SHIVAKUMAR SASTRY, Ph.D.
Associate Professor
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Education

- Ph.D. Computer Engineering and Science, Case Western Reserve University, 1998
- MS Computer Science, University of Central Florida, 1992
- MS Electrical Engineering, Indian Institute of Science, 1987
- BE Electronics Engineering, Bangalore University, 1984

Academic Positions

June 2002 – present , Department of Electrical & Computer Engineering, The University of Akron

2008 – present *Associate Professor*

2002 – 2008 *Assistant Professor*

Teach graduate and undergraduate computer engineering courses such as Computer Systems, Object Oriented Design, Programming for Engineers, Communication Networks, Networked Embedded Systems and Real-time Scheduling.

Areas of Expertise: Networked Embedded Systems, Automation, and Graph Algorithms.

Visiting Academic Positions

1. Indian Institute of Science, Department of Electrical Engineering , Summer 2004, 2006-09
2. Case Western Reserve University, Department of Biology, Summer 2005

Professional Industry Experience

1994 – 2001, Rockwell Automation, Allen-Bradley Company
Senior Engineer, Project Engineer, Senior Research Scientist / Advisory Software Developer

- Researched and developed innovative software solutions to support strategic product development.
- Designed and architected system to verify functionality of communications software product, and led a team through system implementation. Introduced object oriented programming and rapid prototyping techniques to integrate diverse existing efforts to verification.
- Led a team to develop an integrated platform that verified the functionality of Ethernet interfaces in Programmable Controllers and Communications modules. Project was completed within budget, ahead of schedule, and resulted in two Business Impact awards.
- Researched Distributed Real-Time Control Systems to develop new taxonomy that characterizes distributed real-time control systems. Invented new method for partitioning tasks in distributed real-time control system.

- Researched new paradigms for distributed automation systems programming resulting in U.S. Patent for data exchange format.
- Developed UML models, control strategies, characterizations of application domain needs, high-level control specifications, and methods to translate high-level specifications to executing ladder programs.

1991 – 1994, GE Consulting Services / Keane, Inc. (assigned to Xerox Corp.)
Senior Consultant

- Developed innovative tool for designing communications network topology using genetic algorithms and graph theory. This tool reduced costs for network management group.
- Re-engineered service planning application and demonstrated benefits of object oriented techniques in re-engineering APL applications; received "Outstanding Cooperation" award.
- Evaluated emerging technologies; developed technology deployment and adoption strategies as a member of the Advanced Technology Group.
- Conducted knowledge acquisition sessions, architected, and implemented prototypes for customer-requirements analyzer, process-flow modeler, and solutions configurator.

1990 – 1991, IntelliSys, Inc.
Systems Engineer

- Led team of engineers to architect, design, and implement commercial features of Real-time Expert Systems Shell (RT/AI). Planned releases and features and productizing RT/AI used to develop real-time artificial intelligence systems and simulation systems.
- Developed graphical user interface, knowledge acquisition and management system, graphical knowledge editor, and structured language translator for RT/AI.

1987 – 1987, Macmet India Pvt. Ltd.
Consulting Software Engineer

- Architected, designed and implemented software systems to solve engineering problems. Designed and implemented two expert systems for Quarry Scheduling and Process Simulation for cement manufacturer to plan preventive maintenance. Developed prototype expert system for monitoring interlocks in electrical switchyard simulator.

Professional Honors and Awards

- Rockwell Automation Innovation Awards, 2001
- Rockwell Software Outstanding Contribution Award, 2000
- Rockwell Automation Business Impact Award, 1998
  1997
- Rockwell Automation Customer Satisfaction Award, 1997
- Xerox Outstanding Cooperation Award, 1993

Professional Affiliations

1. IEEE, Member
2. IEEE Computer Society, Member

Professional Committees

1. International Networked Sensor Systems Conference, 2008, 2009
2. Wright Center for Sensor Systems Engineering, Technology Road map Team Lead, 2007.

3. Ohio ICE Technical Conference, 2006, Chair.
4. Innovations and Commercial Applications of Distributed Sensor Systems, 2006, 2007, 2008
5. IEEE Distributed Computing aspects of Sensor Systems, 2005
6. International Conference on Embedded Systems, 2004.
7. International Conference on Artificial Intelligence, 2003

University and Departmental Committees

1. Departmental Chair Selection Committee, 2003
2. Donovan Chair Committee, 2005
3. Graduate Curriculum Committee, 2005-2006
4. Academic Policies Committee 2008-11
5. Undergraduate Policy Committee 2008-09
6. Integrated Biology Recruitment Committee 2009

Professional Review Activities

1. National Science Foundation
2. U.S. Department of Energy
3. IEEE Distributed Systems Online
4. IEEE Transactions on Computers, Knowledge and Data Engineering, Systems, Man and Cybernetics, Mobile Computing, Instrumentation & Measurement, Parallel & Distributed Systems
5. Journal of Software Testing, Verification and Reliability

Editorial Boards

1. International Journal of Distributed Sensor Networks, 2004-present, Subject Area Editor (Applications)
2. IEEE Conference on Automation Science and Engineering, Associate Editor 2008-present

Student Supervision

Current Ph. D. Students

1. Kranthi K. Mamidisetty Area: Contour Guided Dissemination
2. Branden M. Archer Area: Networked Embedded Systems (Starting Spring 2010)

M.S. Thesis Completed

1. Hamza Abubakari, 2008, *IEEE 1588 Style Synchronization over a Wireless Link*
2. Kranthi K. Mamidisetty, 2008, *Generalizing Contours for Mesh Topologies*
3. Saju A. Kuruvilla, 2007, *Reliability Evaluation of Composable Conveyor Systems*
4. Minlan Duan, 2007, *Quality of Service of Contour Guided Dissemination*
5. Nunzio Hayslip, 2006, *A Discrete Event Simulation of Coupled Conveyors*
6. I-Hsein Chu, 2005, *Contour Guided Dissemination for Networked Embedded Systems*
7. Omer Gundogmus, 2005, *A Goal-seeking Approach to Coordinating the Discharge of a Collection* of *Batteries*
8. Murat Kose, 2004, *Efficient Implementation of Encryption Algorithms on a Microcontroller*

Current M.S. Thesis Students

1.	Branden Archer,	M.S. Thesis	Expected to complete Fall 2009
2.	Maithili Ghamande	M.S. Thesis	Expected to complete Fall 2009
3.	John McGonnell,	M.S. Thesis	
4.	Mukesh K. Chippa	M.S. Thesis	
5.	Chidi Anoize	M.S. Thesis	

Other Graduate Student Committees

1.	Firas Hassan,	2007,	Ph.D.,	The University of Akron
2.	Casey Bakula,	2007,	M.S.,	The University of Akron
3.	Richie Thomas,	2007,	M.S.,	Kent State University
4.	Jingfeng Cai,	2006,	Ph.D.,	The University of Akron
5.	Lily Dong,	2005,	M.S.,	The University of Akron

Undergraduate Senior-Design Project Teams

1.	BalanceBOT	2010	Stefan Branoff, Stephanie Koscek, Nicole Beck, Chris Hamrock
2.	LED Marquee	2009	Tom Breeson, Dan Kephart, Ben Radey
3.	Composer	2008	Branden Archer, Jeffery Bennet, Chris Evers
4.	Model Airplane Engine Benchmark Rig	2007	Chris Feyerchek, Megan Dillon, Ben Bloss, Jon Soudry
5.	Weather Sensitive Car	2003	Abdul Al-Sherifi, Darnell Johnson, Duy Nguyen

Undergraduate Honors Projects

1.	Branden Archer	2008	Task Scheduling with Branch and Bound
2.	Chris Feyerchek	2007	Generating Communications Software for Desktop/Embedded System Interaction
3.	Ben Bloss	2007	Two Algorithms for Automated Data Collection in Remote Control Aircraft Engine Testing

PUBLICATIONS IN REFEREED JOURNALS

1. *Multipath Dissemination in Regular Mesh Topologies,* In press. IEEE Transactions on Parallel and Distributed Systems, Vol. 20, No. 8, August 2009, pp. 1188-1201 (with K.K. Mamidisetty, M. Duan, and P.S. Sastry).
2. *Failure Detectors for Wireless Sensor Actuator Systems,* Ad Hoc Networks, Vol. 7, Issue 5, July 2009, pp. 1001-1013 (with H. Zia and N. Sridhar).
3. *Contour Guided Dissemination for Networked Embedded Systems,* International Journal of Distributed Sensor Networks, Vol 5, Issue 5, 2009, pp. 502-530 (with I. Chu and M. Duan).
4. *Coordinated Discharge of a Collection of Batteries,* Journal of Power Sources, Vol. 166, pages 284-296, 2007 (with O. Gundogmus, T.T. Hartley, R. J. Veillette).
5. *Networked Embedded Automation,* Assembly Automation, Vol. 26, No. 3, 2006 (with N. Hayslip and J. Gerhardt).
6. *Real-time Sensor Actuator Networks,* International Journal of Distributed Sensor Networks, Volume 1, No. 1, pages 17-34, 2005 (with S.S. Iyengar).
7. *A SmartSpace for Automation,* Assembly Automation, Special issue on Man-Machine Interfaces, Vol. 24, No. 2, pages 201-209, 2004.

8. *Sensor Technologies for Future Automation Systems*, Sensor Letters, Vol. 2, No. 1, pages 9-17, 2004 (with S.S.Iyengar).
9. *Foundations of Data Fusion for Automation*, IEEE Instrumentation and Measurement Magazine, Vol. 6, No. 4, pages 35-41, 2003 (with S.S.Iyengar and N. Balakrishnan).
10. *On Finding Euler Tours in Parallel*, Parallel Processing Letters, Vol. 3, No. 3, 1993. (with N. Deo, E. Caceres, and J. Schwarcfiter)
11. *An Application of Functional Dependencies to the Topological Analysis of Protection Schemes*, IEEE Transactions on Power Delivery, Vol. 7, No. 1, Jan 1992. (with L. Jenkins and H.P. Khincha)
12. *Computer Aided Relay Coordination Techniques – A Survey*, Journal of Institution of Engineers, Vol. 71, June 1990. (with L. Jenkins and H.P. Khincha)
13. *An Application of Hypergraphs to the Topological Analysis of Power System Networks*, AMSE Journal on Modeling, Simulation, and Control, Part A. Vol. 17, No. 4, 1988. (with L. Jenkins and H.P. Khincha)

Conference and Workshop Publications

1. *Profiling Primitives of Networked Embedded Automation*, IEEE Conference on Automation Science and Engineering, August 2009 (with B. Archer, A. Rowe, and R. Rajkumar)
2. *Hybrid Input/Output Automata for Composable Conveyor Systems,* IEEE Conference on Automation Science and Engineering, August 2009 (with S. Mitra)
3. *A Domination Approach to Clustering Nodes for Data Aggregation*, IEEE Globecom 2008, (with K.K. Mamidisetty, M. Ghamande, and M.J. Ferrara).
4. *IEEE 1588 Style Synchronization over a Wireless Link*, International Symposium on Precision Time Synchronization for Measurement, Control and Communication, 2008 (with H. Abubakari).
5. *Evaluating the Reliability of Reconfigurable Conveyor Systems*, IEEE Conference on Automation Science and Engineering 2008 (with S. Kuruvilla and S. Gokhale)
6. *A Methodology to Evaluate the Availability of Reconfigurable Conveyor Systems*, International Symposium on the Performance Evaluation of Computer and Telecommunication Systems 2008, (with Z. Qu and S. Gokhale).
7. *Optimal Dissemination in 3-Neighbor Wireless Mesh Topologies*, IISc Centenary Conference on Managing Complexity in a Distributed World, May 2008, (with K.K. Mamidisetty).
8. *Contour Guided Dissemination,* NEONET, 2008 (with K.K. Mamidisetty).
9. *Cyber Physical Systems that Enable Automotive Assembly*, NSF Workshop on Cyber Physical Systems, April 2008.
10. *Contour Guided Dissemination in 4-Neighbor Wireless Mesh Topologies*, Innovations and Commercial Applications of Distributed Sensor Networks, 2007 (with K.K. Mamidisetty).
11. *A Goal-Seeking Framework for Systems Health Management*, Machine Failure Prevention Technology, April 2006, (with F. M. Discenzo).
12. *Sensor-Actuator Systems for Automation*, IEEE Real-time Systems Symposium, WIP Session, Rio de Janiero, Brazil, December 2006.
13. *Contour Guided Dissemination for Networked Embedded Systems*, Innovative Real-time Applications of Distributed Sensor Networks, Washington D.C. October 16-17, 2006.
14. *Sensor-Actuator Networks for Conveyor Systems*, Innovative Commercial Applications of Sensor Networks, Washington, October 2005.
15. *Algebraic Semantics for Complete Interaction Sequence*, IEEE TENCON, Region 10 Conference, 2005. (with Narasimhan and Renyi).
16. *Evaluating Communication Protocols for a Sensor-Actuator Network,* Proceedings of the International Conference on Embedded Systems, ESA'04, Las Vegas, June 2004. (with Kun Huang)
17. *A Taxonomy of Sensor Processing Architectures***,** Proceedings of ASI NATO Workshop on Data Fusion in Armenia - 2003, Fall 2004 (with Iyengar).
18. *Foundations of a SmartSpace for Automation*, Proceedings of International Conference on Artificial Intelligence, Las Vegas, pp. 3-9, June 23-26, 2003.

19. *Firewall Regression Testing of GUI Sequences and Their Interactions*, Proceedings IEEE International Conference on Software Maintenance, Amsterdam, Netherlands, September 22-26, 2003. (with White and Almazen)
20. *From Ear Decompositions to Bandwidth-2 Labelings*, Southeastern Conference on Graph Theory and Combinatorics, Boca Raton, March 1998. (with Dr. Lee J. White)
21. *New Perspectives in Power System Training Simulators – the impact of Artificial Intelligence*, Proceedings on the IEEE Conference on Power System Protection, Bangalore, India, 1988. (with Dr. V.A. Sastry, H.K. Kanodia, and R. Rana)
22. *Modeling and Performance Evaluation of Protection Systems – A Petri Net Approach*, Platinum Jubilee Conference on Systems and Signal Processing, Bangalore, India, 1986. (with Dr. Lawrence Jenkins and Dr. H.P. Khincha)

BOOK/ BOOK SERIES CHAPTERS

1. *Wireless Sensor Networks Enabling Ecological Informatics*, in Handbook of Ecology (with S.S. Iyengar and N. Balakrishnan), 2008, in press.
2. *A Taxonomy of Distributed Sensor Networks*, in Distributed Sensor Networks (editors Brooks, Iyengar) (with S.S. Iyengar) , Chapter 3, pages 29-44, 2005.
3. *Foundations of Data Fusion for Automation*, in Distributed Sensor Networks (editors Brooks, Iyengar) (with S.S. Iyengar and N. Balakrishnan), Chapter 15, pages 291-300, 2005.
4. *A Taxonomy for Distributed Real-time Control Systems,* in Advances in Computers, Editor M. Zelkovitz, Vol. 49, pages 303-352, 1999 (with J. Agre and L. Clare).

U.S. PATENTS ISSUED

1. **Patent Number: 6,104,962**, August 15, 2000, "System For and Method of Allocating Processing Tasks of a Control Program Configured to Control a Distributed Control System"

2. **Patent Number: 6,161,051**, December 12, 2000, "System, Method, and Article of Manufacture for Utilizing External Models for Enterprise Wide Control"

EXTERNAL FUNDING

Research Awards

1. National Science Foundation (ORSSP #7564), Real-time Sensor-Actuator Systems for Automation, **$280,000** (total award in collaboration with Prof. Rajkumar at Carnegie Mellon University is **$680,000** for 2007-2010).
2. Ohio Board of Regents (ORSSP #R7564-OBR), Real-time Sensor-Actuator Systems for Automation, August 2007, **$19,367** and indirect cost reduction from The University of Akron ORSSP #R7564, **$6,000**.
3. Wright Center for Sensor Systems Engineering (ORSSP #R7416), Project 6: Secure Data Aggregation and Decision-Making, August 2007, **$235,869**.
4. OhioICE Research Award (ORSSP # R7290) for Predictable Monitoring, April 2006, **$20,490** (in collaboration with Dr. N. Sridhar at Cleveland State University for total award of $44,552.
5. Ohio ICE Research Award (ORSSP # R7073) for Predictable Node-level Operating System, October 2005, **$15,000** (in collaboration with Professors Branicky and Liberatore at Case Western Reserve University for total award of $50,000).
6. Firestone Research Initiative Award, College of Engineering, January 2003, **$5,000**.
7. College of Engineering, The University of Akron, Research Startup, 2002, **$174,444**.

Equipment Donations/ Awards

1. Rockwell Automation, Automation Controllers, 2006, **$35,000** (with J. Grover).
2. Sandia National Laboratories (ORSSP #R6261), SmartSpace for Automation (JESS Liscense for Software), April 2003, **$5,000**.
3. QNX Software (ORSSP #R6139), QNX Momentics for Automation Research, December 2002, **$26,085**.
4. Rational Rose Development Company Award (ORSSP #O3566), Rational Rose Software, September 2002, **$148,550**.