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Education

Ph.D. in Nuclear Science & Engineering (Automatic Control of Reactors), Idaho State University, 1996. (Advisors: D.S. Naidu and Kevin Moore)
MS in Measurements & Controls Engineering, Idaho State University, 1994.
MS in Engineering Physics, Cairo University, 1992.
BS with High Honors in Electrical Engineering, Cairo University, 1988.

Academic Experience

1/2007 – Current	Fulbright Scholar, EE Department, Qatar University, Qatar
8/2006 – 12/2006	Visiting Scientist, Imaging Science Group, ESTD Division, ORNL, USA
7/2006 – Current	Professor, ECE Department, Tennessee Tech University, USA
8/2001 – 6/2006:	Associate Professor, ECE Department, Tennessee Tech University, USA.
1/1997 – 8/2001:	Assistant Professor, ECE Department, Tennessee Tech University, USA.
8/1996 – 12/1996:	Postdoctoral Research Fellow, Measurements and Controls Center, Idaho State University, USA.
8/1992 – 8/1996:	Research Assistant, Measurements and Controls Center, Idaho State University, USA.
10/1988 – 8/1992:	Instructor, Engineering Physics, Cairo University, Egypt.

Recent Research Projects

1. "Research Experience for Undergraduates in Industrial Applications of Sensing, Modeling and Control," $300,000, Principal Investigator, NSF, June 2006 – June 2009.
2. "An Outreach Program to Manufacturing Industries in Tennessee", ***$40,000***, Principal Investigator, TN DOE, Funding Approved. October 2005 – October 2007 (In Collaboration with ORNL)
3. "In Situ Real Time Monitoring and Control of Mold Making and Filling Processes," Principal Investigator, DOE, January 2004-Current, ***$1.5 millions*** (in collaboration with ORNL, GM, …).
4. "Counter Gravity and Pressure Assisted Lost Foam Magnesium Casting," ***$290,000***, Faculty Investigator, Oak Ridge National Laboratory, September 2004 – Current.
5. "An Expert System for Production of High Purity Iron from Cupola Furnaces," Principal Investigator, NSF, August 2002 -Current, ***$30,000***.
6. "Integrated Industrial Process Sensing and Control Systems Applied to and Demonstrated on Cupola Furnaces," Principal Investigator, DOE, January 1999-January 2002, ***$964,239*** (in collaboration with INEEL and USU).

7. "Development of a Mechatronics Laboratory," Co-principal Investigator, NSF, February 2000-January 2001, ***$62,000***.
8. "Development of Advanced Neural Networks Laboratory," Principal Investigator, Aspen Technology, December 1997-December 1998, ***$94,500***.
9. "Integrating Intelligent Measurement and Control Systems for Industrial Process Control," Principal Investigator, SCEEE, July 1998 – July 1999, ***$19,947***.
10. "Implementation of an Intelligent Controller for a Cupola Furnace," Principal Investigator, US DOE/Idaho State University, 5/1997 - 10/1997, ***$12,000***.
11. "Development of a Broad-Based Tennessee Industries of the Future Network," Faculty Investigator, August 2002 – Current, U.S. Department of Energy, ***$73,334***.

Selected Publications

Refereed Journals

1. Monitoring of Metal Fill in Lost Foam Casting, **Transactions of Instrumentation Society of America**, October 2006. (With Jenison Arulanantham, Ralph Dinwiddie, Graham Walford, and Fred Vondra)
2. A Genetic Algorithm for Single Machine Total Weighted Tardiness Scheduling Problem, Accepted for Publication in **International Journal of Intelligent Systems and Control** (With Ning Liu and Srini Ramaswamy)
3. A complete Multiagent framework for robust and adapatable dynamic jop shop schedulting, Accepted for Publication in **IEEE Transactions on Systems, Man and Cybernetics-Part C: Applications and Reviews** (With Ning Liu and Srini Ramaswamy - Accepted for Publication)
4. "Innovative Methods for Measurement of Foam Quality," **Transactions of AFS**, April 2005, (With Madura Josh, Jerry Barendreght and Mike Renfro)
5. "Vibration Based Method for Characterization of Foam Fusion," **Transactions of AFS,** April 2005, (With Naren Shaam and Sally Pardue)
6. "Fuzzy Logic Based Expert System for Cupola Furnaces," **Transactions of AFS**, April 2005, (With Sridhar Kuppuswamy)
7. "Feasibility Study for Capacitance Based Characterization of Sand Molds," **Transactions of AFS**, April 2005, (With Apar V. and Mike Baswell)
8. "A Flask and Methodology for Lost Foam Casting Under Controlled Environment," **Transactions of AFS**, April 2005, (With Ken Currie. and Graham Walford)
9. "Hardware Implementation of Automated Sensor Self-validation System for Cupola Furnaces," in ***Journal of Computers and Industrial Engineering***, April 2004 (with Wagdy Mahmoud and Roger Haggard).
10. "A Methodology for Integrating Multiple Sensor Fusion in the Controller Design," ***Transactions of Instrumentation Society of America Transactions***, Vol. 42, April 2003, (with P. Kandasamy).
11. "A Fuzzy Controller for Cupola Iron Melting Furnaces," *Transactions of AFS, Spring 2002*, (with (Mike Baswell).
12. "A methodology for self-validation, fusion and reconstruction of quasi-redundant sensors," ***IEEE Transaction on Instrumentation and Measurement.*** Vol. 50, No. 6, December 2001, (with J. Frolik and P. Kandasamy).
13. "A Methodology for Development of Configurable Remote Access Measurement System," ***Transactions of Instrumentation Society of America Transactions***, Volume 39, 441 - 458, December 2000, (Received Sigma Xi Award 2001), (with Abdul Rasheed).
14. "Gas Metal Arc Welding Control: Part 11-Control Strategy," ***Journal of Nonlinear Analysis,*** Volume 19,137-145,1998, (with K. L. Moore and D. S. Naidu).
15. "Finite Time Disturbance Attenuation Control for Singularly Perturbed Discrete Time Systems," ***Journal of Optimal Control. Applications and Methods***, Vol. 35, pp. 85- 93, 1999, (with D. S. Naidu and K. L. Moore).
16. "Intelligent Signal Validation for Cupola Iron Furnaces: Part I-Methodology," *Transactions of American Foundry Society. Spring 2000*. (with S. Subramanian).

17. "Intelligent Signal Validation for Cupola Iron Furnaces: Part 11-Testing and Verification," *Transactions of American Foundry Society, Spring 2000*, (with S. Subramanian).

Book Chapters

Co-authored a chapter in ***6th edition of the Cupola Handbook*** on "Computer Operated Cupolas" With (Kevin Moore and Paul King).

Accepted for Publication

"Addressing the Image and Human Resource Issues of Casting Industry through Multidisciplinary Research Experience for Undergraduates," Accepted for Publication, Transaction of AFS, Spring 2007. (With Sally Pardue and M. Baswell)

"A New Instrument for Measurement of Greensand Properties," Accepted for Publication, Transaction of AFS, Spring 2007. (With M. Baswell)

Conferences

1. "A Methodology for Multi-modal Sensor Fusion," *Proceedings of the 31st International Conference on Computers & Industrial Engineering*, Sheraton Fisherman Wharf, San Francisco, CA, February2-February 4, 2003. (with V. Vijayakumar)
2. "Integration of Multiple Sensor Fusion in Controller Design," *Proceedings of the American Control Conference*, Anchorage, Alaska, May 8-10, 2002. (with P. Kandasamy)
3. "Wavelet-Based Sensor Fusion for Data with Different Sampling Rates," *Proceedings of the American Control Conference*, Washington D.C., June 2001. (with M. Luo and J. Frolik)
4. "Development of Configurable Remote Access Measurement Systems Using Object Oriented Methodology," *7th International Conference on Production Engineering, Design and Control*, February 2001. (with Abdul Rasheed)
5. "A Methodology For Fusion Of Redundant Sensors," Proceedings of the American Control Conference, Chicago, IL, June 2000. (with Param. Kandasarny and J.Frolik)
6. "Synthesis of quasi-redundant sensor data: a probabilistic approach," *Proceedings of the American Control Conference*, Chicago, IL, June 2000. (with J. Frolik)
7. "A Numerically Convenient Methodology for the Hardware Implementation of Fusion of Quasi-Redundant Sensors," in Proceedings of the SSST 2000 Symposium Tallahassee, Florida, March 5-7, 2000 (with Jeff Frolik and Vipin Vijayakumar).
8. "Fuzzy rules for automated sensor self-validation and confidence measure," *Proceedings of American Control Conference*, Chicago, IL, June 2000. (with Steve Orth and J. Frolik)
9. "A Methodology for Integrating Multiple Sensor Fusion in the Controller Design," *Proceedings of the 7th Mechatronics Forum International Conference*, Atlanta, Georgia, September 6-8, 2000. (with Param. Kandasamy)
10. "Intelligent Signal Validation for Cupola Iron Furnaces: Part I-Methodology," *Proceedings of the American Control Conference*, San Diego, California. June 1999. (with S. Subramanian)
11. "Intelligent Signal Validation for Cupola Iron Furnaces: Part H-Testing and Verification," Proceedings *of the American Control Conference*, San Diego, California. June 1999. (with S. Subramanian)
12. "Feedback Control of A Cupola - Concepts and Experimental Results," *The 2nd International Cupola Conference*, Omni Netherlands Plaza Hotel, Cincinnati, Ohio, October 7 - 9, 1998. (With K. Moore, D. Clark, P. King, E. Larson)
13. "Experimental Control of Cupola Iron-Melting Furnaces," *Proceedings of the American Control Conference*, Philadelphia, PA, June 24-26, 1998. (with K. Moore)
14. "Feedback Linearization of Current and Arc Length in GNMW Systems," Invited paper for presentation at the American Control Conference special session on Control of Gas Metal Arc Welding, Philadelphia, PA, June 24-26,1998.
15. "Robust Control of Cupola Iron Furnace," *Proceedings of the American Control Conference*, Albuquerque, NM, June 4-6, 1997. (with K. Moore)

16. “Characterization Of Capacitive Sensors And Monitoring Of Metal Fill In Lost Foam Casting,” Southeastern Symposium On Systems Theory, Mercer University, March 2007 (With Darpan Patil and Wael Deabes)
17. “Design and implementation of a control system for a counter gravity casting machine,” Southeastern Symposium on Systems Theory, Mercer University, March 2007.
18. “An Image Processing Approach For Surface Characterization Of The Foam Patterns,” Southeastern Symposium On Systems Theory, Mercer University, March 2007 (With Wael Deabes)
19. “Robust And Adaptable Job Shop Scheduling Using Multiple Agents,” in Proceedings of SSST05 Symposium, Tuskegee University, Alabama, March 2005 (With Ning Liu and S. Ramaswamy).
20. "Contingency Ranking and Static Security Enhancement in Power Systems Using Heuristics Based Genetic Algorithms," in Proceedings of SSST2004 Symposium, Atlanta, Georgia, March 2004 (with Ahlada Sudersan and Ghadir Radman).
21. “An Adaptive Neuro-Fuzzy Power System Stabilizer for Damping Inter-Area Oscillations in Power Systems,” in Proceedings of SSST2004 Symposium, Atlanta, Georgia, March 2004 (with Ashwini Venugopal and Ghadir Radman).
22. "A Feasibility Study On Using Neural Networks In Performance Analysis Of Coal Fired Power Plants," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Vijaya Kuntaputla).
23. “Artificial Neural Networks Based Steady State Security Analysis Of Power Systems," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Meera Shukla).
24. "A Fuzzy-Logic Based Expert System For A Cupola Furnace," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Sridhar Kuppuswainy).
25. "A Multi-Agent Model For Reactive Job Shop Scheduling," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Ning Liu and Srini Ramaswamy).
26. "A Genetic Algorithm for the Single Machine Total Weighted Tardiness Problem," in Proceedings of SSST 2003 Symposium, West Virginia University, Morgantown, March 2003 (with N. Liu, and S. Ramaswamy).
27. "Towards a Multi-Disciplinary, Project-Based Mechatronics Curriculum," ASEE SE Second Annual Conference Gainesville, Florida, Apr.7-9, 2002 (with Stephen Canfield).
28. "A Methodology For Developing Internet-Based Laboratories," ASEE SE Section Annual Conference, Gainesville, Florida, Apr. 7-9, 2002 (with Wagdy Mahmoud and Mani Gollapudi).
29. "Artificial Neural Networks for Computer Security," in Proceedings of Southeastern Symposium on Systems Theory, Auburn, Alabama, March 20 - 22nd, 1999 (with H. Boghdadi).
30. "Melt rate Estimation of a Cupola Furnace Using Inferential Sensing," in Proceedings of Southeastern Symposium on Systems Theory, Auburn, Alabama, March 20 - 22' , 1999 (with S. Subramanian).
31. "Inferential Sensors for Cupola Iron-Melting Furnaces," in Proceedings Southeastern Symposium on Systems Theory, Auburn, Alabama, March 20 - 22nd, 1999 (with S. Subramanian).
32. "Optimal Choice of Cupola Iron Furnace Operating Point," in Proceedings of 30th IEEE Southeastern Symposium on System Theory, West Virginia University, Morgantown, WV, March 8-10,1998 (with S. Subramanian).

Selected **Courses Taught at TTU**

ECE 7980 Advanced Topics in Fuzzy Control.

ECE 6580	Instrumentation and Transducer Technology.
ECE 6220	Introduction to Fuzzy Control.
ECE 6060	Artificial Neural Systems.
ECE 6980	Object Oriented Analysis and Design in Measurement Systems.
ECE 4230	Computer Based Measurement Systems.
ECE 4943	Multidisciplinary Design: Mechatronics.
ECE 4240	Mechatronics.
ECE 3810	Fundamentals of Electrical Engineering.
ECE 3260	Measurement & Control Laboratory
ECE 3120	Computer Systems
ECE 3210	Control System Analysis.
ECE 3010	Signals and Systems.
ECE 2500	Physical Principles of Electrical Engineering.

15. Theses Supervised

Title	**Publications from Thesis**
1. **Senthil Subramanian:** An Intelligent Signal Validation System for Cupola Iron Melting Furnace, August 1998	"Intelligent Signal Validation for Cupola Iron Furnaces: Part I-Methodology," *Transactions of American Foundry Society. Spring 2000*. (with S. Subramanian). "Intelligent Signal Validation for Cupola Iron Furnaces: Part 11-Testing and Verification," *Transactions of American Foundry Society, Spring 2000*, (with S. Subramanian). "Inferential Sensors for Cupola Iron-Melting Furnaces," in Proceedings Southeastern Symposium on Systems Theory, Auburn, Alabama, March 20 - 22nd, 1999 (with S. Subramanian).
2. **Abdul Rasheed**: *Object Oriented Analysis and Design of Configurable Remote Access Measurement System*, August 1999.	"A Methodology for Development of Configurable Remote Access Measurement System," ***Instrumentation Society of America Transactions***, Volume 39, 441 - 458, December 2000, (Received Sigma Xi Award 2001), (with Abdul Rasheed).
3. **Parameshwaran Kandasamy**: *Development of Sensor Fusion Algorithms for Redundant Sensors and Integration in Controller Design*, May 2000.	"A methodology for self-validation, fusion and reconstruction of quasi-redundant sensors," ***IEEE Transaction on Instrumentation and Measurement.*** Vol. 50, No. 6, December 2001, (with J. Frolik and P. Kandasamy). "A Methodology for Integrating Multiple Sensor Fusion in the Controller Design," ***Instrumentation Society of America Transactions***, Vol. 42, April 2003, (with P. Kandasamy). "Integration of Multiple Sensor Fusion in Controller Design," *Proceedings of the American Control Conference*, Anchorage,

	Alaska, May 8-10, 2002. (with P. Kandasamy)
4. **Min Luo**: *Fusion of Multi-resolution Sensors using Wavelet Transform*, September 2001.	"Wavelet-Based Sensor Fusion for Data with Different Sampling Rates," *Proceedings of the American Control Conference*, Washington D.C., June 2001. (with M. Luo and J. Frolik)
5. **Mani Gollapudi**. *A Methodology For Developing Internet-Based Laboratories*, August 2001	"A Methodology For Developing Internet-Based Laboratories," ASEE SE Section Annual Conference, Gainesville, Florida, Apr. 7-9, 2002 (with Wagdy Mahmoud and Mani Gollapudi).
6. **Vipin Vijayakumar**: *A Methodology for Multi-Modal Sensor Fusion*. June 2001	"A Methodology for Multi-modal Sensor Fusion," *Proceedings of the 31st International Conference on Computers & Industrial Engineering*, Sheraton Fisherman Wharf, San Francisco, CA, February2-February 4, 2003. (with V. Vijayakumar) "A Numerically Convenient Methodology for the Hardware Implementation of Fusion of Quasi-Redundant Sensors," in Proceedings of the SSST 2000 Symposium Tallahassee, Florida, March 5-7, 2000 (with Jeff Frolik and Vipin Vijayakumar).
7. **Aparajithan Vaidyanathan**: Capacitance Based Device for Green Sand Mold Characterization, August 2003.	"Feasibility Study for Capacitance Based Characterization of Sand Molds," **Transactions of AFS**, April 2005, (With Apar V. and Mike Baswell)
8. **Sridhar Kuppuswamy**: A Fuzzy Logic-Based Expert System For A Cupola Furnace: May 2003.	"Development and Implementation of an Expert System for Cupola Iron-Melting Furnaces," **Transactions of AFS**, April 2005, (With Sridhar Kuppuswamy) "A Fuzzy-Logic Based Expert System For A Cupola Furnace," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Sridhar Kuppuswainy).
9. **Vijaya V. Kantubhukta**:A Feasibility Study On Using Neural Networks In Performance Analysis Of Coal-Fired Power Plant: December 2003	"A Feasibility Study On Using Neural Networks In Performance Analysis Of Coal Fired Power Plants," in Proceedings of SSST 2004 Symposium, Atlanta, Georgia, March 2004 (with Vijaya Kuntaputla).
10. **Ahlada Sudersan (CoAdvisor with Ghadir Radman)**	"Contingency Ranking and Static Security Enhancement in Power Systems Using Heuristics Based Genetic Algorithms," in Proceedings of SSST2004 Symposium, Atlanta, Georgia, March 2004 (with Ahlada Sudersan).
11. **Ayman Ahmed Elsawy**: Design of TTUBOT: A Modular Learning Platform For Integration Into Engineering Curriculum: December 2004	Design of TTUBOT: A Modular Learning Platform For Integration Into Engineering Curriculum, **Submitted to SSST 06**
12. **Madhura Vishwas Joshi**: Innovative Methods For Finding The Uniformity Of Foam Quality: July 2005	"Innovative Methods for Measurement of Foam Quality," **Transactions of AFS**, April 2005, (With Madura Josh, Jerry

	Barendreght and Mike Renfro)
13. **Jeanison :Arulanantham**: A Methodology For Monitoring The Metal-Fill In Lost Foam Casting Process: April 2005	"Monitoring of Metal Fill in Lost Foam Casting," ***Transactions of Instrumentation Society of America***. (With Jeansison Arulanantham, Graham Walford and Ralph Dinwiddie)
14. **Ashwini Venugopal (CoAdvisor with Ghadir Radman):** Adaptive Neuro-Fuzzy Power System Stabilizer for Damping Inter-Area Oscillations in Power Systems.	"An Adaptive Neuro-Fuzzy Power System Stabilizer for Damping Inter-Area Oscillations in Power Systems," in Proceedings of SSST2004 Symposium, Atlanta, Georgia, March 2004 (with Ashwini Venugopal and Ghadir Radman).
15. **Darpan Patil:** Development and Characterization of a Capacitive Sensor for Metal Fill	"Characterization Of Capacitive Sensors And Monitoring Of Metal Fill In Lost Foam Casting," in Proceedings of SSST 2007 Symposium, Mercer, Georgia, March 2007 (With D. Patil, K. Rajan, and W. Deabes)

Selected Public and Professional Activities

- Senior Member of IEEE, ISA, Member of ASEE, AFS.
- NSF Panelist for Graduate Research Fellowship, 2002- 2005.
- Member of ABET 2000 Departmental Committee in Charge of ABET accreditation of the ECE program 1999 - Current.
- Member of Tennessee Technological University Faculty Senate and Administrative Council, 2003 - 2006.
- Chair of TTU Committee on Patents and Copyright, 2003 - 2006.
- Associate Editor, CEB of IEEE ACC and CDC conferences, 1998- Current.
- Invited speaker, NSF sponsored workshop, Cairo Egypt, June 2002 & December 2002.
- Chair of Tenure and Promotion Committee for an Engineering Faculty, 2002.
- Chair/Co-chair of sessions at the American Control Conference, 2000 - 2002.
- Receiver of RSLogix 500 ONLINE Training Certificate from RS Logic (PLC), August 2001.
- Reviewer for Transaction of Instrumentation Society of America, 2001 - Current.
- Judge for R&D magazine 100 Awards, 1997 - 2000.
- Member of the American Foundry Society Cupola Committee and Cupola model committee, 1997 - 2002.
- Reviewer for the International Journal of Intelligent Control and Systems and Automatica.

Honors & Recognition

- Selected as a Fulbright Scholar by the **Council for International Exchange for Scholars**, 2007.
- Winner of ***Sigma Xi Research award*** for 2001.
- Research project **featured** in a presentation to **Tennessee Board of Regents**, Summer 2004
- Research project **featured** in **Tennessee Tech Vision Magazine,** Fall 2004
- Research project **featured** in local news paper, **Herald Citizen**, Spring 2004.
- Research project **featured** in **Tech Times,** Spring 2004
- Nominated for **Caplenor Research Award** for 2004.
- Major research project **funded** in a national competition by US DOE for $1.5 Million, October 2003.

- Nominated for **Kinslow Award** 2002 & 2003.
- Advanced to ***IEEE Senior Member*** *Grade*.
- Research project featured on **cover page of Manufacturing Research Center** 2001 Report.
- Selected to be Sensor Fusion **session chair** at the American Control Conference, Washington DC, June 2001
- ***Certificate of Excellence*** for Paper presented at the 7th International Conference on Production Engineering, Design and Control, February 2001.
- Sensor Fusion session **co-chair** at the American Control Conference, Chicago, June 2000.
- Appointed as an **Associate Editor in conference editorial board (CEB)** of the IEEE Control Systems Society for Year 2000.
- Recognized by the R& D magazine for serving as a **Judge in the 1999 R&D 100** Awards
- Recognized by the R& D magazine for serving as a **Judge in the 1998 R&D 100** Awards
- Recognized by the R& D magazine for serving as a **Judge in the 1997 R&D 100** Awards
- Elected for membership in Sigma Xi, the Scientific Research Society, 1997
- Certificate of Appreciation by the Pan Hellenic Council of TTU for commitment to students.