JAGANNATHAN SARANGAPANI
Rutledge-Emerson Distinguished Professor of Electrical and Computer Engineering
Professor of Department of Computer Science (courtesy appointment)
Professor of Department of Engineering Management and Systems Engineering (courtesy appointment)
Site Director of NSF I/UCRC on Intelligent Maintenance Systems
Director, Embedded Control Systems and Networking Laboratory
Missouri University of Science and Technology
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AREAS OF INTEREST: Systems & Control, Neural Network Control, Robotics, Cyber-physical systems, Diagnostics & Prognostics

EDUCATION:

Doctor of Philosophy in Electrical Engineering (1/92-8/94)
Automation and Robotics Research Institute, University of Texas at Arlington
Specialization: Intelligent & Embedded Control of Robotics
Awards: University Doctoral Fellowship Recipient (1/92-8/93)
Rudolf Hermanns Graduate Fellowship holder (9/93-8/94)
University Scholars Fellow (1/92-8/94)
NSF Research Grant Scholar (2/92-08/94)
Doctoral Research Award Recipient of Sigma Xi International Research Society (4/94)

Master of Science (9/87-12/89); GPA 85%
University of Saskatchewan at Saskatoon, Canada
Specialization: Embedded Control Systems and Robotics
Awards: University of Saskatchewan Summer Graduate Fellowship holder

Bachelor of Electrical Engineering (7/82-8/86); GPA 85.5%
Anna University at Madras, India
Specialization: Embedded Systems and Robotics
Awards: University Gold Medalist for being topper (82-86)
National Merit Scholar (82-86)
Won IEEE best student paper contest (85)

AWARDS:

- **University of Missouri Leadership Development Program**
- **Engineers Make a Difference Award in 2008**
- **Boeing Pride Achievement Award 2007**
- **Faculty Excellence Award 2005-2006, 2006-2007**
- **Outstanding Counselor Award for St. Louis (06, 07) and Region 5 in 2006 and Outstanding IEEE Student Branch Award (06, 07)**
- **Teaching Commendation Award in 2005, Commended for Teaching Excellence in 2007, 2013**
- **Caterpillar Research Excellence Award in 2001**
- **The University of Texas Presidential Award for Research Excellence in 2001**
- **NSF CAREER Award (2000)**
- **UTSA Faculty Research Award (2000)**
- Elevated to **Sr. Member** of IEEE in 1999
- Received **"Patent Award"** from Automation and Robotics Research Institute (Dec.96)
- Cited in Marquis Who's Who (Science, Engineering, Finance, World, America) continuously from 1998 till do date.
- Twentieth Century Award for Achievement—International Biographical Center, Cambridge, UK.
- Several Best Paper/session Awards in 2004, 2000

OTHER AWARDS:

- Recipient of **University Gold Medal** for being University Topper during undergraduate degree program
- Recipient of **Papu Subbarao Medal** for the best machine design (May 86)
- Awarded **Gold Medal** for being a State Ranker (Dec. 80)
- Received **Silver Medal** from International Rotary Foundation for being best student (Dec. 80)

EDITORIAL: **(**a) **Series Co-Editor,** IET Control Series UK (2010-
(b) **Associate Editor**, UK Royal Institute Transactions on Measurement and Control (2010-)
(c) **Associate Editor**, IEEE Transactions on Control Systems Technology (2004-2009)
(d) **Associate Editor**, IEEE Transactions on Neural Networks (2005-2009)
(e) **Associate Editor**, IEEE Journal on Systems Engineering (2007-2010)
(f) **Editorial Board Member and Steering Committee**, International Journal of Automatic Control and Systems Engineering (ASCE)
(g) **Chair and Member**, Technical Committee on Intelligent Control (2011-
(h) **Vice Chair**, CIS Tech Committee on Adaptive Dynamic Programming and RL (2013)
(i) **Editor-in-Chief**, Discrete Dynamics in Nature and Society (2013-)
(j) **Editor board**, The Scientific World Journal (2013-)

Research Grants: (September 98-Todate):

No.	Title/PIs/Number	Agency	Years of Support	My Share	Total Value
83.	Investigation of Advance Concepts in Passive Tags with Sensors and Data Communication and Prognosis Applications	Boeing	2014	100%	$135,000
82.	IMS Membership	TDA	2013-2014	10%	$12,000
81.	IMS Membership	Boeing	2013-2014	100%	$40,000
80.	Investigation of Passive Tags with Sensors and Prognosis of Structural Health	Boeing IMS second membership	2013	100%	$105,422
79.	IMS Membership	TDA/Navair	2012-2013	33%	$12,000
78.	"A Doctoral Program in Security and Privacy in Mobile Social Network Space", Co-PI (PI: Madria)	Dept of Education	2012-2015	10%	$356,584
77.	I/UCRC: Collaborative Research on Coupled Models for Prognostics and Health Management, PI	NSF	2012-2014	50%	$49,999
76.	MRI: Development of a Open-source Dual Probe Atomic Force Microscope , Co-PI, PI: Doug Bristow	NSF	2012-2015	15%	$316,044
75.	A Heterogeneous Secure Networking Test-Bed to Counter Explosives, Co-PI (PI: Sriram Chellappan)	ARO	2012-2013	20% ($49,800)	$249,978
74.	Invention of Advance Concepts in Wireless Sensors with Flexible High and Low Storage Memory and Temperature/Humidity Sensing Capabilities and Initiation of Condition Based Maintenance for	Boeing	2012-2013	100%	$116,537

	Diagnosis and prognosis of Plant Machinery: IMS second membership				
73.	NSF I/UCRC Membership	Boeing	2012-2013	100%	$40,000
72.	NSF I/UCRC memberships	Boeing, Kalscott	2011-2012	86%	$52,000
71.	Collaborative: Design of Accelerated Prognostics and Health Management, Co-PI	NSF	2011-2013	50%	$50,000
70.	Industry/University Cooperative Research Center for Intelligent Maintenance Systems: Five Year Renewal Phase II, PI	NSF	2011-2016	100%	$80,000 (total of $200,000)
69.	Agile Systems Engineering: Experiential and Active Learning Approach—Co-PI; PI: Dagli	DoD-SERC from Stevens Institute	2011-2012	5%	$119,988
68.	Adaptive-dynamic programming based control of networked control system	NSF	2011-2014	100%	$346,815
67.	Digital Part Marking and Container Health Monitoring	Boeing	2011	100%	$60,000
66.	NSF IMS Memberships—Boeing I & II, Kalscott and AVETEC	Various	2011-2012	100%	$104,000
65.	Secure Network Protocol	Boeing	2010-2011	50%	$25,000
64.	Unintended Emission Detection and Identification, PI	Army Research Laboratory	2010-2013	100%	$403,873
63.	Human-the-loop with Detectors and Embedded Mobile Sensor Fusion Center for Detection, PI; Co-PI: Jeff Dalton of AVETEC	Army Research Laboratory	2010-2013	100%	$702,120
62.	Localization and Tracking of Explosive Threats using Multi-modal Sensors, PI;	Army Research Laboratory	2010-2013	90%	$646,127
61.	System Integration, PI; Co-PI Levent Acar	Army Research Laboratory	2010-2013	10%	$32,881
60.	Cognitive Network and Protocols using Missouri S&T Mote, Co-PI; PI Maciej Zawodniok	Army Research Laboratory	2010-2013	33%	$450,093
59.	Design of Hardware Platform for Multimodal Sensor Detection, Co-PI; PI-Maciej Zawodniok	Army Research Laboratory	2010-2013	33%	$299,907
58.	Malicious Device Identification Through Statistical Pattern Modeling, Co-PI; PI-Ivan Guardiola	Leonard Wood Institute/Army Research Laboratory	2010-2011	10%	$81,351
57.	NSF REU Supplement for Smart Engines, PI	NSF	2010-2011	50%	$6,000
56.	A Systematic Methodology for Data Validation and Verification for Prognostics Applications, Co-PI, PI:Zawodniok	NSF	2010-2012	50%	$49,998
55.	Agile Systems Engineering: Experiential and Active Learning	DoD/SERC (subcontract	2010-2011	4%	$198,556

	Approach, Co-PI; PI: Dagli	from Stevens Institute of Technology)			
54.	Fault Detection, Isolation, Energy Monitoring and Prognostics	Boeing	2010	100%	$72,101.50
53.	IMS Membership	AVETEC	2010-2011	100%	$12,000
52.	NSF REU Site Supplement	NSF	2010	10%	$20,020
51.	I/UCRC Memberships—Boeing I and II	Boeing	2009-2010	100%	$80,000
50.	Smart Engines: Fuel Flexible Engine Control using Adaptive Neural Network Critics, PI	NSF	2009-2012	60% ($198,000)	$330,000
49.	Condition-based Maintenance on Motors	Boeing	2009	100%	$60,600
48.	NSF I/UCRC Supplement—parameter based prognostics	NSF	2009-2010	50%	$49,999
47.	NSF I/UCRC on Intelligent Maintenance Systems Center Memberships	Caterpillar Chevron	2008-2009	100%	$80,000
46.	Networked Zeolite-Capacitive Sensors for Distributed and Ubiquitous Detection of Chemical/Biological Threats, Co-PI	Army Lab/LWI	2008-2009	19% ($100,000)	$529,160
45.	NSF I/UCRC Supplement: Bio immune system engineering	NSF	2008-2009	100%	$50,000
44.	NSF I/UCRC Memberships	Boeing and AVETEC	2008-2009	100%	$51,000
43.	Network Enabled Manufacturing: Power Utility Monitoring and Bearing Prognostics	Boeing	2008	100%	$109,470
42.	NSF REU Site: Research and Training Experience for Undergraduates in the Area of Sensor Computing, Co-PI (PI: Madria)	NSF	2008-2011	10% ($30,000)	$300,000
41.	NSF I/UCRC on Intelligent Maintenance Systems Center Memberships	Boeing, Caterpillar, Chevron, Honeywell, 21st Century Systems	2007-2008	100%	$171,000
40.	RFID Application to Virtual Enterprises	Boeing	2007-2008	100%	$25,500
39.	IED Localization using Spatial Diversity of Wireless Sensor Networks	Army Research Lab/LWI	2007-2008	100%	$323,922
38.	Wireless Head Set for Ramp Operations	Air Force Research Lab (AFRL)	2007-2008	100%	$147,000
37.	Secure and Adaptable Energy Efficient Sensor Networks for Infrastructure Monitoring, Co-PI	DOEducation Co-PI	2007-2010	25% ($102,000)	$384,000

36.	NSF I/UCRC Memberships	AvETEC, Boeing	2007	100%	$51,000
35.	Supply Chain Management	Boeing	2007	100%	$60,000
34.	Network Enabled Manufacturing	Boeing	2007	100%	$102,003
33.	Development and validation of advanced energy management control algorithms for short or long term storage, Co-PI	Sandia	2006-2007	10% ($1,000)	$10,000
32.	Chemical Management using RFID	Avchem/NSF	2006-2007	100%	$73,000
31.	RFID Hardware Integration	AFRL	2006-2008	100%	$ 75,000
30.	NSF I/UCRC Center Membership fees, PI	Caterpillar, Chevron, Boeing, Festo, Honeywell, 21st Century Systems	2006-2007	70% ($147,700)	$211,000
29.	Robust adaptive critic NN controllers for nonlinear dynamic systems, PI	NSF	2006-2010	100%	$239,999
28.	NSF I/UCRC on Intelligent Maintenance Systems	NSF	2006-2011	100%	$250,000
27.	Hydrualic Pump Prognostics	Caterpillar	2006-2006	100%	$25,000
26.	Katrina SGER: Dynamic Programming based monitoring of structural health and communication infrastructure, PI (Co-PI Dr. Saygin)	NSF	2006-2007	50% ($27,850)	$55,699
25.	Caterpillar Electronics University Research Award: Network Management Protocol, Co-PI	Caterpillar	2006-2007	50% ($25,000)	$50,000
24.	Development and validation of advanced energy management control algorithms for short or long term storage, Co-PI (with PI: Crow, Co-PIs: McMillin, Liu)	Sandia Labs	2006-2007	10% ($143,086)	$680,860
23.	Real-time Locating System Evaluation	Boeing	2006-2006	100%	$37,250
22.	NSF I/UCRC Center Membership fees, PI	Caterpillar, Chevron, Boeing, Festo, Honeywell, 21st Century Systems	2005-2006	70% ($147,700)	$211,000
21.	Real-time Locating System Evaluation (Contract #1050990), PI	Boeing	2005-2005	50% ($2,400)	$4,800
20.	Planning Grant: NSF Industry University Cooperative Center, PI (EEC-0531580) (with Drs. Leu and Saygin)	NSF	2005-2006	50% ($5,000)	$10,000
19.	Development and validation of advanced energy management control algorithms for short or long term	Sandia Labs	2005-2006	10% ($291,251)	$1,270,390

	storage, Co-PI (with PI: Crow, Co-PIs: McMillin, Liu)				
18.	Wireless Sensor Networks for In-quality process monitoring, PI	Air Force Research Laboratory	2005-2007	50% ($164,913)	$329,826
17.	Research Experiences for Undergraduate Students Supplement for ECS#0327877**,** PI (with Dr. Drallmeier as the Co-PI)	NSF	2004-2005	50% ($3,000)	$6,000
16.	Shop floor management using Auto-ID technologies in Network Centric Environments, Co-PI (PI: Ming Leu, Co-PI: several) (Overall award $8.5 Million)	Air Force Research Laboratory	2004-2006	50% ($139,927)	$279,854
15.	Facts Device Interactions, Co-PI (with PI: Crow, Co-PI: McMillin, Liu)	Sandia Labs	2004-2005	100% of $57,343 Plus 10% of $244,600	$727,891
14.	Wireless test bed for mobile computing research, Co-PI, (PI: Madria; Co-PI: McMillin, Ercal and Subramanya) (MRB: $16.5K, UMR: $16.5K)	NSF	2003-2005	25% ($16,750)	$83,500
13.	Multidisciplinary research and training in secure wireless adhoc and sensor networks (PI) (with Rao, Wunsch, Miller, Madria, Kapila, Erickson) (UMR Match : $126,000)	Dept. of Education	2003-2006	20% ($92,654)	$463,272
12.	Adaptive neural architectures for emission control of engines (PI) (ECS#0327877) (with Dr. Drallmeier)	NSF	2003-2006	65% ($327,600)	$504,000
11.	Adaptive traffic management schemes for the Internet	Research Board	2002-2003	100%	$24,400
10.	Research Experiences for Undergraduate Students Supplement	NSF	2002-2003	100%	$10,125
9.	Equipment donation (appx. value)	Motorola, Inc	2001	100%	$185,000
8.	CAREER: Sensor-based adaptive control of complex distributed systems (ECS#9985739, ECS#0296191)	NSF	2000-2005	100%	$300,000
7.	Equipment Supplement (with $10K match) (ECS#0216191)	NSF	2000-2005	100%	$10,000
6.	Bioengineering Materials (Co-PI) (with Drs. Huang and Singh)	Subcontract from UT Austin (NSF)	2000-2001	33% ($32,340)	$98,000
5.	Develop. of an intelligent controller for a golf swing machine using MEMS Technologies (#26-57100-01)	Techathlon, Inc	2000-2001	100%	$100,750
4.	Microsensor-based Autonomous		1999-2002	100%	$126,275

	robots for MARS Greenhouse operation (#26-4315-01)	TSGC/NASA			
3.	Develop. of an intelligent controller for a golf swing machine using MEMS technologies	Techathlon, Inc	1999-2000	100%	$65,000
2.	Adaptive traffic rate control (#14-7519-01)	Faculty Research Award	2000	100%	$5,000
1.	Grant Development	Research and Development	1999 and 2000	100%	$6,000

Total Funding from all sources (98-todate):

Total **$14,238,044**
My Share: $8,254,001

Summary: My shared credit **$618K/year** for the past 13 years (98-todate).

Other Funded Projects (1994-1998)

No.	Title/PIs/Number	Agency	Years of Support	My Share	Funds
1.	Autonomous Mining Truck---backup loading	Decatur, Caterpillar	1994-1995	100%	$125,000
2.	Data Analysis Tool Development for Diagnostics/Prognostics	Parts & Services	1995-1998	100%	$2,000,000
3.	Condition based monitoring, fault symptom analysis, and Prognostics	Parts & Services	1995-1998	100%	$1,250,000
4.	Obstacle avoidance for autonomous trucks	Machine Research Board	1996-1997	100%	$200,000
5.	Engine diagnostics and prognostics	Decatur	1996-1997	100%	$150,000
6.	Embedded blade control of autonomous dozer	Decatur	1997-1998	100%	$500,000

Total Funding: My share (1994-1998) **$4,225,000**

Classes Taught:

Teaching at UMR/Missouri S&T

Fall 2001 Semester	EE 231 Control Systems
Spring 2002 Semester	EE 434 Nonlinear Control (New course)
Fall 2002 Semester	CpE/EE 401 High Speed Networks (New course)
Fall 2002 Semester	EE 337 Neural Networks for Control (New Course)
Spring 2003 Semester	CpE/EE/ME 301 Introduction to MEMS (New course)
Fall 2003 Semester	CpE/EE 401 High Speed Networks (second time)
Course Release	
Spring 2004 Semester	EE 433 Topics in Control Theory: Adaptive Control (New Course)
Spring 2004 Semester	EE 231 Control Systems
Fall 2004 Semester	CpE 448 High Speed Networks (third time)
Spring 2005 Semester	EE 434 Nonlinear Control Systems
Spring 2005 Semester	EE 231 Control Systems
Fall 2005 Semester	CpE 448 High Speed Networks
Spring 2006 Semester	EE 433 Topic in Control-Neural Network Control (New course)
Summer 2006 Semester	EE/CpE 301 Wireless Networks (introduced but taught by grad student)

Fall 2006 Semester	CpE 448 High Speed Networks
Fall 2006 Semester	CpE/EE 401 Wireless Adhoc and Sensor Networks (New course taught by postdoc)
Spring 2007	EE 434 Nonlinear Control Systems
Fall 2007	EE 433 Topics in Control: Discrete-time Neural Network Control CpE/EE 401 Wireless Ad hoc and Sensor Networks (New Course taught by postdoc)
Spring 2008	EE 433 Topics in Control: Adaptive Control CpE/EE/Sys 348 Wireless Networks (taught by postdoc)
Fall 2008	CpE 448 High Speed Networks
Spring 2009	EE 432 Optimal Control
Spring 2009	EE 434 Nonlinear Control Systems
Fall 2009	EE 337 Neural Networks for Control
Spring 2010	EE 432 Optimal Control
Spring 2011	EE 432 Optimal Control
Fall 2011	EE 433 Topics in Control: Discrete-time Neural Network Control
Spring 2012	EE 433 Topics in Control: Adaptive Control
Fall 2012	EE 401 Nonlinear Neural Network Control
Spring 2013	EE 434 Nonlinear Control
Fall 2013	EE 401 Discrete-time Neural Network Control
Spring 2014	EE 432 Optimal Control and Estimation

(Note that within the past three years, several new courses have been introduced and taught)

Teaching AT UTSA

Spring 1999	EE 3413 Analysis and Design of Control Systems
Spring 1999	EE 4443 Discrete-Time Control
Summer 1999	EE 2323 Engineering Analysis
Fall 1999	EE/CS 4723 Intelligent Robotics
Fall 1999	EE 5143 Linear Systems and Control
Spring 2000	EE 3413 Analysis and Design of Control Systems
Spring 2000	EE/CS 5343 Intelligent Robotics
One Course buyout	
Fall 2000	EE 3413 Analysis and Design of Control Systems
Fall 2000	EE/CS 5463 Artificial Neural Networks
One course buyout	
Spring 2001	EE 3413 Analysis and Design of Control Systems
Spring 2001	EE/CS 4723 Intelligent Robotics
Summer 2001	EE 3523 Electromechanical systems

Note that within three years several courses have been introduced and taught.

PROFESSIONAL EXPERIENCE:

Rutledge Emerson Endowed Chair (2008-present)
Tenured Full Professor and Site Director NSF I/UCRC on Intelligent Maintenance Systems (2005-present)
Tenured Associate Professor (2001-2004)
Director, Embedded Systems and Networking Laboratory
Investigator, Intelligent Systems Center
Dept. of Electrical and Computer Engineering
The University of Missouri-Rolla

Assistant Professor & Director (98-01) (Associate Prof with Tenure 2001)
Intelligent Systems Laboratory

Dept. of Electrical and Computer Engineering
Adjunct Professor of Computer Science
Investigator, Center for Advanced Computing and Networking
6900 North Loop 1604 West
The University of Texas at San Antonio
San Antonio, Texas 78249.

Director & Staff Engineer (3/96-11/98) (Supervised 15 engineers)
Sr. Project Engineer (9/94-2/96)
Systems and Controls Research
Caterpillar Inc, Peoria.
Funding levels from Industry and federal agencies: Over 1 mil/year

- Directed a Group to Develop and Implement Embedded Systems for Applications
- Developing control algorithms for tractor type tractor machine.
- Managed advanced retarder control project for off-highway trucks.
- Applied learning-based control work automated loading system-eg. excavators
- Directed a team on rapid prototyping technology
- Directed a team to develop data analysis tools for life prediction.
- Directed a group to develop database architecture (DB2) and tool interface.
- Directed a project on extending engine oil life drain intervals.
- Developed navigation, control, and obstacle Avoidance methods for vehicles using embedded systems, multitasking operating systems, VME and PC 104 platforms.
- Directed diagnostic/prognostic programs using MEMS technologies.
- Developed novel methods to predict life for mechanical components.
- Developed performance models for mechanical components.
- Demonstrated an expert system for intelligent failure diagnosis/prognosis.
- Participated in a group to better control Electro-hydraulic Systems
- Developed and implemented novel path planner for Autonomous Systems
- Worked on obstacle detection systems and developed new techniques
- Developed novel diagnostic and prognostic algorithms for intelligent vehicle health monitoring using object oriented architecture
- Assembled an intelligent health monitoring system

Research Assistant (1/92-8/94)
Automation and Robotics Research Institute,
The University of Texas at Arlington, Fort Worth, Texas

- Implemented adaptive methods for nonlinear systems on embedded systems
- Developed novel nonlinear controllers for robotics and automation
- Developed and Implemented Intelligent controllers: Neural, Fuzzy and Artificial Intelligence based technology on Embedded Microprocessor systems
- Developed path planner and control techniques for autonomous systems
- Implemented various control techniques using Embedded Systems

Research Associate and Industrial Consultant (1/90-12/91)
Department of Mechanical and Industrial Engineering
The University of Manitoba, Winnipeg, Canada

- Developed a Microprocessor based controller in a Multi-tasking Environment for a Flexible Manufacturing Systems
- Implemented novel controllers for Industrial Processes such as Lathe and Milling Operations
- Designed, developed and Implemented an Intelligent Machine Vision approach for Automatic Inspection of Printed Circuit Boards for Northern Telecom Inc., (Bell Northern Research), Canada
- Implemented a knowledge based approach
- Implemented a combined knowledge based with a neural network approach

- Taught Digital Control Class for undergraduate students
- Supervised undergraduate thesis work control systems and expert system projects
- Undertaken several knowledge based system projects for manufacturing applications

Research Assistant (9/87-12/89)
Department of Electrical Engineering
The University of Saskatchewan at Saskatoon, Canada

- VAX System Manager(9/88-12/89)
- Taught and graded undergraduate control and electronics courses.
- Supervised undergraduate labs

Project Engineer (7/86-8/87)
Engineers India Limited, New Delhi India

- Worked in automating the power plant by supervisory control.
- Developed various software for; operator communication, equipment health monitoring, plant performance, transformer tap change control, load sharing
- Load shedding
- Examined software for communication protocols for Local Area Networks
- Worked on PLC design and implementation
- Implemented supervisory control of gas pipe lines using VAX 11/780 through Satellite communication.
- Developed software for SCADA

Programming Languages **:** FORTRAN V and 77, Basic, Pascal, C, C++ VAL Language for controlling robots
Programming Languages Developed : EXPA-Natural language
Computer Experience **:** VAX 11/750, UNIX, DOS
Software Experience **:** Software for CRS plus, Excalibur Robot, PUMA Robot, ASEA Robot, Image processing software, Micro logic for simulation of digital circuits, Auto Cad, Lotus 123, Scribe, Telegraph, Ms Word.

ACTIVITIES:

- Member of Institution of Engineers, India (82-86)
- Member of IEEE Institution of Engineers Inc., USA (88-Present)
- Sr. Member (99-present)
- Honorary member of Eta Kappa Nu(93-Present)
- Honorary member of Tau Beta Pi (93-Present)
- Inducted as a Member into International Scientific Research Society Sigma Xi (94-Present)
- SAE Member (96-present)

Other Professional Activities:

- **Program Chairman** for IEEE Illinois Valley Section (94-95)
- **Branch Counselor**, IEEE Student Branch of Univ of Missouri Rolla and Missouri S&T (03-10)
- Secretary Institution of Engineers (86)
- **Chaired sessions**, IEEE International Conference on Intelligent Control (95,96,01, 04)
- Reviewer for IEEE Trans. on Neural Networks (93-Present)
- Reviewer for IEEE Trans. on Automatic Control (93-Present)
- Reviewer for Journal of Intelligent Robotic Systems (93-Present)
- Reviewer for IEEE Control Systems Magazine (92-Present)
- **Chaired sessions** in American Control Conference (94-Present)
- Reviewer for American Control Conference (93-Present)

- Reviewer for IEEE Conference on Decision and Control (92-Present)
- Reviewer for IEEE Conference on Robotics and Automation(93-Present)
- Reviewer for IEEE Mediterranean Symposium on Control Directions (94-Present)
- **Program Committee**, Mediterranean Symposium on Control Directions (00, 04)
- Reviewer for IEEE Symposium on Intelligent Control (93-Present)
- Reviewer for IEEE Conference on Fuzzy Systems (96-Present)
- **Program Committee** for IEEE Symposium on Intelligent Control (96, 99, 01, 03,05)
- **Chaired sessions** in Conference in Decision and Control (1997-till date)
- Reviewer for IEE Transactions and Proceedings (1995-Present)
- Reviewer for ASME Transactions on Measurements, Dynamics and Control (94-present)
- Reviewer for IEEE Transactions on Robotics and Automation (95-Present)
- Reviewer for IEEE Transactions on Information Technology in Biomedicince (99-Present)
- Reviewer for International Journal of Adaptive and Signal Processing
- Reviewer for Automatica (95-Todate)
- Reviewer, IEEE Transactions on Networking (99-Todate)
- Reviewer, Neurocomputing (04-)
- **Finance Chair**, 2004 IEEE Symposium on Intelligent Control
- **Program Committee,** 2004 IEEE Conference on Cybernetics and Intelligent Systems (http://cis-ram.nus.edu.sg/)
- **Program Committee,** 2004 International Conference on Intelligent Knowledge Systems (IKS), Turkey (http://www.ikss.org/iks-2004.htm)
- **Steering Committee,** 2005 International Congress for Global Science and Technology
- **Publicity Chair,** 2006 International Conference on Networking, Sensing and Control
- **Invited Sessions Chair,** 2006 International Symposium on Intelligent Control
- **Program Chair,** 2007 International Symposium on Intelligent Control as part of first multi conference on systems and control, Singapore
- **Publicity Chair,** 2007 International Symposium on Adaptive Dynamic Programming
- **International Technical Program Committee,** 2008, 2009 International Conference of Wireless Communication and Networking (IEEE WCNC)
- **Program Committee,** 2008 IEEE International Joint Conference on Neural Networks
- **Program Committee,** 2009 International Conference on Systems of Systems Engineering (SoSE)
- **Program Committee,** 2009,2010 IEEE Globecom
- **Program Committee**, 2009 IEEE ADPRL
- **Invited Session Chair,** 2009 IEEE Mediterranean Symposium on Controls and Automation
- **Program Committee,** 2009, 2010 IEEE IJCNN, July 20-23, Barcelona, Spain
- **Program Committee,** 2010 8th International Conference on Controls and Automation (IEEE ICCA), June 9-11th, Xiamen, China
- **Program Committee,** 2010 IEEE Wireless Communications and Networking Conference, April 18-22nd, Sydney, Australia
- **Program Committee,** 2010 7th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2010), 15-18th June, Portugal
- **Program Committee,** 2010 Knowledge-based Intelligent Information and Engineered Systems (KES), Sept. 8-10th, Cardiff UK
- **Program Committee,** 2009, 2010 IEEE SenseApp, Oct 11th-14th, Denver, CO
- **Program Committee,** 2011 3rd International Symposium on Computational

Intelligence and Data Mining, Paris (CIDM), April 11-25, 2011.

- **Program Chair, CCA part of** 2011 IEEE Multi-Conference on Systems and Control, Sept 28-30th, Denver CO
- **Program Chair,** 2011 IEEE ADPRL, April 11-15, Paris, France
- **Member of the International Technical Program Committee,** IEEE International Joint Conference on Neural Networks, (IJCNN), July 29-August 5, 2011, San Jose, CA.
- **Member of the International Technical Program Committee,** 8th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2011), 15-18th June, 2011, Portugal.
- **International Program Committee,** 2011 IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob 2011) Shanghai China, October 10-12.
- **Technical Program Committee,** 2012 IEEE International Conference on Communications (ICC)
- **International Program Committee,** 2012 IEEE Conference on Control Applications
- **Registration Chair,** 2012 IEEE Conference on Decision and Control, Orlando, Dec 2012.
- **Program Co-Chair,** 2013 IEEE ADPRL, April 15-19, Singapore
- **Vice Chair, Technical Committee on Adaptive Dynamic Programming and Reinforcement Learning, IEEE CIS (2013-**
- **Sponsors and Exhibits Chair,** 2013 IEEE Conference on Neural Networks, Dallas, Texas
- **International Program Committee Member,** 2013 IASTED International Conference on Control and Applications (CA 2013) August 2013**.**
- **International Program Committee Member**, 2013 Informatics in Control, Automation and Robotics ICINCO
- **International Program Committee Member**, 2013 10th IEEE International Conference on Control & Automation (ICCA)
- **International Program Committee Member,** 2013 IEEE ICC 2013 Wireless Communications Symposium
- **International Advisory Committee,** 2014 ACODS

Other Academic Activities:

- Search Committee Chair, ECE Department Chair (2012-
- Member, ECE representative of the Budget Affairs Committee (2009-)
- Member, Electronics Faculty Position Recruitment Committee (2012)
- Member, Public Occasions (2011-
- Controls Area Coordinator (2011-
- Member, Dept Executive Committee (2011-
- Member, Campus Professional Degree Selection Committee (2010-)
- Promotion and Tenure Evaluation Faculty member, Engineering Management and Systems Engineering (2010)
- Dept. P&T Chair (2010-)
- Member, University Wide Tenure Committee (2009)
- Faculty Service Awards Committee (2009)
- ECE Representative, Promotion and Tenure Policy Committee (2008-10)
- Chair, Control Systems Search Committee (2007-08)
- ECE representative, Campus Tenure Committee (07-08)
- Member, Compliance Committee(07-
- Member, UM Patent Committee (06-
- Member, Faculty Recruitment Committee Power (2006)

- Member, Academic Freedom Committee(05-09)
- Member, Communications Faculty Recruitment Committee (2005)
- Member, School of Engineering Honors Committee (03-06)
- Member, School of Engineering Awards Committee (02-05)
- Member, Dept Graduate Curriculum Committee (06-
- Member, Dept. Laboratory Committee (02-05)
- Member, Library Committee (04-05)
- Advisor, IEEE Student Branch (03-10)
- Member, Graduate Faculty Council
- University of Texas Honors Program Committee
- University of Texas Graduate Studies Committee
- UTSA Library Committee.
- UTSA EE Faculty Committee.
- UTSA College of Engineering Implementation Committee.
- Member, Academic Policy and Curricula Committee
- Member, Committee for Several Graduate Students

Administrative Experience

1. Currently managing NSF I/UCRC Center with 8 companies, several faculty members and part of 60+ company members over three campuses.
2. Established Embedded Systems and Networking Laboratory at the University of Missouri-Rolla.
3. Worked with other faculty on the Bioengineering Ph.D. Proposal for EE Department at UTSA and University Health Science Center. It is approved in 2001.
4. Assisted the Dean to develop Electrical Engineering Ph.D. Proposal at University of Texas at San Antonio.
5. Director & Consultant, Systems and Controls Research, Caterpillar, Inc from 1996-1998, where I supervised a total of 15 engineers with budgets planned every year. My responsibilities included hiring and guiding people.
6. Established Intelligent Systems Laboratory, funded by several agencies, at Univ. of Texas at San Antonio. Several faculty members later joined the laboratory.

Keynote Talks

1. "Optimal adaptive control of uncertain continuous-time systems", in 2013 Chinese Conference on Decision and Control, Guiyang, China, May 25th, 2013.
2. Delivered keynote on "Cyber-Physical Systems", in NETCOM, Chennai, Dec 23rd, 2012
3. Delivered a talk in 2007 Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), Dec 2007, Melbourne
4. Delivered a keynote talk at "Neural Network Control", ANNIE 2009.

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1. Nurbanu Akylidz, Hao Xu, and S. Jagannathan, "Localization of near field radio controlled unintended emitting sources in the presence of multipath fading", IEEE Transactions on Instrumentation and Measurement, accepted for publication, February 2013.

2. Qiming Zhao, Hao Xu, and S. Jagannathan, "Neural network-based finite-horizon optimal control of uncertain affine nonlinear discrete-time systems", IEEE Transactions on Neural Networks and Learning Systems, accepted for publication with minor revision, February 2014.

3. Qiming Zhao, Hao Xu, and S. Jagannathan, "Optimal control of uncertain quantized linear discrete-time systems", International Journal of Adaptive Control and Signal Processing, accepted for publication, January 2014.

4. W. Meng, Q.Yang, S. Jagannathan, "Adaptive neural control of high-order uncertain nonaffine systems: A transformation to affine systems approach", Automatica, Accepted, January 2014.

5. Hao Xu and S. Jagannathan, "Neural network based finite horizon stochastic optimal control design for nonlinear networked control systems", IEEE Transaction on Neural Networks and Learning Systems, accepted with minor revision, December 2013.

6. Qiming Zhao, Hao Xu, and S. Jagannathan, "Reinforcement neural network learning-based near optimal output feedback control", Acta Automatica Sinica, accepted for publication, January 2014. (invited paper).

7. Qiming Zhao, Hao Xu, and S. Jagannathan, "Fixed final time optimal adaptive control of linear discrete-time systems in input-output form", Journal of Artificial Intelligence and Soft Computing Research, accepted for publication, Sept 2013. (invited paper).

8. H. Ferdowsi, S. Jagannathan, and M. Zawodniok, "An online outlier identification and removal scheme for improving fault detection performance", IEEE Transactions on Neural Networks and Learning Systems, Accepted for publication, Sept. 2013.

9. Balaje Thumati, Miles Fienstein and S. Jagannathan, "A model based fault prognostics scheme for Takagi-Sugeno systems", IEEE Transactions on Fuzzy Systems, Accepted for publication, June 2013.

10. Hao Xu, S. Jagannathan, and F.L. Lewis, "Stochastic optimal output feedback design for unknown linear discrete-time system zero-sum games under communication constraints", Asian Journal of Control, accepted for publication, May 2013. (invited paper).

11. Balaje Thumati and S. Jagannathan, "A model based fault prognostics scheme for uncertain nonlinear discrete-time systems with multiple distinct faults", Transactions of the Institute of Measurement and Control, UK, doi: 10.1177/0142331213494992, October 2013.

12. Hassan Zargarzadeh, Travis Dierks and S. Jagannathan, "Adaptive neural network based optimal control of nonlinear continuous-time systems in strict feedback form", International Journal of Adaptive Control and Signal Processing, doi: 10.1002/acs.2432, Sept 2013.

13. R. Basheer and S. Jagannathan, "Localization and tracking of objects using cross-correlation of shadow fading noise", IEEE Transactions on Mobile Computing, accepted for publication, January 2013.

14. David Nodland, H. Zargarzadeh, A. Ghosh, and S. Jagannathan, "Neuro-optimal control of an unmanned helicopter", Journal of Defense Modeling and Simulation, in Guest editorial by Greg Hudas, D. Mikulski, and F. Lewis, vol. 11, no. 1, pp.5-18, January 2014.

15. V. Thotla, M. Ghasr, M. Zawodniok and S. Jagannathan, "Detection of super-regenerative receivers

using Hurst parameter", IEEE Transactions on Instrumentation and Measurement, vol. 62, no. 11, pp. 3006-3014, March 2013.

16. S. Mehraeen, T. Dierks, S. Jagannathan, and Mariesa Crow, "Zero-sum two-player game theoretic formulation of affine nonlinear discrete-time systems using neural networks", IEEE Transactions on Systems, Man and Cybernetics, vol. 43, no. 6, pp. 1641-1655, 2013.

17. H. Ferdowsi and S. Jagannathan, "A unified model-based fault diagnosis scheme for nonlinear discrete-time systems with additive and multiplicative faults", Transactions of the Institute of Measurement and Control, pp. 452-462, vol. 35, no. 6, August 2013.

18. T. Dierks, B. Brenner and S. Jagannathan, "Neural network-based optimal control of mobile robot formation with reduced information exchange", IEEE Transactions on Control Systems Technology, vol. 21, no. 4, 1407-1415, July 2013.

19. J. Hertenstein and S. Jagannathan, "Simulation and detection of unintended electromagnetic emissions from super-regenerative receivers", IEEE Transactions on Instrumentation and Measurement, vol. 62, no. 7, pp. 2093-2100, July 2013.

20. M. Ghasr, Vivek Thotla, M. Zawodniok and J. Sarangapani, "Detection of super regenerative receiver using amplitude modulated stimulation", IEEE Transactions on Instrumentation and Measurement, vol. 62, no. 7, pp. 2029-2036, July 2013.

21. David Nodland, Hassan Zargarzadeh and S. Jagannathan, "Neural network-based optimal adaptive output feedback control of a helicopter UAV", IEEE Transactions on Neural Networks and Learning Systems, vol. 24, no. 7, pp. 1061-1073, July 2013.

22. R. Basheer and S. Jagannathan, "Localization of RFID tags using stochastic tunneling", IEEE Transactions on Mobile Computing, Vo. 12, no. 6, pp. 1225-1235, June 2013.

23. B. T. Thumati, G. Halligan and S. Jagannathan, "A novel fault diagnostics and prognostics scheme using a nonlinear observer with artificial immune system as an online approximator", IEEE Transactions on Control Systems Technology, vol. 21, no. 3, pp. 569-578, May 2013.

24. Hao Xu and S. Jagannathan, "Stochastic optimal controller design for uncertain nonlinear networked control system via neuro dynamic programming", IEEE Transactions on Neural Networks and Learning Systems, , vol. 24, issue. 3, pp. 471-484, March 2013.

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26. Hao Xu and S. Jagannathan, "Optimal adaptive distributed power allocation for enhanced cognitive radio network in the presence of channel uncertainties", International Journal of Computer Networks and Communications, vol. 5, no. 1, pp. 1-20, January 2013.

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32. T. Dierks, B. Thumati, and S. Jagannathan, "An online model-based fault accommodation scheme for nonholonomic mobile robots in formation", Journal of Defense Modeling and Simulation, in Guest editorial by Greg Hudas, D. Mikulski, and F. Lewis, vol. 9, no. 1, pp.17-32, January 2012.

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Summary: 1.1 patents/year for the past 16 years

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INVENTION DISCLOSURES

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3) S. Jagannathan, N. Regatte, and M. Zawodniok, “Adaptive and Distributed Fair Scheduling Schemes for Wireless Sensor Networks”, Invention Disclosure, May 2006.

4) S. Jagannathan and J. Drallmeier, “Neural Network Control of Spark Ignition Engines Operating Lean”, Invention Disclosure, May 2006.

5) S. Jagannathan and J. Drallmeier, “Neural Network Control of Spark Ignition Engines with High EGR Levels”, Invention Disclosure, May 2006.

6)S. Jagannathan, “Adaptive HE Implement Control”, Invention Disclosure, November 1998.

7) S. Jagannathan, “On-line HE Learning Control”, Invention Disclosure, November 1998.

8) S. Jagannathan, “A Method to Predict Confidence”, Invention Disclosure, December 1998.

9) S. Jagannathan, F. Lombardi, and C. Ramamoorthy, “A System and Method to Control ON/OFF Valves and Associated Implement Circuits”, Invention Disclosure, January 1999.

Past Graduate Students

Doctoral Students

1. Pingan He*, "Neural network control of a class of discrete-time nonlinear systems with application to engine emission control", December 2004. (GM Power Train, Michigan)
2. Maciej Zawodniok, "Power sensitive algorithms and protocols for wireless ad hoc and sensor networks", December 2005. (Assistant Professor, Dept. of Computer Engg, Missouri University of Science and Technology, Rolla, USA)
3. Jianjun Guo, "Decentralized control and placement of multiple FACTS devices", co-advisor, September 2006. (Los Angeles)
4. Eyad Taqeiddin, "Trust level energy efficient routing protocols for wireless ad hoc networks", May 2007, co-advisor, (Assistant Professor, Department of Computer Science and Information Technology, Jordon University of Science and Technology).
5. Qinmin Yang, "Advanced control design of nonlinear dynamical systems using neural networks", August 2007. (University of Connecticut and Zhejiang University, China)
6. J. Vance, "Neural network control of nonstrict feedback and nonaffine nonlinear discrete-time systems with application to engine control", Sept. 2007. (Advanced Computing and Information Technology Group, Boeing, Advanced Technologist)
7. James W. Fonda, "Energy efficient wireless sensor network protocols for monitoring and prognostics of large scale systems", January 2008. (Advanced Computing and Information Technology Group, Boeing as an Advanced Technologist).
8. Travis Dierks, "Formation control of mobile robots and UAVs", August 2009. (DRS Technologies, St. Louis)
9. Carl Larsen, "Quality of service provisioning through resource allocation and data aggregation in wireless sensor networks", August 2009. (Patent Examiner, United States Patents and Trademarks Office)
10. Shahab Mehraeen, "Decentralized adaptive neural network control of nonlinear dynamic systems with application to power systems", Nov. 2009. (Assistant Professor, Louisiana State University, Baton Rouge; NSF Career Awardee)
11. Balaje Thumati, "Incipient fault prognostics and accommodation for nonlinear discrete-time systems", Nov 2009. (Boeing, Seattle)
12. Ahmet Soylemezoglu, "Sensor-based decision making", Mar. 2010. USACE ERDC-CERL (United States Army Corps of Engineers - Engineer Research and Development Center - Construction Engineering Research Laboratory, Urbana Champaign, IL).
13. Behdis Eslamnour, "Adaptive resource allocation for cognitive wireless ad hoc and hybrid networks", October 2010. (Faculty in Iran)
14. Rana Basheer, "Real-time localization system by using received signal strength indicator", April. 2012. (Broadcom, Irvine, CA).
15. Hao Xu, "Stochastic controller and communication protocol design for the networked control system", May 2012. (Assistant Professor, University of Tennessee at Martin).
16. Hassan Zargarzadeh, "Optimal adaptive control of a class of nonlinear continuous and discrete-time systems", August 2012 (Assistant Professor/Instructor, Southern Illinois University, Carbondale).
17. Hasan Ferdowsi, "Model based diagnosis and prognosis of nonlinear systems", October 2013. (Postdoc Missouri S&T)
18. Qiming Zhao, "Finite horizon optimal control of a class of linear and nonlinear systems", October 2013.

Additional Advisor/Committee Member for Doctoral Students:

1. Wenxin Liu, "Power system stabilizing control using neural networks", May 2005. Additional advisor (Assistant Professor, New Mexico State University, Las Cruses)

Master Students

1. J. Talluri, "Adaptive traffic management in ATM Networks", Dec 2000. (Software company Austin)
2. A. Tohmaz, "Adaptive bandwidth estimation and control in ATM Networks", May 2001. (Beckwith Electronic Engineering Company, San Antonio)

3. G. Galan, “Neural network control of a class of nonlinear systems”, August 2001. (Software Engineer Lead in San Antonio)
4. A. Levesque, “Neural Network-based robot control”, August 2001. Grubber Engineering San Antonio, Texas.
5. Satish Ponipireddy, “Distributed power control of wireless networks”, August 2002. (co-advisor) (SBC Communications)
6. M. Peng, “End to end congestion control of the INTERNET”, December 2002. co-advisor (working as a software engineer, California)
7. S. Dontula, “Power sensitive algorithms and protocols for wireless cellular and adhoc networks”, May 2003. (Software Engineer, Florida)
8. M. Hameed, “Adaptive force balancing control of MEMS gyroscope”, May 2003. (Student State University of New York, Bio Engineering using MEMS sensors)
9. N. Regatte, “Distributed fair scheduling for wireless ad hoc and sensor networks”, May 2004. (Design Engineer)
10. V. Janardhan, “Control of a class of nonlinear systems”, Sept. 2005. (Embedded Systems Engineer, Peoria, IL)
11. Jonathan Vance, “Embedded networked system controller for spark ignition control”, November 2005. (Boeing St. Louis)
12. Sibala Ratnaraj, “Self organizing and optimal energy subnet routing protocol for wireless networks”, December 2005. (Boeing, CA)
13. Kainan Cha, “Adaptive and probabilistic power control schemes for RFID networks”, April 2006. (Garmin, Kansas City)
14. Tim Landstra, “Hybrid key management and secure routing protocols for wireless sensor networks”, May 2006. (Sandia National Labs)
15. Anil Ramachandran, “Improving accuracy in RTLS Systems”, November 2006. (Sprint, Kansas City and now at Emerson, St. Louis)
16. Peter Shih, “Reinforcement learning-based NN control of complex nonlinear discrete-time systems with application to engine control”, November 2006. (Software Engineer, Hugh Res. Lab)
17. Deepak Mohan, “Real-time grip length detection of rotary tools: A Mahalanobis Taguchi Strategy”, May 2007, Co-advisor. (Software Engineer at Intel; Now at Garmin, Kansas City)
18. Travis Dierks, “Nonlinear control of nonholonomic mobile robot formations”, June 2007. (Doctoral student at Missouri S&T and DRS Technologies, St. Louis)
19. Amit Shah, “Terahetrz data processing for standoff detection of improvised explosive devices”, August 2007. Co-advisor (Florida Engineer)
20. Phani Gajjala, “Energy efficient processor operation and vibration-based energy harvesting schemes for wireless sensor nodes”, August 2007. (Dallas Engineer)
21. Reghu Anguswamy, “Wireless sensor network-based prognostic schemes for pull-type tool”, May 2008. (Doctoral student at Virginia Tech in Dept of ECE)
22. Hindu Kothapalli, “Localization in wired and wireless networks”, May 2009. (Morgan & Chase, MD)
23. Gary Halligan, “Fault detection and prediction with application to rotating machinery”, Nov 2009. (Rockwell Collins, Iowa)
24. Priya Kasirajan, “Data aggregation”, Dec 2009 (with graduation May 2010). (Garmin International, Kansas City)
25. Jake Hertenstein, “Detection of unintended RF emission and explosive threats by using wireless sensor-based networks”, Jan 2010. (DRS Technologies, St. Louis)
26. Bryan Brenner, “Embedded implementation of mobile robot formation control”, August 2010.
27. David Nodland, “Neuro-optimal control of unmanned air vehicle”, Oct 2011 (Caterpillar, Peoria, IL).
28. Deepthi Raja, “Decentralized diagnostics and prognostics of discrete-time systems”, May 2012.
29. R. Kraleti, “Diagnostics and prognostics of a class of industrial systems”, May 2012. (Co-advisor)

Current Graduate Students (All Ph.D.) (expected)

1. Avimanyu Sahoo, “Event-triggered neural network control of a class of linear and nonlinear systems”, August 2014.
2. Nurbanu Akyuz, “Localization and tracking of unintended emitting devices”, December 2014.

3. Haci Guzey, “Formation control of unmanned aerial vehicles”, May 2015.
4. Haifeng Niu, “RFID-based passive networks”, December 2015.
5. Jia Cai, “Fault detection and isolation in distributed parameter systems”, May 2016.
6. Behzad Talaei, “Adaptive optimal control of PDE systems”, May 2016.

Current M.S: None

Undergraduate Students:

1. Van Hai Bui, “Neural network control of spark ignition engines with high levels of EGR”, (Summer 03, Fall 04, Spring 04). Supported by NSF 0327877 grant.
2. Robert Stewart, “Spark ignition engine modeling with high EGR”, Summer 03. NSF #0327877.
3. Jamie McChesney, “Autonomous navigation of a mobile base with an onboard arm for MARS greenhouse operation (Fall 00, Spring 01) Supported by NASA/TSGC grant.
4. Juan Portillo, “Obstacle avoidance of a mobile base with an onboard arm”, (Fall 00, Spring 01). Supported by NASA/TSGC.
5. Adam Wolf, “Interfacing the real world-robots and sensors”, Spring 2001. Supported by Office of Naval Research through ONR Scholar’s program.
6. Cynthia Green, “Force controller”, Spring 2001. ONR Scholars program

External Examiner to Doctoral Students from Other Institutions:

1. Haung Houglin, “Constrained Control of Robotic Mechanisms”, Ph.D. Dissertation, National University of Singapore, 2004.
2. Alma Yolanda Alanis Garcia, “Control of Nonlinear Discrete-time Systems with Application to Induction Motor”, CINVESTAV, Guadalajara, Mexico, Sept. 2007.
3. Several from IITs in India

External Examiner for Tenure Decisions: Several from Singapore, USA and from India