P. Suess).
- “Run-Time Secure Evaluation: Can We Afford It?,” *New Security Paradigms Workshop*, (with C. Serban), September, 1996, Oakland, Ca.

- "Wheels: An Automated Program Analysis Tool," *The 8th International Conf. on Software Engineering and Knowledge Engineering*, June 10-12, 1996, Lake Tahoe, NV, pp. 269-276 (with A. Sun).
- "[Run-Time Security Evaluation \(RTSE\) for Distributed Applications](#)," *Proceedings of the IEEE Symposium on Security and Privacy*, Oakland, CA, May, 1996, pp. 222-232, (with C. Serban).
- "Checking Program Proofs Made Easy," *Proceedings of COMPSAC'95, the 19th International Computer Software and Applications Conference*, pp. 102-107, August 1995 (with M. Schollmeyer)
- "Assertion-Based Program Verification Using a Constraint Logic Programming Tool," *Proceedings of CONSTRAINT'95, The International Workshop on Constraint Based Reasoning*, April, 1995, (with M. Schollmeyer).
- "Constructing an Interval Temporal Logic for Real-Time Systems" Proc. First IEEE International Conference on Engineering of Complex Computer Systems, Nov. 6-10, 1995, Ft. Lauderdale, FL, Pergamon Press. (also as *UMR Department of Computer Science Technical Report Number CSC 93-25*), (with M. Insall and G. Tsai)
- "Ensuring the Satisfaction of a Temporal Specification at Run-Time" Proc. First IEEE International Conference on Engineering of Complex Computer Systems, Nov. 6-10, 1995, Ft. Lauderdale, FL, pp. 397-404. (also as *UMR Department of Computer Science Technical Report Number CSC 93-20*), (with M. Insall and G. Tsai)
- "Force Control in Two-Dimensional End Milling Operations Using Recurrent Neural Networks," *1995 ASME Int. Mechanical Engineering Congress and Exposition*, DSC-Vol. 57-2, November 1995, pp. 773-780 (With Luo, T., Xu, Q., Krishnamurthy, K., and Lu, W).
- "CCSP - A Formal System for Distributed Program Debugging," *Proceedings of the Software for Multiprocessors and Supercomputers, Theory, Practice, Experience*, Moscow, Russia, September 21-23, 1994, pp. 260-269 (with E. Arrowsmith) (also as *UMR Department of Computer Science Technical Report, CSC-94-13*).
- "An Improved Characterization of 1-step Recoverable Embeddings: Rings in Hypercubes," *Proceedings of the 1994 International Conference on Parallel and Distributed Systems*, (with J. Liu and T. Sager), pp. 508-513, December 1994.
- "A General Method for Maximizing the Error-Detecting Ability of Distributed Algorithms," *PARLE '94 Parallel Architectures and Languages Europe*, Springer-Verlag, Berlin, Athens, Greece, pp. 725-736, July, 1994, (also as *UMR Department of Computer Science Technical Report Number CSC 93-16*) (with M. Schollmeyer)
- "A Neural Controller for Force Control in End Milling," *1994 International Mechanical Engineering Congress and Exposition*, (with K. Krishnamurthy, Q. Xu, and W. Lu), DSC-Vol. 55-1, pp. 563-572, November, 1994,

- "A Recursive Least Squares Training Algorithm for Multi-layer Recurrent Neural Networks," *Proc. of the American Control Conference*, (with K. Krishnamurthy, Q. Xu, and W. Lu), pp. 1712-1716, June, 1994.
- "Identification of Cutting Force in End Milling Operations Using Recurrent Neural Networks," *Proceedings of the IEEE Conference on Neural Networks*, Orlando, FL, June-July, 1994, 3828-3833 (with Q. Xu, K. Krishnamurthy, and W. Lu).
- "An Enhanced Reconfigurable Embedding Scheme for Rings in Hypercubes," *Proceedings of the 1992 International Conference on Parallel and Distributed Systems*, (with J. Liu), pp. 298-305, December, 1992.
- "The Computation of Supersonic Combustor Flows using Multi-Computers," *American Institute of Aeronautics and Astronautics (AIAA)*, AIAA paper number 93-0060, Reno, NV, January, 1993, (with D. Riggins, M. Underwood, L. Reeves, and E. Lu).
- "A Divide and Conquer Ring Embedding Scheme on Hypercubes with Efficient Recovery Capability," *Proceedings of the 21st International Conference on Parallel Processing*, pp. III-38-III-45, August, 1992 (with J. Liu).
- "Fault-Tolerant Distributed Deadlock Detection/Resolution," *Proceedings of the 17th International COMPSAC*, November, 1993, pp. 224-230, (with P. Li). (Also as *UMR Department of Computer Science Technical Report Number CSC 92-04*).
- "Formal Derivation of an Error-Detecting Distributed Data Scheduler Using CHANGELING," *Formal Methods in Programming and their Applications*, Springer-Verlag, Lecture Notes in Computer Science Series 735, July, 1993, pp. 363-376. (with H. Lutfiyya and A. Su). (Also as a Poster in the 15th ICSE, Baltimore, MD, May, 1993).
- "Fault-Tolerant Distributed Sort Generated from a Verification Proof Outline," *Responsive Computer Systems - Dependable Computing and Fault-Tolerance*, Vol. 7, 1992, Springer-Verlag, H. Kopetz and Y. Kakuda eds, pp. 71-96. (with H. Lutfiyya and M. Schollmeyer). (Also as a Short Talk in the 14th ICSE, Melbourne, Australia May, 1992).
- "Fault-Tolerant Concurrent Branch and Bound Algorithm Derived from Program Verification" *Proceedings of the 16th International COMPSAC*, September, 1992, pp. 182-187, (with A. Sun and H. Lutfiyya).
- "Fault-Tolerant Matrix Multiplication with One-Iteration Fault Latency," *Proceedings of the 15th International COMPSAC*, September, 1991, pp. 665-672, (with C. Hong).
- "PAFMV - Pairwise Asynchronous Multigrid," *Proceedings of the 1990 International Conference on Parallel Processing*, August, 1990, pp. I-388-I-392, (with S. Franks, and R. Khanna). (Also as *Technical Report, UMR Intelligent Systems Center, ISC-TR-90-007*, January, 1990).



- "Experimental Comparison of Bidding and Drafting Load Sharing Protocols," Accepted as a Contributed Talk in the *Proceedings of the Fifth Distributed Memory Computing Conference*, Charleston, SC, April 1990, pp. 968-974 (with A. Ross).
- "DAWGS: A Distributed Compute Server Utilizing Idle Workstations," Accepted as a Contributed Talk in the *Proceedings of the Fifth Distributed Memory Computing Conference*, Charleston, SC, April 1990, pp. 732-741 (with H. Clark).
- "Expectations for Associative-Commutative Unification in the Multicomputer Environment," *Proceedings of the 13th International COMPSAC*, Orlando, FL, September 1989, pp. 158-165. (with R. Wilkerson).
- "Reliable Parallel Sorting Through the Application-Oriented Fault Tolerance Paradigm" *Proceedings of the 9th International DCS*, Newport Beach, CA, June, 1989, pp. 508-515. (with L. Ni)
- "A Non-Relaxation Based Problem Instantiation for the Application- Oriented Fault Tolerance Paradigm," Accepted as a Contributed Talk and in the *Proceedings of the Fourth Conference on Hypercube Concurrent Computers and Applications*, Monterey, CA, March 1989, pp. 109-116.
- "Executable Assertion Development for the Distributed Parallel Environment," *Proceedings of the 12th International COMPSAC*, Chicago, IL, October 1988, pp. 284-291. (with L. Ni).
- "Limitations of System Level Diagnosis by Fault Model Consideration," *Proceedings of the Third International Conference on Supercomputing*, Vol. III, Boston, MA, May 1988, pp. 258-261. (with L. Ni and A. Esfahanian)
- "A Reliable Parallel Algorithm for Relaxation Labeling," *Parallel Processing for Computer Vision and Display*, P. M. Dew, R. A. Earnshaw, and T. R. Heywood, eds., Addison-Wesley, 1989, pp. 190-209. (with L. Ni).
- "Byzantine Fault Tolerance through Application-Oriented Specification," *Proceedings of the 11th International COMPSAC*, Tokyo, Japan, October 1987, pp. 347-353. (with L. Ni).

*Books and Contributions to Published Books*

- "Intelligent Control of Cutting Force in End Milling Operations," *Intelligent Control*, ed. R. Shoureshi, K. Baheti, D. Garg, J. Maulbetsch, and D. Wormely, IEEE Press, 1995 (with K. Krishnamurthy, and W. Lu).
- "Parallel Algorithm Fundamentals and Analysis," *Parallel Computer Architectures, Languages, and Algorithms*, ed. T. Casavant, P. Tvrdik, and F. Plasil, IEEE Computer Society Press, 1995, pp. 151-182. (with J. Liu).
- "Formal Methods to Generate and Understand Distributed Computing Systems," *Parallel Computer Architectures, Languages, and Algorithms*, ed. T. Casavant, P. Tvrdik, and F. Plasil, IEEE Computer Society Press, 1995, pp. 351-368, (with G. Tsai and H. Lutfiyya).

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*Software Invention*

"Intelligent Control Through the Use of Neural Networks," *Developed Under Contract for the Electric Power Research Institute*, Palo Alto, CA, Disclosure No. 95UMR024, May, 1996 (with K. Krishnamurthy and W. Lu).

*Abstract or Unrefereed Conferences*

B. McMillin, "Privacy and Confidentiality in Cyber-Physical Power Systems," *Proceedings of the IEEE Power & Energy Society General Meeting*, San Diego, CA, July 2012.

Xin Qiu, Tu Nguyen, M. L. Crow, A. C. Elmore, and B. McMillin, "Computer Models for Microgrid Applications," *Proceedings of the IEEE Power & Energy Society General Meeting*, Detroit, MI, July 2011 (poster).

B. McMillin and R. Akella, "Verification of Information Flow Properties in Cyber-Physical Systems," Presented at *Workshop on Foundations of Dependable and Secure Cyber-Physical Systems*, CPSWeek 2011

B. McMillin, R. Akella, D. Ditch, G. Heydt, Z. Zhang, and M-Y. Chow, "Architecture of a Smart Microgrid Distributed Operating System," PSCE 2011 (poster).

["Testing and Verification of Cyber-Physical \(Social\) Systems,"](#) *Panel: New Paradigms in Software Testing: Towards Solutions 33<sup>rd</sup> Intl., COMPSAC*, Seattle, WA, July 2009 (uncredited)

"Engineering the Advanced Power Grid: Research Challenges and Tasks," *Workshop on Research Directions for Security and Networking in Critical Real-Time and Embedded Systems (In Conjunction with IEEE RTAS06)*, April, 2006, (with M. L. Crow, C. Gill, F. Liu, D. Niehaus, and D. Tauritz)

"An Approach to Improving the Physical and Cyber Security of a Bulk Power System with FACTS," *Proceedings of 2005 EESAT Forum*, San Francisco, Ca, Oct 2005, (with Mariesa Crow).

"Multi-Layer Vulnerability Assessments of SCADA Networks," *Workshop on Cyber Infrastructure Emergency Preparedness Aspects*, April 21-22, 2005, Ottawa, Ontario, CA (with Dan Craigen, Irwin Meisels, Mark Saaltink (Noranics) Ann Miller, and Kelvin Erickson).

- [“Hardware/software co-design for power system test development,”](#) *Proceedings of the 2004 ACM workshop on Interdisciplinary software engineering research*, 2004, pp. 83-88, with Austin Armbruster, Matt Ryan, Frank Liu, and Ying Cheng.
- “An integrated pattern recognition approach for intrusion detection,” *Biomedical Science and Instrumentation*. 2002;38:447-52 (with Pandit A, and Stanley RJ).
- “Object–Oriented Modeling and Fault Detection of a Powder Feeder for a Laser Metal Deposition System,” *Proceedings of the Thirteenth Annual Solid Freeform Fabrication Symposium*, Austin, Texas, August 5–7, 2002 (with Landers, R.G., Hilgers, M.G., and Liou, F.W.)
- "Fault-Tolerant and Secure Intelligent Vehicle Highway System Software - a Safety Prototype" *Proceedings of 1998 Intelligent Vehicles Symposium*, Stuttgart, Germany, October, 1998, pp. 487-492, (with J. Sirois, R. Mahoney, and F.Budd)
- "Modeling of Injection in Supersonic Combustor Flows," *1994 SCALABLE HIGH PERFORMANCE COMPUTING CONFERENCE*, Knoxville, TN, May 1994. Poster Presentation (with Mark Underwood, David Riggins, Larry Reeves, and Eric Lu)
- "Formal Generations of Executable Assertions for a Fault-Tolerant Parallel Bitonic Sort," Short presentation at the *14th International Conference on Software Engineering*, May, 1992 (Also as *UMR Department of Computer Science Technical Report Number CSC 91-12*) (with H. Lutfiyya).
- "Parallel Error Tolerance Scheme Based on the Hill Climb Nature of Simulated Annealing," *Proceedings of the 35th Midwest Symposium on Circuits and Systems*, (with C. Hong), pp. 685-688, 1992.
- "A Visualization Model for Massively Parallel Algorithms," *Proceedings of the 6th Distributed Memory Computing Conference* May, 1991, pp. 617-620, (with R. Khanna).
- "Neural Modeling and Control of a Distillation Column," *Proceedings of International Joint Conference on Neural Networks*, Seattle, WA, July 1991, (with J. Steck, K. Krishnamurthy, and G. Leininger) pp. II-771 - II-774.
- "Parallel Implementation of a Recursive Least Squares Neural Network Training Method on the Intel iPSC/2," *Proceedings of International Joint Conference on Neural Networks*, San Diego, CA, June 1990, pp. I-631 - I-636. (with J. Steck, K. Krishnamurthy, M. Ashouri, and G. Leininger). (Also as a UMR Intelligent Systems Center Technical Report, ISC-TR-90-005).
- "Composite Stock Cutting Pattern Classification Through Neocognitron," *Proceedings of the 1990 International Joint Conference on Neural Networks*, January 1990, Washington, D.C., pp. 587-590, (with C. Dagli, R. Ashouri, and G. Leininger).
- "Application-Oriented Fault Tolerance," *2nd Annual OSU Workshop on Parallel Computing*, March 28-89, Columbus, OH.

- "Composite Stock Cutting using Simulated Annealing," *MAECON 1990*, St. Louis, MO, October, 1990, (with H. Lutfiyya, C. Dagli, and P. Poshyanonda). .KE
- "Fault-Tolerant Matrix Multiplication with One-Iteration Latency," *MAECON 1990*, St. Louis, MO, October, 1990, (with C. Hong).
- "A Fast O(k) Multicast Message Routing Algorithm," *Frontiers of Massively Parallel Computation*, New York, NY, October, 1990, pp. 372-374, (with T. Sager). also as a UMR Department of Computer Science Technical Report, CSC-90-002.
- "An Asynchronous Multigrid Algorithm for the Intel iPSC/2," *Copper Mountain Conference on Iterative Methods*, April, 1990. (with S. Franks and R. Khanna).
- "Reliable Parallel Elliptic PDE Solution," Presented at the 3rd. SIAM Conf. on Parallel Processing for Scientific Computing, Los Angeles, CA, December, 1987. (with L. Ni).

*Invited Papers*

- ["Information and Net-Centric Security in Cyber-Physical Power Systems,"](#) Bruce McMillin, Mo-Yuen Chow, and Mark Anderson, HICSS New Research Directions for Future Cyber-Physical Energy Systems, June 2-4, 2009, Baltimore, MD.
- ["Cyber-Physical Systems for Renewable Electric Energy Delivery and Management,"](#) Bruce McMillin, Mariesa Crow, and Alex Huang, HICSS New Research Directions for Future Cyber-Physical Energy Systems, June 2-4, 2009, Baltimore, MD.
- "Cyber-Physical Systems Engineering: The Advanced Power Grid," NSF Cyber-Physical System Workshop, <http://varma.ece.cmu.edu/cps/>, October 2006.
- ["A Practical Application for Formally-Specified Assertions: Debugging and Monitoring,"](#) (Proceedings of SEKE2000 (to appear))
- "Automated Highway Systems," *IEEE Potentials*, V. 17, No. 4, October-November, 1998, pp. 7-11 (with K. Sanford).
- "Distributed Operating Systems," *Encyclopedia of Distributed Computing*, invited paper, P. Dasputa and J. Urban (eds), To appear.
- "Parallel Algorithm Fundamentals and Analysis," *International Summer Institute on Parallel Computer Architectures, Languages, and Algorithms*, July 5-10, 1993, Prague, Czech Republic, (with H. Lutfiyya, G. Tsai, and J. Liu). (Also as UMR Department of Computer Science Technical Report Number CSC 93-05).
- "Safe Computing," *IEEE Potentials*, October, 1989, pp. 29-31 (with T. Casavant).

"Personal Computing for the Visually Impaired," *IEEE Potentials*, May, 1989, pp. 17-20.  
*Education Publications* "Teaching the Practice of Formal Methods in Distributed Computing Systems - A Module" *Teaching Formal Methods: Curriculum Development Workshop*, Hamilton College, Clinton, N.Y., July 30 - Aug 5, 1994.

"Parallel Programming as an Early Paradigm," *Trans. Missouri Academy of Sciences*, Vol. 23, 1989 pg. 82.

#### *Technical Reports*

"History Clipping in Event-Driven Distributed Systems," *UMR Department of Computer Science Technical Report Number CSC 00-01* (with M. Chittajulu).

"From Formal Security Specifications to Executable Assertions - A Distributed Systems Preliminary Study," *UMR Department of Computer Science Technical Report Number CSC 95-01* (with C. Serban)

"Initial Experimental Results for Controlling the Cutting Force in End Milling Operations," *Dept. of MAE&EM, University of Missouri-Rolla, Rolla, Missouri, Technical Memorandum MAE-TM-31*, September 1994. (with Xu, Q., Luo, T., Krishnamurthy, K., and Lu, W.)

"An Approach for Implementing On-Line Learning for Force Control in End Milling Operations," *Dept. of MAE&EM, University of Missouri-Rolla, Rolla, Missouri, Technical Memorandum MAE-TM-30*, August 1994. (with Smolik, T., Krishnamurthy, K. and Lu, W.)

"Experimental Setup to Test Intelligent Control Algorithms for Controlling Cutting Force in End Milling Operations," *Dept. of MAE&EM, University of Missouri-Rolla, Rolla, Missouri, Technical Memorandum MAE-TM-29*, May 1994. (with Su, A., Swope, K., Krishnamurthy, K., and Lu, W.)

"Efficient Run-Time Assurance in Distributed Systems Through Selection of Executable Assertions," *UMR Department of Computer Science Technical Report Number CSC 94-01* (with M. Schollmeyer)

"Using Temporal Subsumption for Developing Efficient Error-Detecting Distributed Algorithms," *UMR Department of Computer Science Technical Report Number CSC 93-28* (with M. Schollmeyer)

"Formal model and specification of deadlock," *UMR Department of Computer Science Technical Report CSC-93-31* (with P. Li).

"Formal verification of distributed deadlock detection algorithm using a time-dependent proof technique," *UMR Department of Computer Science Technical Report Number CSC-94-06* (with P. Li).

"An Algorithm for Generating Executable Assertions for Fault Tolerance," *UMR Department of Computer Science Technical Report Number CSC 92-01* (with H. Lutfiyya and M. Schollmeyer).

- ["How to Program in CCSP"](#) *UMR Department of Computer Science Technical Report CSC-94-20* (with E. Arrowsmith)
- "CCSP - A Formal System for Distributed Program Debugging," *UMR Department of Computer Science Technical Report CSC-94-13* (with E. Arrowsmith)
- "Fault Tolerant Concurrent Branch and Bound Algorithm Derived From Program Verification," *UMR Department of Computer Science Technical Report Number CSC 92-02* (with H. Lutfiyya and A. Sun).
- "A Divide and Conquer Ring Embedding Scheme on Hypercubes With Efficient Recovery Ability," *UMR Department of Computer Science Technical Report Number CSC 92-03* (with J. Liu).
- "Fault-Tolerant Distributed Database Lock Managers Formally Derived From Program Verification," *UMR Department of Computer Science Technical Report Number CSC 92-05* (with H. Lutfiyya and M. Schollmeyer).
- "An Improved Characterization of 1-Step Recoverable Embeddings: Rings in Hypercubes," *UMR Department of Computer Science Technical Report Number CSC 92-07* (with J. Liu and T. Sager).
- "An Enhanced Reconfigurable Embedding Scheme for Rings in Hypercubes," *UMR Department of Computer Science Technical Report Number CSC 92-08* (with J. Liu).
- "Fault Tolerance in Concurrent Systems Through Formal Methods," *UMR Department of Computer Science Technical Report Number CSC 92-14* (with H. Lutfiyya).
- "Formal Generations of Executable Assertions for Application-Oriented Fault Tolerance," *UMR Department of Computer Science Technical Report Number CSC 92-15* (H. Lutfiyya, M. Schollmeyer).
- "Using Minimal and Maximal Fault Tolerance for the Assessment of Fault-Tolerant Algorithms," *UMR Department of Computer Science Technical Report Number CSC 92-16* (with M. Schollmeyer).
- "A Run-Time Decision Procedure for Responsive Computing Systems" *UMR Department of Computer Science Technical Report Number CSC 93-29*, (with M. Insall and G. Tsai)
- "Constructing an Interval Temporal Logic for Real-Time Systems" *UMR Department of Computer Science Technical Report Number CSC 93-25*, (with M. Insall and G. Tsai)
- "Ensuring the Satisfaction of a Temporal Specification at Run-Time" *UMR Department of Computer Science Technical Report Number CSC 93-20*, (with M. Insall and G. Tsai)
- "Fault-Tolerant Distributed Deadlock Detection/Resolution," *UMR Department of Computer Science Technical Report Number CSC 92-04* (also in *Proceedings of the 17th International COMPSAC*) (with P. Li)

- "Relaxing Synchronization in Distributed Simulated Annealing," *UMR Department of Computer Science Technical Report Number CSC 92-06* (with C. E. Hong) (Also as "Maximum Tolerable Error Bound in Distributed Simulated Annealing," *ETRI Journal*. Vol. 15, No. 3-4, Jan 1994, p 1-26 (with C. Hong and H. Ahn))
- "Use of Multigrid Methods to Improve Parallel Speedup of the Solution of Non-Linear Partial Differential Equations" *UMR Intelligent Systems Center Technical Report*, ISC-TR-91-009, December 1991 (with L. Reeves and D. Riggins).
- "Fault-Tolerant Parallel Matrix Multiplication with One Iteration Fault Detection Latency", *UMR Department of Computer Science Technical Report Number CSC 91-6* (with C. E. Hong).
- "Comparison of Three Axiomatic Systems for CSP" *UMR Department of Computer Science Technical Report Number CSC 91-7*, (with H. Lutfiyya).
- "SMILI - Visualization of Asynchronous Massively Parallel Programs", *UMR Department of Computer Science Technical Report Number CSC 91-8* (with R. Khanna).
- "Composite Stock Cutting Through Simulated Annealing" *UMR Department of Computer Science Technical Report Number CSC 91-9*, (with H. Lutfiyya).
- "A Visualization Model for Massively Parallel Algorithms" *UMR Department of Computer Science Technical Report Number CSC 91-11*, (with R. Khanna).
- "Formal Generations of Executable Assertions for a Fault-Tolerant Parallel Bitonic Sort" *UMR Department of Computer Science Technical Report Number CSC 91-12*, (with H. Lutfiyya).
- "Formal Generation of Executable Assertions for a Fault-Tolerant Parallel Matrix Relaxation Algorithm" *UMR Department of Computer Science Technical Report Number CSC 91-13*, (with H. Lutfiyya).
- "Application-Oriented Fault-Tolerant Parallel Branch) Bound" *UMR Department of Computer Science Technical Report Number CSC 91-14*, (with A. Y. Sun).
- "Experimental Computation Laboratory, 1990-1991 Annual Report" *UMR Department of Computer Science Technical Report Number CSC 91-15*.
- "Multicast Routing in Unreliable Networks" *UMR Department of Computer Science Technical Report Number CSC 91-16*, (with M. Schollmeyer).
- "Formal Methods of Real-Time Systems" *UMR Department of Computer Science Technical Report Number CSC 91-17*, (with S. M. Tsai).
- "Effect of Domain Decomposition on Parallel Speedup of the Solution of Non-Linear Partial Differential Equations" *UMR Intelligent Systems Center Technical Report*, ISC-TR-91-005, May 1991 (with L. Reeves and D. Riggins).
- "Composite Stock Cutting Through Simulated Annealing," *UMR Intelligent Systems Center Technical Report*, ISC-TR-91-004, May 1991 (with H. Lutfiyya, P. Poshyanonda, C. Dagli).

"Experimental Computation Laboratory, 1989-1990 Annual Report," *Technical Report, UMR Department of Computer Science*, July, 1990.

"Neural Controller for a Wastewater Treatment System," *UMR Intelligent Systems Center Technical Report*, ISC-TR-90-017, May 1990 (with N. Prema, G. Leininger, K. Krishnamurthy, and J. Steck).

*Reliable Parallel Processing - The Application Oriented Paradigm*, Ph.D. Dissertation, Department of Computer Science, Michigan State University, 1988.

"Design of a Reliable Parallel Environment Through Application Oriented Specification," *Technical Report MSU-ENGR-87-023*, Department of Computer Science, Michigan State University, December 1987. (with L. Ni and A. Esfahanian).

"High Level Abstraction of Fault-Tolerance under Byzantine Fault Conditions," *Technical Report MSU-ENGR-86-021*, Department of Computer Science, Michigan State University, December 1986. (with L. Ni).

#### *Published Reviews*

Review of Taylor, Richard N. and Levine, David L., and Kelly, Cheryl D., "Structural Testing of Concurrent Programs," Vol. 34, No. 9, September, 1993.

Review of Abbott, Russell, J. "Resourceful Systems of Fault Tolerance, Reliability, and Safety," Vol. 32, No. 3, March, 1991.

Review of Grant, Clive, *Computing for Engineers: a problem solving approach to programming in Pascal*, *Computing Reviews*, Vol. 31, No. 8, August, 1990, p. 393.

Review of Tripathi, Satish, Finkel, David, and Gelenbe, Erol, "Load Sharing in Distributed Systems with Failures," *Computing Reviews*, Vol. 30, No. 9, September, 1989, p. 478.

Review of Tremblay, Jean-Paul and Bunt, Richard B., *Introduction of Computer Science: An Algorithmic Approach*, *Computing Reviews*, Vol. 30, No. 9, September, 1989, p. 439.

Review of Morganti, M. "Reliable Communications," *Computing Reviews*, Vol. 30, No. 2, February, 1989.

Review of Kime, Charles, "System Diagnosis," *Computing Reviews*, Vol. 29, No. 7, July, 1988, pp. 370-371.



## Academic Activities

### *Courses Created*

- 1995** CSE 534/**C. Sc. 384 - Distributed Operating Systems** - This is a study of modern operating systems, particularly distributed operating systems. Topics include a review of network systems and interprocess communication, causality, distributed state maintenance, failure detection, reconfiguration and recovery, load balancing, distributed file systems, distributed mutual exclusion, and stable property detection including deadlock detection.
- 1990** C. Sc. 487 - **Parallel Computation Theory** - research-oriented study of theoretical aspects of organizing multiple, independent, and loosely connected processors to perform coherent problem solving.
- 1989** **C. Sc. 485 - Distributed Computing** - research-oriented study of formal methods of logic in reasoning about distributed and concurrent computer systems.
- 1988** C.Sc. 410 - **Computer Science Seminar** - research presentations of Departmental interest for graduate and undergraduate students.
- 1988** C. Sc. 385 - **Computer Communications and Networks** - first year graduate study of fundamental aspects of computer communications and networking through the use of network architecture models coupled with laboratory experiences.

### *Courses Taught (in addition to those created)*

- 2000** C.Sc. 307 - Software Testing and Quality Assurance
- 1998-2000** C.Sc. 397/398 - Senior Projects in Computer Science
- 1994-2008, 2011-2012** C.Sc. 253 - Data Structures II
- 1996-2000** C.Sc. 234 - Computer Architecture I

Graduate Student Theses—Completed				
Name	Support	Title	Degree	Grad. Date
David Cape	NSF/DOE	Complexity Reduction in Model Checking	Ph.D.	2010
Thoshitha Gamage	AFRL/LWI	CEEME: Compensating Events based EM Enforcement for Cyber-Physical Systems	Ph.D.	2011
Chul-Eui Hong	NSF	Asynchronous Parallel Simulated Annealing	Ph.D.	1992
Pei-Yu Li		Fault-Tolerant Distributed Deadlock Detection	Ph.D.	1994
Jun-Lin Liu		Recoverable Ring Embeddings in Hypercubes	Ph.D.	1993
Jui-Lin Liu	UMR	Computational Mathematics (co-supervised)	Ph.D.	1996
Hanan Lutfiyya	NSF	Fault Tolerance in Concurrent Systems Through Formal Methods	Ph.D.	1992
Martina Schollmeyer	ASOSR/UMR	Formal Methods for Subsumption of Assertions for Fault Tolerance in Changeling	Ph.D.	1994
Su-Mei Tsai	AFOSR	<a href="#">Fault-Tolerant Distributed Real-Time Systems</a>	Ph.D.	1994
Cristina Serban	AFOSR/UMR	Run-Time Security Evaluation (RTSE) for Distributed Applications	Ph.D.	1996
Aggie Sun	NSF/AFOSR	Declarative Approach to Generalizing the Understanding of Program Behavior Through Program Visualization	Ph.D.	1996
I. Baird	NSF	Middleware Efficiency	M.S.	2007
David Cape	DOE	Model Checking of Can Communications	M.S.	2006
Henry Clark	UMR	DAWGS—A Distributed Compute Server Utilizing Idle Workstations	M.S.	1990
Steven Franks	MDC	An Asynchronous Parallel Multigrid Algorithm	M.S.	1990
Rashi Khanna	NSF	A Visualization Model for Massively Parallel Algorithms	M.S.	1991
C. Marutikumar	UMRB	History Clippings in an AHS System	M.S.	2000
J. Madden	NSF/DOE	Embedded Systems Security	M.S.	2013
Geoff Roth	UMRB	Biologically Inspired Intrusion Detection in Distributed Systems	M.S.	2003
C. Sreerambhatla	UMRB	Runtime Assertion Checking in Complex Concurrent Systems	M.S.	2001
Alan Su	NSF	A Deterministic Membership Algorithm in Asynchronous Distributed Systems	M.S.	1994
H. Tang	DOE	Security Analysis of a Cyber-Physical System	M.S.	2007
R. Underwood	DOE	An Open Framework for Highly Concurrent Hardware-in-the-Loop Simulation	M.S.	2007
R. Akella	ISC	Verifying BNDC in Cyber-Physical Sys	M.S.	2009



<b>Undergraduate Student Research Supervised</b>				
S. Jackson	OURE/REU	Complexity Reduction in Model Checking	B.S.	2009
M. Mitchell	OURE/REU	Embedded Systems Implementation	B.S.	2009
J. Madden	OURE/DOE	Embedded Systems Implementation	B.S.	2007
B. Stauffer	OURE	Universal Analog-to-Digital Two-channel Data Acquisition Interface Program	B.S.	2007
A. Lininger	DOE/OURE	Analysis of FACTS device placements in the 118 Bus power system	B.S.	2007
J. Townsend	DOE/OURE	Real-Time Communications	B.S.	2006
M. Swenty	OURE	Vulnerabilities of Power System Devices	B.S.	2006
I. Baird	NSF	Insider Threat Creation	B.S.	2001
L. Forscher		An Experiment in OpenGL Landscaping	B.S.	1998
J. Lovitt	Boeing	Component Expansion in XML		
R. Mensching		Secure Access Protocols	B.S.	1998
R. Mahoney	Mid AM	Automated Highway System Simulations	B.S.	1998
J. Sirois	Mid AM	Automated Highway System Simulations	B.S.	1998
<b>Graduate Student Theses—Active</b>				
Name	Support	Area	Degree	Expected
R. Akella	NSF/ISC	Security	Ph.D.	2012
D. Ditch	NSF/DoD	Vulnerability of Cyber-Physical Infrastruct.	Ph.D.	2014
L. Feng	S&T	Security in Cyber-Physical Systems	Ph.D.	2014
M. Gosnell	NSF/DOE	Spatial Temporal Logic	Ph.D.	2012
S. Jackson	DOE	CPS Security	Ph.D.	2014

### **Professional Activities**

#### *Mentoring*

##### **2005-2007**

- New Faculty Teaching Scholars tenure mentor

##### **2003-**

- Junior faculty mentor

#### *CAMPUS & University Committee Service*

##### **2011-2012**

- ABET Accreditation Coordinator
- Department Graduate Policies Procedures Committee
- Campus Promotion and Tenure Review Committee

- Electrical and Computer Engineering Department Assistant Professor Search Committee
- ISC Poster Competition Coordinator
- Director, S&T Center for Academic Excellence in Information Assurance
- Faculty Senate Administrative Review Committee
- Senior Investigator, ISC, Cyber Physical Systems area

**2010-2011**

- ABET Accreditation Coordinator
- Graduate Coordinator
- Department Graduate Policies Procedures Committee Chair
- University of Missouri Research Board Member & Physical Sciences and Mathematics Subcommittee Convener
- Campus Promotion and Tenure Review Committee
- Electrical and Computer Engineering Department Assistant Professor Search Committee
- ISC Poster Competition Coordinator
- Director, S&T Center for Academic Excellence in Information Assurance
- Faculty Senate Administrative Review Committee
- Senior Investigator, ISC, Cyber Physical Systems area

**2009-2010**

- ABET Accreditation Coordinator
- Graduate Coordinator
- Departmental CS&E Study Committee Chair
- Department Graduate Policies Procedures Committee Chair
- University of Missouri Research Board Member & Physical Sciences and Mathematics Subcommittee Convener
- Campus Promotion and Tenure Review Committee
- Electrical and Computer Engineering Department Assistant Professor Search Committee
- ISC Poster Competition Coordinator
- Director, S&T Center for Academic Excellence in Information Assurance
- Faculty Senate Administrative Review Committee
- Senior Investigator, ISC, Cyber Physical Systems area

**2008-2009**

- ABET Accreditation Coordinator
- Graduate Coordinator
- Departmental CS&E Study Committee Chair
- Department Graduate Policies Procedures Committee Chair
- University of Missouri Research Board Member & Physical Sciences and Mathematics Subcommittee Convener

- Campus Academic Council Tenure Committee (Chair and member of Rules, Procedures and Agenda Committee)
- Campus Promotion and Tenure Review Committee
- Electrical and Computer Engineering Department Assistant Professor Search Committee
- ISC Poster Competition Judge
- Director, S&T Center for Academic Excellence in Information Assurance

**2007-2008**

- Department Graduate Policies Procedures Committee Chair
- University of Missouri Research Board Member & Physical Sciences and Mathematics Subcommittee Convener
- Campus Class “A” Center Review Committee
- Campus Academic Council Tenure Committee (Chair and member of Rules, Procedures and Agenda Committee)
- Campus Promotion and Tenure Review Committee
- Electrical and Computer Engineering Department Assistant Professor Search Committee
- ISC Poster Competition Judge

**2006-2007**

- University of Missouri Research Board Member
- Campus Academic Council Tenure Committee (Chair and member of Rules, Procedures and Agenda Committee)
- Computer Science Chair Search Committee (Chair)
- Computer Science Endowed Chair Search Committee (Chair)
- College of Arts and Sciences Promotion and Tenure Committee
- Graduate Faculty Council
- Department 3<sup>rd</sup> Year Review Committee (Chair)
- Department Graduate Policies Procedures Committee Chair
- Electrical and Computer Engineering Department Assistant Professor Search Committee

**2005-2006**

- Electrical and Computer Engineering Department Finlay Chair Search Committee
- ABET Task Force Chair
- Campus Academic Council Tenure Committee (Chair and member of Rules, Procedures and Agenda Committee)
- Campus Promotion and Tenure Committee
- Campus Woman of the Year Selection Committee
- Computer Science Chair Search Committee (Chair)
- College of Arts and Sciences Promotion and Tenure Committee (Chair)
- Graduate Faculty Council
- Department 3<sup>rd</sup> Year Review Committee (Chair)

- Department Graduate Policies Procedures Committee Chair

**2004-2005**

- Electrical and Computer Engineering Department Finlay Chair Search Committee
- ABET Task Force Chair
- Computer Science Laboratory Committee
- Computer Science Faculty Search Committee
- Graduate Faculty Council
- Department Graduate Policies Procedures Committee Chair
- Campus Tenure Committee
- Department 3<sup>rd</sup> Year Review Committee (Chair)

**2003-2004**

- Computer Science Laboratory Committee
- College of A&S Promotion and Tenure Committee
- Graduate Faculty Council
- Department Graduate Policies Procedures Committee Chair
- Department 3<sup>rd</sup> Year Review Committee (Chair)

**2002-2003**

- ABET Reaccreditation Effort Chair
- Computer Engineering Departmental Faculty Search Committee
- Computer Science Laboratory Committee
- College of A&S Promotion and Tenure Committee
- Graduate Faculty Council
- Department Graduate Policies Procedures Committee Chair
- Campus Tenure Committee

**2001-2002**

- Campus Doctoral Faculty
- Computer Engineering Departmental Faculty Search Committee
- Chair Computer Science Departmental Faculty Search Committee
- Computer Science Laboratory Committee
- Software Engineering Program Proposal Committee
- Electrical and Computer Engineering Steering Committee
- Chair Ad Hoc Committee on Division of Foundational Studies
- Campus Tenure Committee

**2000-2001**

- Campus Doctoral Faculty
- Computer Engineering Departmental Faculty Search Committee
- Computer Science Departmental Faculty Search Committee
- Computer Science Laboratory Committee
- Software Engineering Program Proposal Committee
- Electrical and Computer Engineering Steering Committee

**1999-2000**

- Campus Doctoral Faculty
- Campus Safety Committee
- College of Arts and Sciences Promotion and Tenure Committee

- Computer Science Departmental Faculty Search Committee
- College of Arts and Sciences 3-Year Review Committee
- Electrical and Computer Engineering Steering Committee

**1998-1999**

- Campus Doctoral Faculty
- Campus Safety Committee
- Computer Science Departmental Faculty Search Committee
- Computer Science 3-Year Review
- College of Arts and Sciences Student Academic Affairs Committee
- Electrical and Computer Engineering Steering Committee
- Graduate Faculty Council

**1997-1998**

- Campus Doctoral Faculty
- Campus Safety Committee
- Computer Science Departmental Faculty Search committee
- Computer Science Department CSAB Reaccreditation Coordinator
- College of Arts and Sciences Planning Committee

**1996-1997**

- Campus Doctoral Faculty
- Campus Safety Committee
- College of Arts and Sciences Dean Search Committee
- Computer Engineering Program Proposal Committee
- Computer Science Departmental Graduate Planning Committee

**1995-1996**

- Campus Doctoral Faculty
- College of Arts and Sciences Planning Committee
- Campus Safety Committee
- Computer Science Graduate Curriculum Committee

**1994-1995**

- Campus Doctoral Faculty
- Sabbatical, no other campus committee service

**1993-1994**

- Campus Doctoral Faculty
- Chair, College of Arts and Sciences Planning Committee
- Computer Science Departmental Faculty recruiting committee
- Computer Science Mentoring and 3-Year Review Committee
- Graduate Faculty Council
- Graduate Faculty Scholarship Committee
- Graduate Planning Committee

**1992-1993**

- Campus Doctoral Faculty
- College of Arts and Sciences Planning Committee
- College of Arts and Sciences Distinguished Teaching Award Selection Committee



- Computer Science Laboratories Committee
- Computer Science Research Readiness Committee
- Graduate Faculty Council
- Graduate Faculty Scholarship Committee

**1992-1993**

- Campus Doctoral Faculty
- Campus Computer Policy Committee
- Computer Science Computer Policy Committee
- Computer Science Research Readiness Committee

**1991-1992**

- Campus Doctoral Faculty
- Campus Computer Policy Committee
- College of Arts and Sciences Distinguished Teaching Award Selection Committee
- Computer Science Computer Policy Committee
- Computer Science Research Readiness Committee
- Computer Science Departmental Area Coordinator, Computer Systems
- Computer Science Departmental Faculty Recruiting, Chair
- Graduate Faculty Council
- Graduate Faculty Scholarship Committee

**1990-1991**

- Campus Doctoral Faculty
- Campus Computer Policy Committee
- Computer Science Computer Policy Committee
- Computer Science Research Readiness Committee
- Computer Science Departmental Faculty Recruiting, Chair
- Department of Computer Science Area Coordinator, Computer Systems
- Graduate Faculty Council
- Graduate Faculty Scholarship Committee

**1989-1990**

- Campus Doctoral Faculty
- Campus Computer Policy Committee
- Computer Science Computer Policy Committee
- Graduate Planning Committee

**1988-1989**

- Campus Doctoral Faculty
- Computer Science Departmental Curriculum Revision Committee

**1987-1988**

- Departmental Advisory Committee - Department of Computer Science, Michigan State University

**1986-1987**

- Graduate Studies and Research Committee - Department of Computer Science, Michigan State University

*National and International Committee Service***2012-2013**

- Member of NIST Cyber Security Working Group and contributor to NISTiR 7628 Vol 2. And Vol 3.
- Program Committee, 8<sup>th</sup> International Conference on Software Paradigm Trends (ICSOFT 2012)
- Program Committee, National Colloquium for Information Systems Security Education (NCISSE 2012)
- Program Committee, 7<sup>th</sup> International Conference on Secure Software Integration and Reliability Improvement (SERE 2012)
- Standing Committee IEEE COMPSAC
- Associate Editor, International Journal of Computer Applications
- Associate Editor, Frontiers of Computer Science in China
- Associate Editor, International Journal of Social Computing and Cyber-Physical Systems

**2011-2012**

- Program Committee, 3<sup>rd</sup> ACM/IEEE Third International Conference on Cyber-Physical Systems, (ICCPS 2012)
- Member of NIST Cyber Security Working Group
- Program Committee, 7<sup>th</sup> International Conference on Software Paradigm Trends (ICSOFT 2012)
- Program Committee, National Colloquium for Information Systems Security Education (NCISSE 2012)
- Program Committee, 6<sup>th</sup> International Conference on Secure Software Integration and Reliability Improvement (SERE 2012)
- Standing Committee IEEE COMPSAC
- Associate Editor, International Journal of Computer Applications
- Associate Editor, Frontiers of Computer Science in China
- Associate Editor, International Journal of Social Computing and Cyber-Physical Systems

**2010-2011**

- Program Committee, 5<sup>th</sup> International Conference on Secure Software Integration and Reliability Improvement (SSIRI 2011)
- Program Committee, 6<sup>th</sup> International Conference on Software and Data Technologies (ICSOFT 2011)
- Program Committee, National Colloquium for Information Systems Security Education (NCISSE 2011)
- Program Committee, High Assurance Systems Engineering Symposium (HASE 2010)
- General Conference Chair, IEEE COMPSAC 2011
- Steering Committee IEEE COMPSAC
- Associate Editor, International Journal of Computer Applications

- Associate Editor, Frontiers of Computer Science in China
- Associate Editor, International Journal of Social Computing and Cyber-Physical Systems

**2009-2010**

- Program Committee, IEEE ICST 2010 (3rd International Conference on Software Testing, Verification and Validation)
- Program Committee, 4<sup>rd</sup> International Conference on Secure Software Integration and Reliability Improvement (SSIRI 2010)
- Program Track Co-Chair, Real-Time and Embedded Systems, IEEE COMPSAC
- Steering Committee IEEE COMPSAC
- Associate Editor, International Journal of Computer Applications
- Associate Editor, Frontiers of Computer Science in China
- Associate Editor, International Journal of Social Computing and Cyber-Physical Systems

**2008-2009**

- Program Committee, IEEE ICST 2009 (2nd International Conference on Software Testing, Verification and Validation)
- Program Committee, 4<sup>th</sup> International Conference on Software and Data Technologies (ICSOF 2009)
- Program Committee, 2<sup>nd</sup> Workshop on Cyber-Physical Systems
- Program Committee, 3<sup>rd</sup> International Conference on Secure Software Integration and Reliability Improvement (SSIRI 2009)
- Program Track Co-Chair, IEEE COMPSAC
- Steering Committee IEEE COMPSAC
- Associate Editor, International Journal of Computer Applications

**2007-2008**

- Program Committee, IEEE ICST 2008 (First International Conference on Software Testing, Verification and Validation)
- Program Committee, 3<sup>th</sup> International Conference on Software and Data Technologies (ICSOF 2008)
- Reviewer, Advanced Research Program, Texas Higher Education Coordinating Board
- Program Track Co-Chair, IEEE COMPSAC
- Steering Committee IEEE COMPSAC
- Session Chair, QSIC 2007
- Associate Editor, International Journal of Computer Applications

**2006-2007**

- UMR Technical Representative to Great Plains Network
- Program Co-Chair, IEEE COMPSAC
- Panelist - NSF Software Engineering and Languages – Career
- Panelist – NSF CPATH initiative
- Associate Editor, International Journal of Computer Applications
- Co-leader, Critical Physical Infrastructures working group of NSF Cyber Physical Systems Workshop, Austin, TX, October, 2006.

**2005-2006**

- Associate Editor, International Journal of Computer Applications

**2004-2005**

- Student Volunteer Chair, IEEE ICSE 2005.
- Associate Editor, International Journal of Computer Applications

**2001-2002**

- Program Committee, IEEE COMPSAC
- Panelist - NSF Software Engineering and Languages

**2000-2001**

- Program Committee – 2001 International Conference on Parallel Processing
- Program Committee, IEEE COMPSAC
- Session Chair, ISCA 13th International Conference on Parallel and Distributed Computing Systems.

**1999-2000**

- Panelist - NSF Software Engineering and Languages
- Program Evaluator on a site visit - Computer Sciences Accreditation Board

**1997-1998**

- Panelist - NSF Software Engineering and Languages

**1995-1996**

- Guest Editor - Special Issue: Formal Methods in Logic for Responsive Systems of the *Journal of Methods of Logic in Computer Science*.
- Editor in Chief Search Committee for *IEEE Transactions on Parallel and Distributed Systems*.
- Program Committee, 20th IFAC/IFIP Workshop on Real Time Programming.

**1994-1995**

- Program Committee, IEEE COMPSAC

**1992-93**

- Publicity Chair - 13th International Conference on Distributed Computing Systems (ICDCS)

- Program Vice-Chair - IEEE Computers, Software, and Applications Conference (COMPSAC)
- Session Chair - 21st. Intl. Conference on Parallel Processing (ICPP)
- Session Chair - 35th Midwest Symposium on Circuits and Systems
- Program Committee, IEEE COMPSAC
- Session Chair for IEEE COMPSAC 1992

**1990-1991**

- Program Co-Chair for Real-Time/Transactions/Reliable Systems Track, (COMPSAC)
- Program Committee, IEEE COMPSAC
- Session Chair for IEEE MAECON 1990
- Session Chair for IEEE COMPSAC 1991

**1989-90**

- Session Chair for IEEE COMPSAC 1989
- Program Committee, IEEE COMPSAC

*Community Service*

- 2005** Guest Lecturer – Rolla High School World Foods  
**2003** Member, Rolla High School Band Boosters Association  
**1999** Volunteer, Rolla Middle School Pond Ecology Day  
**1998** Volunteer Mark Twain Elementary School Pond Ecology Day  
**1997** Volunteer - Mark Twain Elementary Science Olympiad  
**1991-1993** Judge, South Central Missouri Regional Science & Engineering Fair

*Awards*

- 2010** IEEE Computer Society Outstanding Contribution Award
- 2008** Faculty Excellence Award, Missouri University of Science and Technology (\$2500)
- 1994** Phillips Petroleum Foundation Faculty Excellence Award, University of Missouri-Rolla (\$2500)
- 1993** IEEE Computer Society Certificate of Appreciation for contributions to the 1993 ICDCS
- 1992** Phillips Petroleum Foundation Faculty Excellence Award, University of Missouri-Rolla (\$2500)
- 1991** Phillips Petroleum Foundation Faculty Excellence Award, University of Missouri-Rolla (\$2500)
- 1990** Amoco Foundation Faculty Excellence Award, University of Missouri-Rolla (\$2500)
- 1989** McDonnell Douglas Foundation Faculty Excellence Award, University of Missouri-Rolla (\$2500)
- 1988-** Doctoral Faculty Member, University of Missouri-Rolla
- 1988** Outstanding Graduate Student Award, Department of Computer Science, Michigan State University
- 9/87-6/88** GTE Research Fellowship (renewal)
- 1/87-6/87** GTE Research Fellowship
- 9/86-6/87** Graduate Office Fellowship, College of Engineering, Michigan State University

*Invited Talks and Panels*

- 2012** Cyber-Enabled Smart Distribution Systems and Micro Grids, Smart Grid Update, March 2012, Atlanta, Georgia
- 2011** Information Flow Properties for Cyber-Physical Systems, Information Systems Security Association, September 20, 2011, St. Louis, MO
- 2011** Information Flow Properties for Cyber-Physical Systems, NSA, Linthicum, MD, May 20, 2011.
- 2011** Information Flow Properties for Cyber-Physical Systems, Tsinghua University, Beijing, March 22, 2011.
- 2011** Information Flow Analysis of Energy Management in a Smart Grid, NC State Cyber-Physical Applications in Smart Grids Workshop, Raleigh, NC, February 18-19, 2011.
- 2010** Cyber-Enabled Smart Distribution Systems and Micro Grids, Networked Energy (Microgrid) Workshop, October 27, 2010
- 2010** Cyber-Enabled Smart Distribution Systems and Micro Grids, NC State CI Days Raleigh, NC, Sept. 8, 2010.

- 2010** Smart Solutions, Software Beyond the Digital Society, Panelist, 2010 Computers, Software, and Applications Conference, Are We Headed Toward Smart Solutions?, Moderator: Rajesh Subramanian, Siemens Corporate Research, USA, Seoul, KOREA, July 2010.
- 2010** Cyber-Enabled Smart Distribution Systems and Micro Grids, Missouri River Valley/Texoma Regional and Midwest Levee Conference, St. Louis, MO, July 12-14, 2010.
- 2010** Information Flow Properties for Security in Cyber-Physical Systems, STEM-Academy, University of Arkansas, Pine Bluff, February 11, 2010.
- 2009** Testing and Verification of Cyber-Physical (Social) Systems, Panelist, 2009 Computers, Software, and Applications Conference, New Paradigms in Software Testing: Towards Solutions, Moderator: Rajesh Subramanian, Siemens Corporate Research, USA, Seattle, WA, July 2009.
- 2009** [Cyber-Enabled Smart Distribution Systems and Micro Grids](#), HICSS New Research Directions for Future Cyber-Physical Energy Systems, June 2-4, 2009, Baltimore, MD
- 2009** Information Flow Properties for Security in Cyber-Physical Systems, Advances in Information Assurance, Network and Software Security'09 Symposium, St. Cloud State University, May 1, 2009.
- 2008** ["Cyber-Physical Systems Energy and the Environment"](#), "NSF Cyber Physical Systems Information Day, December, 2008, Arlington, VA.
- 2008** "Professional Roots in EE," HKN Invited lecture, April, 2008.
- 2008** "P&T Landscape," NFTS Forum, April, 2008.
- 2008** ["Computer Science in the Real World"](#), S&T Global Research Learning Community, Feb 2008
- 2008** "Vulnerabilities of Cyber-Physical Systems," ACM SIGSEC, January, 2008.
- 2006** ["Improving Power Transmission Efficiency and Reliability through Hardware/Software Co-Design"](#), Second Carnegie Mellon Conference in Electric Power Systems, January, 2006.
- 2005** "Bad things about distributed computing," UMR ACM Chapter, February, 2005.
- 2004** "FACTS Applications for Transmission System Stability," DOE Program Review, Washington D.C., November, 10, 2004.
- 2004** "Advanced Protection and Control of the Power Grid," NSF Critical Information Infrastructure Protection Workshop, October, 2004.
- 2003** "Fault-Tolerant Power Grids," Truman State University ACM Chapter, October, 2003.
- 2003** "Bad things about distributed computing," UMR ACM Chapter, February, 2003.

- 2002** "Trustworthy Object-Oriented Distributed Embedded Hybrid Systems" – Invited Presentation at the 2002 NSF-Sponsored US-EU Workshop, Virginia, October, 2002.
- 1999** "Fault-Tolerant and Secure Automated Highway System Software - a Safety Prototype" given at the *Mid-America Transportation Center* and at the *St. Louis ACM Chapter*.
- 1994** "Formal Derivation of High Assurance Concurrent Software," given at *AFOSR Software Systems Meeting, Argonne National Labs, IBM T. J. Watson Research Labs* and *The University of Idaho Department of Computer Science*.
- 1994** "Parallel Computing for Engineering Problems," UMR Department of Civil Engineering.
- 1994** "Computing: Science, Pseudo-Science, or Belief?" St. Joseph's College, Rensselaer, IN.
- 1993** "Parallel Algorithm Fundamentals and Analysis," *International Summer Institute on Parallel Computer Architectures, Languages, and Algorithms*, July 5-10, 1993, Prague, Czech Republic.
- 1993** "Computing: Science, Pseudo-Science, or Belief?" UMR Last Lecture Series.
- 1992** "Error-Detecting Concurrent Software through Changeling" University of Illinois-Chicago.
- 1992** "Assured Concurrent Software Through Application-Oriented Fault Tolerance," McDonnell Douglas Corporation, St. Louis, MO.
- 1992** "Assured Concurrent Software Through Application-Oriented Fault Tolerance," Washington State University, School of EE/CS, Pullman, WA.
- 1991** "Introduction to Parallel Computing on Distributed Memory Architecture," Florida State University, Department of Computer Science, Tallahassee, FL.
- 1991** "Parallel Computing for Electromagnetic Compatibility," IEEE Symposium on EMC, Cherry Hill, NJ.
- 1991** "Introduction to Parallel Computing on Distributed Memory Architecture," University of Mississippi Center for Computational Hydrodynamics, Oxford, MS.
- 1991** "Dependable Parallel Processing through Application-Oriented Fault Tolerance," Iowa State University, Department of Electrical Engineering and Computer Engineering, Ames, IA.
- 1990** "The Quest for Dependable MIMD Algorithms," University of Iowa, Department of Electrical Engineering, Iowa City, IA.
- 1990** "Parallel Processing - Termites vs. Chainsaws," Engineer's Club of St. Louis.
- 1988** "Security in Computer Networks," National Technical University.



*Past and Present Referee Service*

*International Journal of Computer Aided VLSI Design, IEEE Transactions on Parallel and Distributed Systems, Journal of Parallel and Distributed Computing, Journal of Systems and Software, IEEE Computer, IEEE Computers, Software, and Applications Conference (COMPSAC), IEEE International Conference on Parallel Processing, Hawaii Conference on System Sciences, IEEE Transactions on Computers, IEEE Transactions on Software Engineering, IEEE Transactions on Data Engineering, Frontiers of Massively Parallel Computing, ACM Computing Reviews, University of Missouri Research Board, Computing Reviews, National Science Foundation, and Department of Energy.*

1991-1992 Visiting Scholar - Oak Ridge Associated Universities.

**Nonacademic Experience**

**10/82-9/85** Michigan Technological University, Houghton, MI

6/84-9/85 **Capacity Planning Analyst**

10/82-5/84 **Sr. Systems Programmer**

**3/81-10/82** Badger Meter, Inc., Milwaukee, WI

**Systems Programmer/Database Administrator**

**12/79-2/81** Michigan Technological University, Houghton, MI

**Systems Programmer**