

Jagannathan (Jag) Sarangapani, Ph.D.

University of Missouri Curators' Distinguished Professor
Rutledge-Emerson Endowed Chair of Electrical Engineering
Professor of Department of Computer Science (courtesy appointment)
Professor of Engineering Management and Systems Engg (courtesy appointment)
Director, Embedded Control Systems and Networking Laboratory
Missouri University of Science and Technology
222 Emerson Electric Co. Hall • 301 West 16th Street • Rolla, MO 65409-0040
Tel: (573) 341-6775; Fax: (573) 341-4532. Email: sarangap@mst.edu; <https://ece.mst.edu/people/faculty-directory/jagannathan-sarangapani/>
https://scholar.google.com/citations?hl=en&user=RTewL_wAAAAJ

AREAS OF INTEREST: Learning, Adaptation and Neural Network Control, Robotics/Autonomous Systems, Secure Cyber-physical Systems, Diagnostics & Prognostics

EDUCATION: **Doctor of Philosophy in Electrical Engineering (1/92-8/94)**

Automation and Robotics Research Institute, University of Texas

Specialization: Learning and Adaptation, Neural Network Control

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)

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)

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)

PROFESSIONAL EXPERIENCE:

Curators' Distinguished Professor (2023-present)

Rutledge Emerson Endowed Chair (2008-present)

Tenured Full Professor (2005-present)

Interim Director, Intelligent Systems Center (February-July 2021)

- Overseen 55 campus science and engineering faculty's research
- Allocation of space needs for the center faculty for research
- Drafted the vision of the Center for research
- Reports to the Associate Vice Chancellor for Research

Associate Chair of Graduate Studies (June 2014-August 2016)

- Grew the graduate program multifold
- Applications increased ten-fold (1800 applications)
- Admitted 600 and advised 200 students every semester

Site Director NSF I/UCRC on Intelligent Maintenance Systems (2005-2017)

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 (12/98-01)

(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 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.

AWARDS/HONORS:

- Senior Editor, IEEE Transactions on Neural Networks and Learning Systems
- Elevated to Curators' Distinguished Professor (less than 10% of the faculty)
- Included as one of the World's top 2% scientist list (2019-present)
<https://elsevier.digitalcommonsdata.com/datasets/btchxktyw/3>
- Fellow, Asia-Pacific Artificial Intelligence Association (2021, Invited)
- The University of Missouri Presidential Award for Excellence (teaching, research, and service): Sustained Career (2021) (2 out of over 2000 faculty in four University campuses)
- Best Associate Editor, IEEE Trans of SMC-Systems (2020)
- Fellow, National Academy of Inventors (2018) (International)
- IEEE Control System Society's Transition to Practice Award (Only one per year - 2018)
- Fellow, IEEE, USA (2016) (only *one-10th of 1 percent of the* total IEEE voting membership is awarded)
- Fellow, Institute of Engineering Technology, UK (2015)
- Fellow, Institute of Measurement and Control, UK (2014)
- University of Missouri Leadership Development Program (2013-2014)

- Intelligent Systems Center (ISC) Distinguished Investigator Research Award (2012, 2017)
- Engineers Make a Difference Award in 2008 (local)
- 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 2006-2007, 2012-2013, 2013-2014
- Outstanding Teaching Award in 2014-2015, 2015-2016, 2017-2018
- Caterpillar Research Excellence Award (2001)
- The University of Texas Presidential Award for Research Excellence (2001)
- NSF CAREER Award (2000)
- UTSA Faculty Research Award (2000)
- Received “Patent Award” from Automation and Robotics Research Institute (Dec.96)
- 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) **Editorial Board**, Springer Journal on Intelligent Industrial Systems (2017-present)
- (b) **Series Co-Editor**, IET Control Series UK (2010-2013)
- (c) **Associate Editor**, UK Royal Institute Transactions on Measurement and Control (2010-2015)
- (d) **Associate Editor**, IEEE Transactions on Control Systems Technology (2004-2009)
- (e) **Associate Editor**, IEEE Transactions on Neural Networks (2005-2009) (2019-
- (f) **Associate Editor**, IEEE Journal on Systems Engineering (2007-2010)
- (g) **Editorial Board Member and Steering Committee**, International Journal of Automatic Control and Systems Engineering (ASCE)
- (h) **Chair and Member**, Technical Committee on Intelligent Control (2011-2015)
- (i) **Vice Chair**, CIS Tech Committee on Adaptive Dynamic Programming and RL (2013)
- (j) **Editor**, Discrete Dynamics in Nature and Society (2013-)
- (k) **Editorial board**, The Scientific World Journal now Complexity (2013-2015)
- (l) **Associate Editor**, IEEE Transactions on Systems, Man, and Cybernetics (2017-2021)
- (m) **Editorial Board**, Sensors Journal (2020-)

Mentoring Junior Faculty: Dr. Sarangapani has mentored several junior faculties resulting in several NSF Career and Young Investigator Awards for them. His former doctoral students won NSF Career Awards.

Research Grants: (September 98-Todate):

Total Funding from all sources (99-todate):

Total	\$31,942,529
My Share:	\$13,593,757

Summary: My shared credit expenditure **\$504,076K/year** for the past 25 years (99-todate).

No.	Title/Pis/Number	Agency	Years of
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			Support
112.	Human-Machine Teaming using Multiagent Reinforcement Learning for Construction Applications, PI	ARL/DAC	2024-2027
111.	Learning enabled Collaborative Autonomy for Networked CPS, Co-PI (subcontract from USC)	AFOSR	2024-2027
110.	Safe and Resilient Deep Learning based Optimal Adaptive Tracking with Adversaries	ONR	2024-2029
109.	Center for Durable and Resilient Infrastructure, Dr. Dr. Maria Konsta-Gdoutos, UT Arlington Lead, Theme Leader on Health Monitoring, Co-PI	DoT, Tier 1	2023-2027
108.	A Secure Heterogenous Testbed for Learning and Adaptation Research of Complex Networked Dynamical Systems, PI	ONR	2023-2024
107.	Leader-follower UAV Swarms using Deep Reinforcement Learning, PI	ARO	Sept 2022-Sept 2025
106.	Human Robot Swarm Integration (Co-PI; PI Dr. Zawodniok)	Army Research Lab	Sept 2022-March. 2025
105.	Deep-learning based Leader-Follower Robotic Swarms, PI	Army Research Office (ARO)	Sept. 2021-Sept. 2024
104.	Deep Neural Network Control of Complex Dynamic Systems, PI	Office of Naval Research (ONR)	April 2021-March 2026
103.	RFID In Plant Tracking and Part DNA	Honeywell	2020-2021
102.	A Doctoral Program in Big Data, Machine Learning, and Analytics for Security and Safety” (PI: Sanjay Madria, Co-PI: Sajal Das, Nadella)	Dept of Education Supplement	2020-2023
101.	MRI: Development of an Advanced Materials Additive Manufacturing (AM2) System for Research and Education, Co-PI, PI: Frank Liou, Co-PI: Joe Newkirk; Undergrad REU	NSF	2016-2021 (with no cost extension)
100.	Planning Grant: Engineering Research Center for Integrative Manufacturing and Remanufacturing Technologies (iMart) to Spur Rural Development (PI: Frank Liou, Co-PIs: A. Leuking, Carolyn Seepersad, Oscar Suarez)	NSF	2019-2024 (with no cost extension)
99.	RFID based Asset Tracking and Evolvable DNA	Honeywell	2019-2020
98.	RFID based Asset Tracking and	Honeywell	2019

	Evolvable DNA (Co-PI Tauritz)		
97.	A Doctoral Program in Big Data, Machine Learning, and Analytics for Security and Safety” (PI: Sanjay Madria, Co-PI: Sajal Das, Z. Yin, Yanjie Fu)	Dept of Education	2018-2023
96.	System theoretic principles and decentralized sensor network and control algorithms for dynamic data driven and situational awareness and response applications	AFOSR (Subcontract from USF) FA9550-17-1-0303	2017-2018
95.	MRI: Development of an Advanced Materials Additive Manufacturing (AM2) System for Research and Education, Co-PI, PI: Frank Liou, Co-PI: Joe Newkirk	NSF	2016-2021 (with no cost extension)
94.	Investigation of Advanced Concepts in Smart Factory Data Collection, Analysis & Communication for Manufacturing Processing Monitoring	Boeing	2016-2017
93.	IMS Center Membership I	Boeing	2016-2017
92.	IMS Center Membership	Boeing	2015-2016
91.	Eager/Cyber Manufacturing: Cyber-Enabled Additive Manufacturing of Advanced Materials (Co-PI; PI: Frank Liou)	NSF	2015-2017
90.	IMS Membership I and II (Co-PI; PI: Maciej Zawodniok)	TDA	2015-2016
89.	Investigation of Advance Concepts in Passive Tags with Sensors with Data Communication, Security and Prognosis Applications	Boeing	2015
88.	IMS Center Membership II	Boeing	2015-2016
87.	IMS Center Membership I	Boeing	2014-2015
86.	Event Triggered Control of Networked Control Systems by using Adaptive Dynamic Programming	NSF	2014-2019
85.	IMS Membership I and II (Co-PI; PI: Maciej Zawodniok)	Technical Data Analysis	2014-2015
84.	Investigation of Advance Concepts in Passive Tags with Sensors and Data Communication and Prognosis Applications	Boeing	2014
83.	IMS Boeing Memberships II	Boeing	2014
82.	IMS Membership, CO-PI	TDA	2013-2014
81.	IMS Membership	Boeing	2013-2014
80.	Investigation of Passive Tags with Sensors and Prognosis of Structural Health	Boeing IMS second membership	2013
79.	IMS Membership	TDA/Navair	2012-2013
78.	“A Doctoral Program in Security and Privacy in Mobile Social	Dept of Education	2012-2016

	Network Space”, Co-PI (PI: Madria) with Zhaozheng Yin, Dan Lin and Sriram Chellappan		
77.	I/UCRC: Collaborative Research on Coupled Models for Prognostics and Health Management, PI	NSF	2012-2014
76.	MRI: Development of an Open-source Dual Probe Atomic Force Microscope, Co-PI, PI: Doug Bristow	NSF	2012-2015
75.	DURIP: A Heterogeneous Secure Networking Test-Bed to Counter Explosives, Co-PI (PI: Sriram Chellappan)	ARO	2012-2013
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 Diagnosis and prognosis of Plant Machinery: IMS second membership	Boeing	2012-2013
73.	NSF I/UCRC Membership	Boeing	2012-2013
72.	NSF I/UCRC memberships	Boeing, Kalscott	2011-2012
71.	Collaborative: Design of Accelerated Prognostics and Health Management, Co-PI	NSF	2011-2013
70.	Industry/University Cooperative Research Center for Intelligent Maintenance Systems: Five Year Renewal Phase II, PI	NSF	2011-2017
69.	Agile Systems Engineering: Experiential and Active Learning Approach—Co-PI; PI: Dagli, Co-PI-Chandrasekhara, Corns, Gaurdiola, Sarangapani, Zawodniok, Chellappan	DoD-SERC from Stevens Institute	2011-2012
68.	Adaptive dynamic programming based control of networked control system	NSF	2011-2016
67.	Digital Part Marking and Container Health Monitoring	Boeing	2011
66.	NSF IMS Memberships—Boeing I & II, Kalscott and AVETEC	Various	2011-2012
65.	Secure Network Protocol	Boeing	2010-2011
64.	Unintended Emission Detection and Identification, PI	Army Research Laboratory	2010-2014
63.	Human-the-loop with Detectors and Embedded Mobile Sensor Fusion Center for Detection, PI; Co-PI: Jeff Dalton of AVETEC	Army Research Laboratory	2010-2014
62.	Localization and Tracking of	Army	2010-2014

	Explosive Threats using Multi-modal Sensors, PI;	Research Laboratory	
61.	System Integration, PI; Co-PI Levent Acar	Army Research Laboratory	2010-2014
60.	Cognitive Network and Protocols using Missouri S&T Mote, Co-PI; PI Maciej Zawodniok	Army Research Laboratory	2010-2014
59.	Design of Hardware Platform for Multimodal Sensor Detection, Co-PI; PI-Maciej Zawodniok	Army Research Laboratory	2010-2014
58.	Malicious Device Identification Through Statistical Pattern Modeling, Co-PI; PI-Ivan Guardiola	Leonard Wood Institute/Army Research Laboratory	2010-2011
57.	NSF REU Supplement for Smart Engines, PI	NSF	2010-2011
56.	A Systematic Methodology for Data Validation and Verification for Prognostics Applications, Co-PI, PI:Zawodniok	NSF	2010-2012
55.	Agile Systems Engineering: Experiential and Active Learning Approach, Co-PI; PI: Dagi, Co-PI-Chandrasekhara, Corns, Guardiola, Sarangapani	DoD/SERC (subcontract from Stevens Institute of Technology)	2010-2011
54.	Fault Detection, Isolation, Energy Monitoring and Prognostics	Boeing	2010
53.	IMS Membership	AVETEC	2010-2011
52.	NSF REU Site Supplement	NSF	2010
51.	I/UCRC Memberships—Boeing I and II	Boeing	2009-2010
50.	Smart Engines: Fuel Flexible Engine Control using Adaptive Neural Network Critics, PI	NSF	2009-2012
49.	Condition-based Maintenance on Motors	Boeing	2009
48.	NSF I/UCRC Supplement—parameter based prognostics	NSF	2009-2010
47.	NSF I/UCRC on Intelligent Maintenance Systems Center Memberships	Caterpillar Chevron	2008-2009
46.	Networked Zeolite-Capacitive Sensors for Distributed and Ubiquitous Detection of Chemical/Biological Threats, Co-PI	Army Lab/LWI	2008-2009
45.	NSF I/UCRC Supplement: Bio immune system engineering	NSF	2008-2009
44.	NSF I/UCRC Memberships	Boeing and AVETEC	2008-2009
43.	Network Enabled Manufacturing: Power Utility Monitoring and	Boeing	2008

	Bearing Prognostics		
42.	NSF REU Site: Research and Training Experience for Undergraduates in the Area of Sensor Computing, Co-PI (PI: Madria) with Sriram Chellappan	NSF	2008-2012
41.	NSF I/UCRC on Intelligent Maintenance Systems Center Memberships	Boeing, Caterpillar, Chevron, Honeywell, 21 st Century Systems	2007-2008
40.	RFID Application to Virtual Enterprises	Boeing	2007-2008
39.	IED Localization using Spatial Diversity of Wireless Sensor Networks	Army Research Lab/LWI	2007-2008
38.	Wireless Head Set for Ramp Operations	Air Force Research Lab (AFRL)	2007-2008
37.	Secure and Adaptable Energy Efficient Sensor Networks for Infrastructure Monitoring, Co-PI	DOEducation Co-PI	2007-2010
36.	NSF I/UCRC Memberships	AvETEC, Boeing	2007
35.	Supply Chain Management	Boeing	2007
34.	Network Enabled Manufacturing	Boeing	2007
33.	Development and validation of advanced energy management control algorithms for short or long term storage, Co-PI	Sandia	2006-2007
32.	Chemical Management using RFID	Avchem/NSF	2006-2007
31.	RFID Hardware Integration	AFRL	2006-2008
30.	NSF I/UCRC Center Membership fees, PI	Caterpillar, Chevron, Boeing, Festo, Honeywell, 21 st Century Systems	2006-2007
29.	Robust adaptive critic NN controllers for nonlinear dynamic systems, PI	NSF	2006-2010
28.	NSF I/UCRC on Intelligent Maintenance Systems	NSF	2006-2011
27.	Hydraulic Pump Prognostics	Caterpillar	2006-2006
26.	Katrina SGER: Dynamic Programming based monitoring of structural health and communication infrastructure, PI (Co-PI Dr. Saygin)	NSF	2006-2007
25.	Caterpillar Electronics University Research Award: Network Management Protocol, Co-PI	Caterpillar	2006-2007

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
23.	Real-time Locating System Evaluation	Boeing	2006-2006
22.	NSF I/UCRC Center Membership fees, PI	Caterpillar, Chevron, Boeing, Festo, Honeywell, 21 st Century Systems	2005-2006
21.	Real-time Locating System Evaluation (Contract #1050990), PI	Boeing	2005-2005
20.	Planning Grant: NSF Industry University Cooperative Center, PI (EEC-0531580) (with Drs. Leu and Saygin)	NSF	2005-2006
19.	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	2005-2006
18.	Wireless Sensor Networks for In-quality process monitoring, PI	Air Force Research Laboratory	2005-2007
17.	Research Experiences for Undergraduate Students Supplement for ECS#0327877, PI (with Dr. Drallmeier as the Co-PI)	NSF	2004-2005
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
15.	Facts Device Interactions, Co-PI (with PI: Crow, Co-PI: McMillin, Liu)	Sandia Labs	2004-2005
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
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
12.	Adaptive neural architectures for emission control of engines (PI)	NSF	2003-2006

	(ECS#0327877) (with Dr. Drallmeier)		
11.	Adaptive traffic management schemes for the Internet	Research Board	2002-2003
10.	Research Experiences for Undergraduate Students Supplement	NSF	2002-2003
9.	Equipment donation (appx. value)	Motorola, Inc	2001
8.	CAREER: Sensor-based adaptive control of complex distributed systems (ECS#9985739, ECS#0296191)	NSF	2000-2005
7.	Equipment Supplement (with \$10K match) (ECS#0216191)	NSF	2000-2005
6.	Bioengineering Materials (Co-PI) (with Drs. Huang and Singh)	Subcontract from UT Austin (NSF)	2000-2001
5.	Develop. of an intelligent controller for a golf swing machine using MEMS Technologies (#26-57100-01)	Techathlon, Inc	2000-2001
4.	Microsensor-based autonomous robots for MARS Greenhouse operation (#26-4315-01)	TSGC/NASA	1999-2002
3.	Develop. of an intelligent controller for a golf swing machine using MEMS technologies	Techathlon, Inc	1999-2000
2.	Adaptive traffic rate control (#14-7519-01)	Faculty Research Award	2000
1.	Grant Development	Research and Development	1999 and 2000

Other Funded Projects (1994-1998):

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

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

Classes Taught:

Teaching at UMR/Missouri S&T

Semester	Course Information
Fall 2024	EE 5320 Neural Network Control and Applications EE 6370 Adaptive Control
Spring 2024	EE 6335 Discrete-time Neural Network Control
Fall 2023	EE 6320/MAE 6420 Nonlinear Control Systems
Spring 2023	EE 6310 Optimal Control & Estimation
Fall 2022	EE 5320 Neural Network Control and Applications EE 6350 Neural Network Ctrl of Nonlinear Continuous-time Systems
Spring 2022	Sabbatical
Fall 2021	EE 5320 Neural Network Control and Applications EE 6370 Adaptive Control
Spring 2021	EE 5325 Applied Nonlinear Control EE 6310 Optimal Control and Estimation
Fall 2020	EE 5320 Neural Network Control and Applications EE 6350 Neural Network Ctrl of Nonlinear Continuous-time Systems
Spring 2020	EE 6310 Optimal Control & Estimation
Fall 2019	EE 5320 Neural Network Control & Applications
Spring 2019	EE 6335 Discrete-time Neural Network Control
Fall 2018	EE 6320 Nonlinear Control Systems
Spring 2018	EE 6001 Special Topics: Discrete-time Control EE 6310 Optimal Control & Estimation
Fall 2017	EE 6350 Neural Network Control
Spring 2017	EE 6310 Optimal Control & Estimation
Fall 2016	Research Leave
Spring 2016	EE 5001 Applied Nonlinear Control EE 6310 Optimal Control & Estimation
Fall 2015	EE 5320 Neural Network Control and Applications EE 6001 Neural Network Control
Spring 2015	EE 6310 Optimal Control & Estimation
Fall 2014	EE 5320 Neural Network Control EE 6001 Neural Network Control
Spring 2014	EE 6310 Optimal Control & Estimation
Fall 2013	EE 401 Adaptive Control
Spring 2013	EE 6320 Nonlinear Control Systems
Fall 2012	EE 401 Special Topics Adaptive Control
Spring 2012	EE 6310 Optimal Control & Estimation EE 433 Special Topics: Neural Network Control
Fall 2011	EE 433 Current Topics in Control Theory
Spring 2011	EE 434 Nonlinear Control Systems
Spring 2010	EE 432 Optimal Control & Estimation
Fall 2009	EE 337 Neural Networks for Control
Spring 2009	EE 432 Optimal Control & Estimation EE 434 Nonlinear Control Systems
Fall 2008	CpE 448 High Speed Networks
Spring 2008	EE 433 Current Topics in Control Theory
Fall 2007	EE 433 Current Topics in Control Theory
Spring 2007	EE 434 Nonlinear Control Systems
Fall 2006	CpE High Speed Networks
Spring 2006	EE 433 Current Topics in Control Theory
Fall 2005	CpE 448 High Speed Networks
Spring 2005	EE 331 Digital Control EE 434 Nonlinear Control Systems
Fall 2004	CpE High Speed Networks Course Buyout
Spring 2004	EE 231 Control Systems

	EE 433 Current Topics in Control: Adaptive Control
Fall 2003	CpE 401 High Speed Networks Course Buyout
Spring 2003	EE 301 MEMS
Fall 2002	EE 337 Neural Networks for Control CpE 401 High Speed Networks Sec B CpE 401 High Speed Networks Sec A
Spring 2002	EE 434 Nonlinear Control Systems
Fall 2001	EE 231 Control Systems

Teaching at Univ of Texas at San Antonio (UTSA)

<u>Semester</u>	<u>Course Information</u>	<u>No. of Students</u>
Spring 2001	EE 4723 Intelligent Robotics	22
	EE 3413 Analysis & Design of Control	30
Spring 2000	EE 3413 Analysis & Design of Control	27
	EE/CS 5343 Intelligent Robotics	21
Fall 2000	EE 5463 Artificial Neural Networks	7
	EE 3413 Analysis & Design of Control	26
Spring 1999	EE 4443 Discrete-time Control	12
	EE 3413 Analysis & Design of Control	27
Fall 1999	EE 5143 Linear Systems and Control	10
	EE 4723 Intelligent Robotics	26

Teaching AT UTSA

Summer 1999

EE 2323 Engineering Analysis

Summer 2001

EE 3523 Electromechanical systems

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

Memberships:

- Member of Institution of Engineers, India (82-86)
- Member of IEEE Institution of Engineers Inc., USA (88-Present)
- Sr. Member (99-2015)
- 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 (96-99)

Administrative Experience

1. Managed Intelligent Systems Center-faculty over 55 across campus involved in the multidisciplinary center on Campus.
2. Managed NSF I/UCRC Center with several companies, faculty members and part of 60+ company members over four universities.
3. As an Associate chair for graduate studies, grown the graduate program in Electrical and Computer Engineering dept by 400% with applications increasing by several fold.
4. Established Embedded Systems and Networking Laboratory at the University of Missouri-Rolla.
5. 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.
6. Assisted the Dean to develop Electrical Engineering Ph.D. Proposal at University of Texas at San Antonio.
7. 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.
8. Established Intelligent Systems Laboratory, funded by several agencies, at Univ. of Texas at San

Antonio. Several faculty members later joined the laboratory.

Keynote/Plenary Talks

1. **Plenary**, “Lifelong Machine learning/AI for Robotics/Autonomous Systems”, Recent Innovations in Production Engineering (RIPE 2024), Anna University, Chennai, India, May 30-31st, 2024.
2. **Plenary**, “Machine Learning/AI in 6G networks”, Mobile Radio Communications & 5G Networks (MRCN 2024), August 25th-26th, 2024, Kurukshetra, Haryana, India.
3. **Keynote**, “Lifelong learning of Robotics/Autonomous Systems”, International Advanced Computing Conference (IACC), Pune, India December 15-16th, 2023.
4. **Keynote**, “Artificial Intelligence: Good, bad and the ugly for 6G networks”, Mobile Radio Communications & 5G Networks (MRCN 2023), August 25th-26th, 2023, Kurukshetra, Haryana, India.
5. **Keynote**, “Lifelong Online Learning in Feedback Control of Robotics/Autonomous Systems”, 2023 International Workshop on Industrial Internet of Things and Smart Manufacturing, June 17-18, 2023 in Ezhou, China.
6. **Keynote**, “Direct Error Driven Deep Learning for Bigdata Classification”, 2023 International Conference on Electrical, Electronics, Communications and Information System, Feb 23-24th, 2023, Singapore.
7. **Keynote**, “Direct Error Driven Deep Learning for Bigdata Analytics”, 2nd International Conference on Advanced Network Technologies and Intelligent Computing (ANTIC-2022), Banaras Hindu University, Varanasi, India, 22nd -24th December, 2022. <https://www.antic.co.in>
8. **Keynote**, “Lifelong Online Learning in Feedback Control of Autonomous/Robotics Systems”, International Conference on Emerging Electronics and Automation, NIT Silchar, India, 16th-18th December, 2022. E2a2022.nits.ac.in
9. **Keynote**, “A Cross-layer Network Protocol and Optimal Control Design for Cyber-Physical Systems”, 3rd International Conference on Mobile Radio Communications and 5G networks (MRCN2022), August 5-6th, 2022, Kurukshetra, India.
10. **Plenary**, “Machine Learning/Artificial Intelligence for Robotics and Autonomous Systems”, 11th International Advanced Computing Conference (IACC), December 18-19th, 2021, University of Malta, Malta, <https://computingconf.com/speakers.php>.
11. **Keynote**, “Machine Learning/Artificial Intelligence for Robotics and Autonomous Systems”, 2nd International Conference on Robotics and Artificial Intelligence (ROAI), Nov 28-30th, 2021, India, <https://advancedcomputingresearchsociety.org/roai-2021>.
12. **Plenary**, “Machine Learning/AI in Feedback Control: Challenges and Successful Applications”, International Symposium of Asian Control Association on Intelligent Robotics and Industrial Automation (IRIA 2021), Goa, Sept 2021.
13. **Keynote**, “Artificial Immune Systems as a Function Approximator for Prognostics Applications”, IEEE Madras Section, Nature Inspired Workshop, July 24-25th, 2021.
14. **Plenary**, “Direct Driven Deep Learning Scheme for Bigdata Classification”, International Conference on Communication and Information Systems, May 24th-26th, 2021, Valencia, Spain.
15. **Plenary**, “Artificial Intelligence: Good, bad and the ugly”, International Advanced Conference on Computing, Dec 5th-6th, 2020, Goa, India.
16. **Plenary**, “Deep Neural Network based Reinforcement Learning for Online Games”, International Advanced Conference on Computing, Dec 14-15th, 2019, Trichy, India
17. **Plenary**, “Learning Controllers: Transitioning from Theory to Practice”, IEEE Conference on Control Technology and Applications, August 18-21, 2019 Hong Kong.
18. **Plenary**, “Direct Error Driven Learning for Bigdata Analytics”, International Advanced Conference on Computing, Dec 14-15th, 2018, New Delhi India.
19. **Plenary**, “Optimal Adaptive Control using Event Driven Approximate Dynamic Programming”, IEEE Latin America Conference, Nov 7-9th, 2018, Guadalajara, Mexico.
20. **Keynote**, “Cyber-physical Systems: Opportunities and Challenges”, International Conference on Systems Design and Engineering, held at Sastra University, Tanjore, December 11-12, 2017.
21. **Keynote**, “Cyber-physical Systems”, IEEE CIS and Signal Processing Workshop, held in Ahmedabad, April 11-13, 2017.
22. **Keynote**, “A Novel Hybrid Reinforcement Learning Approach and its Application to Optimal Control of Dynamic Systems”, IEEE Computational Intelligence Workshop, Chennai, January 2nd,

- 2017.
23. **Keynote**, “Event-triggered Control”, IEEE CSS workshop on CPS, Jan 5-8th, 2017.
 24. **Keynote**, “Cyber-physical Systems and its application to Smart Cities”, International Conference on Smart Cities, December 2016.
 25. **Plenary**, “A Novel Hybrid Reinforcement Learning Approach and its Application to Optimal Control of Dynamic Systems”, 2nd Cognitive Conference, Mysore, India, August 2016.
 26. **Keynote**, “Neural Networks and Control”, in IEEE Workshop on Computational Intelligence, Bengaluru, August 2016.
 27. **Keynote**, “Neural Networks and Control”, in IEEE Workshop on Computational Intelligence, Ahmedabad, March 2016.
 28. **Keynote**, “Event Driven Adaptive Dynamic Programming”, in IEEE Workshop on Computational Intelligence, Kanpur, India 2015.
 29. **Plenary**, “Optimal adaptive control of uncertain continuous-time systems”, in 2013 Chinese Conference on Decision and Control, Guiyang, China, May 25th, 2013.
 30. **Keynote**, “Cyber-Physical Systems”, in NETCOM, Chennai, Dec 23rd, 2012
 31. **Plenary**, “Wireless Sensor Networks/RFID: Challenges & Future Directions”, 2007 Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), Dec 2007, Melbourne
 32. **Keynote**, “Neural Network Control”, ANNIE 2009.

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 IEEE Transactions on Systems, Man and Cybernetics: Systems 11.47
 IEEE Transactions on Cybernetics 19.118
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 IEEE Transactions on Bigdata 4.271
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 IET Transactions on Control Theory and Applications 3.527
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***Graduate student**

1. Irfan Ganie* and S. Jagannathan, “Online lifelong optimal tracking control of uncertain nonlinear continuous-time strict-feedback systems using deep neural networks” Neural Networks, accepted for publication with minor revision, December 2024.
2. B. Farzanegan* and S. Jagannathan, “Lifelong safe optimal tracking control of nonlinear strict feedback discrete-time systems”, International Journal of Adaptive Control and Signal Processing, accepted for publication, November 2024.
3. Irfan Ganie* and S. Jagannathan, “Optimal trajectory tracking of uncertain nonlinear continuous-time strict-feedback systems with dynamic constraints” International Journal of Control, accepted for publication, May 2024.
4. Charles Rawlins* and S. Jagannathan, “Predicting IoT distributed ledger fraud transactions with a lightweight GAN network”, IEEE Transactions on Mobile Computing, accepted for publication, November 2023.
5. Shirin Nasr and S. Jagannathan, “SIFT feature-based relative altitude estimation enhanced with siamese network”, IEEE Transactions on Geoscience and Remote Sensing, Vol.63, pp.1-15, January 2025.

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7. B. Farzanegan*, R. Moghadam*, S. Jagannathan, and N. Pappa, "Optimal adaptive tracking control of partially uncertain nonlinear discrete-time systems using lifelong hybrid learning", IEEE Transactions on Neural Networks and Learning Systems, vol.35, no. 12, pp. 17254-17265, December 2024.
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9. H. Ferdowsi*, Jia Cai*, and S. Jagannathan, "Adaptive fault estimation and accommodation for distributed parameter systems with coupled parabolic partial differential equations", Journal of Control and Decision, pp. 1-16, 2024. <https://doi.org/10.1080/23307706.2024.2388560>.
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253. S. Jagannathan, A. Tohmaz*, A. Chronopoulos, and H.G. Cheung, "Adaptive admission control of multimedia traffic in high-speed networks", Proc. of the IEEE Symposium on Intelligent Control, pp. 728-733, Oct 2002.

254. S. Jagannathan, "Adaptive critic neural network-based controller for nonlinear systems", Proc. of the IEEE Symposium on Intelligent Control, pp. 303-308, Oct 2002.
255. S. Jagannathan, "End to end congestion control of packet switched networks", Proc. of the IEEE Conference on Control Applications", vol. 1, pp. 519-524, Sept. 2002.
256. S. Jagannathan, "Admission controller design for high-speed networks: A hybrid systems approach", Proc. of the IEEE Conference on Control Applications", vol. 1, pp. 542-546, Sept. 2002.
257. A. Chronopoulos, S. Ponipireddy*, and S. Jagannathan, "Constructing energy efficient broadcast trees in wireless adhoc networks", Proc of the International Symposium on Parallel and Distributed Computing, Romania, pp. 205-213, July 2002.
258. A. Chronopoulos and S. Jagannathan, "A distributed discrete-time neural network architecture for pattern allocation and control", Proc. of IEEE Symposium on Parallel and Distributed Systems (IPADS), Workshop on Bio-Inspired Solutions to Parallel Processing Problems (BioSP3), April 15-19, pp. 204-211, 2002.
259. G. Galan* and S. Jagannathan, "Adaptive critic-based object grasping controller for a three-fingered gripper", Proc of the IEEE Conference on Decision and Control, vol.4, pp. 3140-3145, Dec. 2001.
260. S. Jagannathan A. Tohmaz*, "congestion control of ATM networks using a Learning Methodology", Proc. of the IEEE Conference on Control Applications, pp. 135-140, September 2001.
261. S. Jagannathan, Annie Levesque* and Yesh Singh, "Approximation-based control and avoidance of a mobile base with an onboard arm for MARS greenhouse operation", Proc of the IEEE Symposium on Intelligent Control, pp. 103-108, September 2001.
262. G. Galan* and S. Jagannathan, "Adaptive critic-based object contact controller for a three-fingered gripper", Proc of the IEEE Symposium on Intelligent Control, pp. 109-114, September 2001.
263. S. Jagannathan and J. Talluri*, "Congestion control of ATM networks using a multilayered approach: multiple sources/single buffer scenario", Proc of American Controls Conference, vol.5, pp. 3789-3794, June 2001.
264. S. Jagannathan, Annie Levesque* and Yesh Singh, "Adaptive network control of a mobile base with an arm", Proc of the American Controls Conference, pp. 606-611, 2001.
265. S. Jagannathan, "Control of a multiple link robot arm at very high speeds for an industrial application", Proc. of the American Controls Conference, vol. 2, pp. 793-798, June 2001.
266. S. Jagannathan, G. Galan* and F. L. Lewis, "Control of autonomous underwater vehicles using neural network Approach", Proc of the IFAC Symposium on System Structure and Control, August 2001.
267. S. Jagannathan and J. Talluri*, "Predictive congestion control of ATM networks: multiple sources/single buffer scenario", Proc of IEEE Conference on Decision and Control, vol.1, pp. 47-52, Dec. 2000.
268. S. Jagannathan and J. Talluri*, "Traffic Rate Control of ATM Networks Using Neural Network Approach: Single Source/Single Buffer Scenario", Proc of the IEEE Symposium on Intelligent Control, pp. 315-320, July 2000.
269. S. Jagannathan and J. Talluri*, "Adaptive traffic rate control of ATM networks", Proc of the American Control Conference, vol.3, pp.1577-1581, June 2000. **(voted best paper in the session)**
270. S. Jagannathan and G.V.S. Raju, "Remaining useful life prediction of automotive engine oils

using MEMS technologies”, Proc. of the American Controls Conference, vol.5, pp.3511-3512, June 2000.

271. S. Jagannathan and A.C. Rogers, "Coordinated motion control of a mobile base with an arm", Proc of the ASCE Conference, Space and Robotics 2000, pp. 270-276, March 2000.

272. S. Jagannathan, “Robust backstepping control of a robotic systems using neural networks”, Proceedings of the IEEE Conference on Decision and Control, vol.1, pp. 943-948, Dec. 98.

273. S. Jagannathan, “Robust backstepping control of nonlinear systems using multilayered neural networks”, Proceedings of the IEEE Conference on Decision and Control, vol.1, pp.480-485, Dec. 97.

274. S. Jagannathan and F. L. Lewis, “Multilayer neural network control of a class of nonlinear systems”, Proceedings of the IEEE International Conference on Intelligent Control, pp. 181-186, July 97.

275. S. Commuri and S. Jagannathan, “Modular controls design for robot manipulators using CMAC neural networks”, Proceedings of the IEEE Conference on Robotics and Automation, vol. 3, pp. 1725-1730, April 1997.

276. S. Jagannathan, “Adaptive control of unknown feedback linearizable nonlinear systems”, Proceedings of the IEEE Conference on Decision and Control, pp. 4747-4752, Dec. 96.

277. S. Jagannathan, S. Commuri and F. L. Lewis, “Feedback linearization using CMAC neural networks”, Proceedings of the IEEE Conference on Decision and Control, pp.3304-3309, Dec. 96.

278. S. Jagannathan, "Discrete-time fuzzy logic control of a mobile robot with an onboard manipulator", Proceedings of the IEEE Conference on Decision and Control, pp. 1135-1140, Dec. 96.

279. S. Jagannathan, F. L. Lewis, M. Vandegrift, and S. Commuri, “Feedback linearization of nonlinear systems using fuzzy logic systems”, Proceedings of the ISAI/IFIS, pp. 385-392, Nov. 96.

280. S. Jagannathan, "Adaptive fuzzy logic control of a feedback linearizable discrete-time nonlinear systems ", Proceedings of the IEEE International Conf. on Intelligent Control, pp. 133-138, Sept. 96.

281. S. Jagannathan, "Discrete-Time CMAC NN control of a feedback linearizable nonlinear systems under a persistence of excitation", Proceedings of the IEEE International Conf. on Intelligent Control, pp. 462-467, Sept. 96.

282. S. Jagannathan, "Adaptive discrete-time fuzzy logic control of a feedback linearizable nonlinear systems", Proceedings of the IEEE International Conf. on Fuzzy Systems, pp. 1273-1278, Sept. 96.

283. S. Jagannathan, "Adaptive control of feedback linearizable discrete-time nonlinear systems using neural networks under a persistence of excitation", Proceedings of the IEEE Mediterranean Symposium on New Directions, pp. 35-40, Jun. 96.

284. S. Jagannathan, "Discrete-Time fuzzy logic control of a mobile robot with an onboard manipulator", Proceedings of the IEEE Mediterranean Symposium on New Directions, pp.451-456, Jun. 96.

285. S. Jagannathan, "Discrete-time adaptive control of feedback linearizable nonlinear systems using neural networks", Proceedings of the IEEE Conf. on Neural Networks, vol.4, pp. 1704-1709, Jun. 96.

286. S. Jagannathan and F. L. Lewis, "Discrete-time adaptive fuzzy logic control of robotic systems", Proceedings of the IEEE Conf. on Robotics and Automation, vol.3, pp.2586-2591, April 96.

287. S. Jagannathan, "Adaptive control of unknown feedback linearizable systems in discrete-time using neural networks", Proc. of the IEEE Conf. on Robotics and Automation, vol.1, pp. 258-263, April 96.

288. S. Commuri, F. L. Lewis and S. Jagannathan, "Discrete-time CMAC neural networks for Control Applications", Proceedings of the IEEE Conference on Decision and Control, pp. 2420-2426, Dec. 1995.
289. S. Jagannathan, "Robust modified implicit self tuning regulator/MRAC convergence and stability", Proceedings of the IEEE Conference on Systems, Man and Cybernetics, vol.3, pp. 2171-2175, Oct. 95.
290. S. Jagannathan and F. L. Lewis, "Multilayer neural net controller for a class of nonlinear dynamical systems", Proceedings of the IEEE International Symposium on Intelligent Control, pp. 427-432, Aug. 95.
291. S. Jagannathan and F. L. Lewis, "Robust implicit self tuning regulator/MRAC convergence and stability", Proceedings of the IEEE International Symposium on Intelligent Control, pp. 42-46, Aug. 95.
292. S. Jagannathan and P.S. Shiakolas, "A comparison of neural network controllers for a mobile base with an onboard manipulator using neural networks", Proceedings of the IEEE International Symposium on Intelligent Control, vol. 1, pp. 405-410, Aug. 95.
293. M. Vandergrift, F. L. Lewis, S. Jagannathan, and K. Liu, "Adaptive fuzzy logic control of discrete-time dynamical systems", Proceedings of the IEEE International Symposium on Intelligent Control, pp. 395-401, Aug. 95.
294. P. Shiakolas and S. Jagannathan, "Control of a mobile robot with an onboard arm using neural networks", Proceedings of the IEEE Mediterranean Symposium on New Directions and Automation, pp. 315-323, June 95.
295. S. Jagannathan and F. L. Lewis, "Identification of nonlinear dynamical systems using multilayer neural networks", Proceedings of the IEEE International Symposium on Intelligent Control, pp. 345-351, Aug. 94.
296. A. Yesilderek, S. Jagannathan, and F. L. Lewis, "Continuous and discrete-time neural controllers", Proceedings of the IEEE Mediterranean Symposium on New Directions and Automation, Crete, pp. 9-16, June 94.
297. S. Jagannathan and M. Evans, "Intelligent control of flexible autonomous robots Part I: architectural considerations", Proceedings of the IEEE Conf. on Neural Networks, vol.5, pp. 2837-2841, June 94.
298. S. Jagannathan, "Intelligent control of flexible autonomous robots Part II: implementation", Proceedings of the IEEE Conf. on Neural Networks, vol.5, pp. 2831-2836, June 94.
299. S. Jagannathan, F. L. Lewis, and O. C. Pastravanu, "MRAC of nonlinear dynamical systems using multilayer neural networks", Proceedings of the IEEE Conf. on Neural Networks, vol.7, pp. 4766-4771, June 94.
300. S. Jagannathan and F. L. Lewis, "Discrete-time neural net controller with guaranteed performance", Proceedings of the American Control Conference, pp. 3334-3339, May 1994.
301. S. Jagannathan, F. L. Lewis and K. Liu, "Modeling, control, and obstacle avoidance of a mobile robot with an onboard manipulator", Proceedings of the IEEE Symposium on Intelligent Control, vol. 1, pp. 196-201, Aug. 93.
302. F. L. Lewis, H-Huang, and S. Jagannathan, "A systematic approach to discrete-event controller design for manufacturing applications control", Proceedings of the American Control Conference, vol.2, pp. 1525-1531, June 1993.

303. S. Jagannathan, S. Balakrishnan and N. Popplewell, "Visual inspection of wave soldered joints using neural networks", Proceedings of the IEEE-IJCNN Conference on Neural Networks, vol.1, pp.7-12, Dec. 91.
304. S. Jagannathan, S. Balakrishnan and N. Popplewell, "Sampling and loop delay intervals for digital control", Proceedings of the ISMM Conference on Mini and Microcomputers, vol.2, pp.114-117, Dec. 91.
305. S. Jagannathan, N. Popplewell and S. Balakrishnan, "Digital control of a CNC milling machine", Proceedings of the ISMM Conference on Mini and Microcomputers, vol.2, pp.118-121, Dec. 91.
306. S. Jagannathan, S. Balakrishnan and N. Popplewell, "Task level language for robot arm control", Proceedings of the modeling and simulation conference, vol.3, pp.995-1001, May 91.
307. K. Udayakumar, S. Jagannathan, D. Shankar and E. Vadivelu, "Magnetic levitation and propulsion", Proceedings of the International Conference on Railway Electrification, New Delhi, Vol.1, pp. 221-223, Oct. 85.

PRESENTATIONS ONLY

1. Soylemezoglu, A., J. Birt, Sarangapani, J. D. Trimble and C. Rouse, "Auto-ID Technologies and Solutions for Aerospace Manufacturing," *AEROMAT'05*, Orlando , Florida , June 6-9, 2005.
2. K. Cha, Soylemezoglu, A., J. Birt, M. Zawodniok, J. Fonda, E. Taqieddin, E. M. Millis-Harris, Saygin, and J. Sarangapani, "A Testbed for Validation and Benchmarking of Auto-ID Solutions," *AEROMAT'05*, Orlando, Florida, June 6-9, 2005.
3. C. Saygin and J. Sarangapani, "Auto-ID Technologies Research Group at the University of Missouri-Rolla", US Air Force Depot Maintenance Transformation (DMT) Automatic Identification Technology (AIT) Workshop, Sept. 12-15, Ogden, Utah, 2005.
4. J. Sarangapani and C. Saygin, "Monitoring, Diagnostics, and Prognostics Research at the University of Missouri-Rolla," 9th Bi-annual Industry Advisory Board Meeting of the Intelligent Maintenance Systems (NSF I/UCRC) Center, May 2005, Ann Arbor, Michigan.
5. J. Sarangapani and C. Saygin, "Monitoring, Diagnostics, and Prognostics Research at the University of Missouri-Rolla ," 8th Bi-annual Industry Advisory Board Meeting of the Intelligent Maintenance Systems (NSF I/UCRC) Center, Nov 1-2, 2004 , Milwaukee , Wisconsin.
6. S. Jagannathan, "Energy Efficient Protocols for Wireless Networks", Indian Institute of Technology, Dept. of Computer Science, Chennai, June 2004.
7. J. Sarangapani, "Monitoring, Diagnostics, and Prognostics Research at the University of Missouri-Rolla ," 9th Bi-annual Industry Advisory Board Meeting of the Intelligent Maintenance Systems (NSF I/UCRC) Center, May 2004, Ann Arbor , Michigan.
8. J. Sarangapani, "Monitoring, Diagnostics, and Prognostics Research at the University of Missouri-Rolla ," 8th Bi-annual Industry Advisory Board Meeting of the Intelligent Maintenance Systems (NSF I/UCRC) Center, Nov 2003 , Milwaukee , Wisconsin.
9. S. Jagannathan and J. Drallmeier, "Neuro Emission Controller for Spark Ignition Engines", Sandia National Laboratories, June 2004.
10. S. Jagannathan and G.V.S Raju, "Integration of Microsensor Arrays", Tex MEMS, August. 99. (invited).

11. S. Jagannathan, "Computers and society", National Seminar, Feb. 1983.
12. S. Jagannathan and M. Arif, "Digital techniques in nuclear instrumentation", IEEE Student Chapter, Madras, pp. 1-7, April 85.

SHORT COURSES

1. "Embedded Computer Systems", Offered at IEEE MOCON March 2004
2. "Wireless Networking", Offered at IEEE MOCON March 2004. (With Dr. Subramanya)
3. "Embedded Computer Systems for Control", IEEE ISIC Symp. on Intel. Control, Oct 2003.

PATENTS AWARDED

1. Al Salour, D. Trimble, J. Sarangapani, and E. Taqieddin*, "Ultra-lightweight Mutual Authentication Protocol with Substitution Operation", US Patent No. 10198605, February 5, 2019. **(Cybersecurity jointly filed with Boeing)**
2. Jagannathan Sarangapani, M. Zawoniok, Vivek Thotla*, T. Ghasr, and Jake Hertenstein, "Electronic Device Detection Systems and Method", US Patent No. 9689964B2, June 27, 2017. **(Explosive threat detection)**
3. Jagannathan Sarangapani, A. Ramachandran*, C. Saygin, and K. Cha*, "Decentralized Radio Frequency Identification System", US Patent No. 8143996B2, March 27, 2012.
4. S. Mehraeen* and J. Sarangapani, "System and method for harvesting energy from environmental energy", US Patent 8,129,887B2, March 6, 2012. **(8 to 10 times more energy than commercially available hardware at the time of evaluation)**
5. Jagannathan Sarangapani, A. Ramachandran*, C. Saygin, and K. Cha*, "Adaptive Inventory Management System", US Patent No. 7752089B2, July 2010. **(NN Decision making for asset localization and tracking)**
6. S. Jagannathan and S.K. Rangarajan, "A Method to Predict Severity of a Trend toward an Impending Machine Failure and Responding to the Same", US Patent No. 6,442,511, August 2002. **(Prognostics for Caterpillar)**
7. S.R. Rangarajan, and S. Jagannathan, "Method and Apparatus for Predicting a Fault Condition using Nonlinear Curve Fitting Techniques", US Patent No. 6,363,332, March 26, 2002.
8. S. Jagannathan, "Apparatus and Method for Diagnosing an Engine Using Computer-Based Models in Combination with a Neural Network", US Patent No. 6,240,343, May 29, 2001.
9. S. Jagannathan, "A Method for Determining a Desired Response to Detection of an Obstacle", US Patent No 6,173,215, January 2001. **(Autonomous Systems)**
10. S. Jagannathan, "Energy-Based Approach for Obstacle Avoidance", US Patent No. 6,134,502, Oct. 17, 2000.
11. S. Jagannathan, "Method and Apparatus of Predicting a Fault Condition", US Patent No. 6,119,074, Sept. 12, 2000.
12. S. Jagannathan and D.R. Schricker, "Apparatus and Method for Diagnosing an Engine Using an Exhaust Temperature Model", US Patent No. 6,092,016, July 18, 2000.
13. S. Jagannathan and C. A. Kemner, "Method and Apparatus for Determining an Alternate path in Response to Detection of An Obstacle", US Patent No. 6,064,926, May 16, 2000.
14. S. Jagannathan and F.L.Lewis, "Discrete-Time Neural Network Tuning of a Class of Nonlinear Dynamical Systems", The Univ. of Texas, US Patent No. 6,064,997, May 16, 2000.
15. S. Jagannathan, "Method and Apparatus for Detecting Obstacles Using Multiple Sensors for Range Selective Detection", US Patent No. 6,055,042, April 25, 2000.
16. S. Jagannathan, "Method for Determining the Condition of Engine Oil based on TBN Modeling", US Patent 5,987,976, November 23, 1999.
17. S. Jagannathan and D. R. Schricker, "Method and Apparatus for Predicting a Fault Condition",

Caterpillar Inc., US Patent No. 5,950,147, September 7, 99.

18. C. Kemner, C. Khoerson, and S. Jagannathan, "System and Method for Managing a Fleet of Mobile Machines for Dumping at a Plurality of Dump Points", US Patent No. 5,931,875, August 3, 99.

19. S. Jagannathan et al., "Automated Systems—Automated Loader System", Defensive Publication, Research Disclosure Technology Journal, Pub. No. 42368, July 99.

20. S. Jagannathan, D. R. Schrieker, and Trent Simpson, "Method for Determining the Condition of Engine Oil based on Soot Modeling", US Patent No. 5,914,890, June 22, 1999.

21. S. Jagannathan, "Method and Apparatus for Determining a Path for a Machine between a Predetermined Route and a Final Position", US Patent No. 5,752,207, May 12, 98.

22. D.R. Schrieker, S. Jagannathan, D. G. Young, Satish M. Shetty, "Method and Apparatus for Comparing Machines in Fleet", US Patent No. 5,737,215, April 7, 98.

PATENT/PROVISIONAL PATENT FILED

1) K. Cha*, M. Zawodniok, A. Ramachandran, S. Jagannathan and C. Saygin, "Decentralized Radio Frequency Identification System", Patent Filed, Nov 2007.

2) M. Thiagarajan*, M. Zawodniok, S. Jagannathan, "RFID-based Adaptive Inventory Management System", Provisional patent application filed in Dec 2007.

INVENTION DISCLOSURES

1) S. Jagannathan, K. Cha, A. Ramachandran, and C. Saygin, "Read Rate and Coverage Improvement Through Reader Power Control", Invention Disclosure, January 2006.

2) S. Jagannathan, S. Ratnaraj, J. Fonda and M. Zawodniok, "Optimal Energy Delay Routing Protocol for Wireless Sensor Networks", Invention Disclosure, May 2006.

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.

Former 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. (Associate Professor, Dept. of Computer Engg, Missouri University of Science and Technology, Rolla, USA; **NSF Career Awardee**)
3. Jianjun Guo, “Decentralized control and placement of multiple unified power flow controllers”, co-advisor, September 2006. (Los Angeles)
 4. Eyad Taqueiddin, “Trust level energy efficient routing protocols for wireless ad hoc networks”, May 2007, co-advisor, (Professor, Department of Computer Science and Information Technology, Jordon University of Science and Technology).
 5. Qinmin Yang, “Advanced control design using neural networks for micro/nano robotics”, August 2007. (Professor, Zhejiang University, China)
 6. Jonathan Vance, “Neural network control of nonstrict feedback and nonaffine nonlinear discrete-time systems with application to engine control”, Sept. 2007. (Associate Tech. Fellow, 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. (Associate Tech Fellow, 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, now in a startup in 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 interconnected nonlinear dynamic systems with application to power systems”, Nov. 2009. (Distinguished Professor, Louisiana State University, Baton Rouge; **NSF Career Awardee**)
 11. Balaje Thumati, “A control theoretic fault prognostics and accommodation framework for a class of nonlinear discrete-time systems”, Nov 2009. (Associate Tech Fellow-Boeing, St. Louis) (**Won Boeing Chairman Award for Safety**)
 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 **now having his own company Edza, CA**).
 15. Hao Xu, “Stochastic optimal adaptive controller and communication protocol design for the networked control system”, May 2012. **NSF Career Awardee** (Associate Professor, University of Nevada, Reno).
 16. Hassan Zargarzadeh, “Lyapunov based optimal control of a class of nonlinear systems”, August 2012 (Associate Professor, Lamar University, Beaumont, Texas).
 17. Hasan Ferdowsi, “Model based diagnosis and prognosis of nonlinear systems”, October 2013. (Assistant Professor, Northern Illinois University, Dekalb, IL)
 18. Qiming Zhao, “Finite horizon optimal control of a class of linear and a class of nonlinear systems”, October 2013. (Denso, Michigan).
 19. Avimanyu Sahoo, “Event-sampled regulation of a class of linear and nonlinear systems”, April 2015. (Assistant Professor-University of Alabama at Huntsville, AL)
 20. Nurbanu Guzey, “Localization and tracking of unintended emitting sources”, October 2015. (Associate Professor, Department of Electrical Engineering, Erzurum Technical University, Turkey)
 21. Behzad Talaei, “Boundary control of distributed parameter systems using adaptive dynamic programming”, March 2016. (American Axle Corporation, Warren, MI)
 22. Jia Cai, “Model-based diagnosis and prognosis of a class of linear and nonlinear distributed parameter systems”, April 2016. (Microsoft, Seattle)
 23. Haifeng Niu, “A control theoretic approach to security in cyber-physical systems”, April 2016. (Amazon Corp, and now at Google Cloud Seattle)
 24. Haci Guzey, “Consensus based formation control of unmanned vehicles”, November 2016. (Associate Professor, Department of Electrical Engineering, Erzurum Technical University, Turkey)

25. Xiang Gao, "Using wireless sensors and networks program for chemical particle propagation mapping and chemical source localization", November 2016 (co-advisor)
26. Vignesh Narayanan, "Event triggered optimal adaptive control of interconnected systems", June 2017. (Assistant Professor, Dept of Computer Science-University of South Carolina)
27. Krishnan Raghavan, "Deep learning neural network-based classifier design with applications to bigdata analytics", March 2019. (Scientist, Dept of Comp Science and Mathematics, Argonne National Laboratory, Chicago)
28. Rohollah Moghadam, "Optimal adaptive control of time-delay dynamical systems with known and unknown dynamics", October 2020. (Assistant Professor, California State University-Sacramento)
29. Charles Rawlins, "IoT Security using Block Chain protocols", January 2024.

Additional Advisor for Doctoral Students:

1. Wenxin Liu, "Power system stabilizing control using neural networks", May 2005. Additional advisor (Professor, Lehigh University, PA) (Published several papers)
2. Ivo Grondman, "Online model-based learning algorithms for actor-critic control", Tu Delft, Netherlands, March 2015. (published a conference paper)
3. Ravi Prakash, "Intelligent control for complex manipulation tasks using skill transfer", December 2021, IIT-Kanpur, India. (Published several journal papers; Now Assistant Professor, IISc Bangalore)
4. Tejalal Chowdhury*, "Pruning in deep neural networks", June, Bennett University, Noida, 2022. (Published several journal papers)
5. S. Gupta*, "Q-SANE spiking neural networks", June, Bennett University, Noida, 2022. (published a journal paper)

Master Students

1. J. Talluri, "Adaptive traffic management in ATM Networks", Dec 2000. (Software company Austin)
2. A. Tohmaz, "Adaptive congestion control and bandwidth estimation in high-speed 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 and optimal routing protocols for wireless ad hoc and sensor networks", May 2004. (Design Engineer)
10. V. Janardhan, "Implementation and 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 routing protocols for wireless sensor networks", December 2005. (Boeing, CA)
13. Kainan Cha, "Interference mitigation using distributed power control algorithms for RFID reader networks," April 2006. (Garmin, Kansas City)
14. Tim Landstra, "Hybrid key management and secure routing protocol", May 2006. (Sandia National Labs)
15. Anil Ramachandran, "Diversity techniques for signal strength based WLAN location determination 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. (DRS Technologies, St. Louis, Startup in a company and part time instructor in Rolla)
 19. Amit Shah, “Terahertz 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 mote-based in-process diagnostics using hand held tools in network enabled manufacturing environments”, May 2008. (Doctoral student at Virginia Tech in Dept of ECE, now in India as a VP in a company)
 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 in wireless sensor networks”, Dec 2009 (with graduation May 2010). (Qualcomm, San Diego)
 25. Jake Hertenstein, “Detection of explosive threats by using embedded wireless sensor-based networks”, Jan 2010. (Boeing, St. Louis)
 26. Bryan Brenner, “Embedded optimal control of mobile robot formations using neural networks,” August 2010.
 27. David Nodland, “Optimal control of helicopter 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)
 30. Nathan Szanto, “Event sampled control of strict feedback systems with application to quadrotor UAV”, Sept 2016. (startup company)
 31. Arnold Fernandez, “Attack detection and mitigation in mobile robot formations”, December 2019. (Doctoral student at S&T)

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

1. Maxwell Geiger, “Optimal adaptive tracking using lifelong learning”, December 2025.
2. Ahmed Abugroun, “Safe and lifelong learning with image feedback”, December 2025.
3. Irfan Ganie, “Lifelong learning based optimal adaptive tracking control of continuous-time dynamical systems”, May 2025.
4. Behzad Farzanegan, “Lifelong learning based optimal control formulation for discrete-time systems”, May 2025.
5. Ehsan Soleimani, “Optimal adaptive control of multiagent systems”, August 2028.
6. Mohamed Tanvir Shahed, “Optimal control of power grid with adversaries”, August 2028.
7. Insha Sheikh, “Deep learning using imagery data for healthcare applications”, August 2028.

Current M.S: None.

Postdoctoral Fellow/Visiting Scholar:

Shirin Nasr, Trajectory generation by using imagery data, Oct 2022-todate.

Vijay Kumar Singh, Optimal adaptive control of power systems, Sept 2024-todate

Pappa Rajan, Process Control, August 2019-March 2020 Fulbright scholar

Undergraduate Students:

1. Redemer Payton, “Block-chain based reputation system”, ARO Grant, Fall-Spring 2023.
2. Cheng-Yuan Wang, “Predicting IoT attacks using GAN”, ARO Grant, Fall-Spring 2023.
3. Aaron Burke, “Online learning for formation control”, ARO grant supported, Spring 2023.
4. Jared Allen, “3D printer as a CPS system with attacks”, Fall 2021.
2. Carlos Cook, “Inplant RFID and Part DNA”, Fall 2020, Honeywell.
3. Eric Hanson, “RFID Cart System”, 2019-2020. Supported by Honeywell.

4. 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.
5. Robert Stewart, "Spark ignition engine modeling with high EGR", Summer 03. NSF #032787
6. 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.
7. Juan Portillo, "Obstacle avoidance of a mobile base with an onboard arm", (Fall 00, Spring 01). Supported by NASA/TSGC.
8. Adam Wolf, "Interfacing the real world-robots and sensors", Spring 2001. Supported by Office of Naval Research through ONR Scholar's program
9. Cynthia Green, "Force controller", Spring 2001. ONR Scholars program.
10. P. Au, Gilani, and J.Putz, "Sensor network alert system," B.S Thesis, 2003.

Service Activities (Internal and External)

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 Biomedicine (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, Hawaii, 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)**
- **International Program Committee**, 9th International Conference on Knowledge, Information and Creativity Support Systems, Kraków, Poland, from November 7 to 9, 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 Wireless Communications Symposium
- **International Advisory Committee**, 2014 ACODS
- **Program Co-Chair Chair**, 2014 IEEE Adaptive Dynamic Programming and Reinforcement Learning, Orlando, December 2014
- **International Program Committee**, 2014 IEEE Multi Conference on Systems and Control, Antibes, France, October 2014
- **International Program Committee**, International Conference on Contemporary Computing and Informatics (IC3I), Mysore, India, November 27-29, 2014.
- **International Program Committee**, The 7th International Conference on Network Security & Applications (CNSA-2014), Zurich Switzerland
- **General Chair**, Sixth International Conference on Networks & Communications (NETCOM – 2014),

Chennai, India

- **International Program Committee**, 9th International Conference on Knowledge, Information and Creativity Support Systems, Tokyo, Japan
- **International Program Committee Member**, 2014 Informatics in Control, Automation and Robotics ICINCO, October
- **International Program Committee member**, 2014 eKNOW, The Sixth International Conference on Information, Process, and Knowledge Management, Barcelona, July 2014.
- **Advisory Committee Member**, International Conference on Recent Developments in Control, Automation and Power Engineering (RDCAPE 2015) <http://rdcape.com/> on 12-13 March 2015.
- International Program Committee Member, ICPRAM 2015 <http://www.icpram.org/RegistrationFees.aspx>.
- International Program Committee Member, The first International Conference on Cognitive Computing and Information Processing (CCIP-15) at JSSATEN on 3- 4th, March 2015.
- **International Program Committee Member**, 2015 Informatics in Control, Automation and Robotics ICINCO, October.
- **Associate Editor and International Program Committee Member**, 2015 International Joint Conference on Neural Networks (IJCNN 2015) which will take place in Killarney, Ireland, July 12-17, 2015.
- **Associate Editor**, 2015 IEEE Multi-conference on Systems and Control, Sydney Australia, Sept 21-24, 2015.
- **International Program Committee Member**, 2015 Wireless Communications Symposium (ICC 2015)
- **International Program Committee Member**, 2015 IEEE Adaptive Dynamic Programming and Reinforcement Learning, Cape Town, South Africa, December 2015.
- **International Advisory Committee**, Biennial International Conference on Control, Measurement and Instrumentation (CMI 2016), January 08-10, 2016.
- International Program Committee Member, ICPRAM 2016 <http://www.icpram.org/RegistrationFees.aspx>.
- **International Technical Program Committee Member**, The twelfth International Conference on Autonomic and Autonomous Systems, June 26 - 30, 2016 - Lisbon, Portugal.
- **International Program Committee Member**, The Seventh International Conference on Adaptive and Self-Adaptive Systems and Applications, March 20 - 24, 2016 - Rome, Italy.
- **International Advisory Program Committee**, National Conference in the field covering Electronics, Communication, Power Electronics and Computer Science during July 2016.
- **International Program Committee Member**, International Conference on Advances in Intelligent Control and Automation (ICAICA 2016) during March 10-12, 2016. <http://rjit.co.in/icaica2016/>.
- **International Program Committee Member**, 4th IFAC International Conference on Intelligent Control and Automation Sciences (ICONS 2016), in Reims, France, June 1-3, 2016.
- **International Program Committee Member**, The Eighth International Conference on Information, Process, and Knowledge Management, eKNOW April 24 - 28, 2016 - Venice, Italy.
- **International Program Committee Member**, IEEE First International Conference on Control, Measurement and Instrumentation (CMI 2016), January 8-10, Kolkota, India. www.cmi2016india.org
- **International Program Committee Member**, IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), Bangalore, India <https://edas.info/Tyn.php?tpc=999032496>.
- International Program Committee Member, ICPRAM 2017 <http://www.icpram.org/RegistrationFees.aspx>.
- **International Program Committee Member**, India Controls Conference, Ghawhati, January 2017.
- **Member of Advisory Board**, 2nd International Conference on Recent Technological Development in Electronics and Electrical Engineering, (RTDEEE-2018) during 6th – 7th April 2018.
- **Technical Program Committee**, International Conference on Advanced Research in Computational Intelligence and Computing (ICARCIC 2018), August 9-11, 2018, Lam, Guntur, Andhra Pradesh, India.
- **Technical Program Committee, International Program Committee Member**, 15th International Conference on Informatics on Control, Automation and Robotics, Porto Portugal, July 29-31, 2018.

- **Technical Program Committee Member**, Indian Control Conference, IIT Kanpur, Jan 4-8th 2018.
- **Honorary Co-Chair**, 8th IEEE International Advanced Computing Conference, New Delhi, Dec 12-14th, 2018.
- **Technical Program Committee Member**, 7th International Conference on Pattern Recognition Applications and Methods, Funchal Madeira, Portugal, 16-18th January 2018.
- **Program Co-Chair**, IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning, Bangalore India, Nov 18-23, 2018.
- **Program Co-Chair**, IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning, China, Dec 18-23, 2019.
- **Honorary Co-Chair**, 9th IEEE International Advanced Computing Conference, Trichy, Dec 14-15th, 2019.
- **International Program Committee Member**, 15th International Conference on Informatics on Control, Automation and Robotics, Prague, Czech Republic, July 29-31, 2019.
- **Technical Program Committee Member**, Indian Control Conference, IIT Guwahati, Jan 9-11th 2019.
- **International Technical Program Committee Member**, 7th International Conference on Pattern Recognition Applications and Methods, Funchal Madeira, Portugal, 16-18th January 2019.
- **International Technical Program Committee Member**, 11th International Conference on Neural Computation Theory and Applications, 17-19th Vienna Austria Sept. 2019.
- **International Technical Program Committee Member**, 15th International Conference on Autonomic and Autonomous Systems, Athens Greece, June 2-6th 2019.
- **International Technical Program Committee Member**, 15th International Conference on Adaptive and Self-Adaptive Systems and Applications, Venice, Italy, May 5-9th 2019.
- **International Program Committee**, 9th International Conference on Pattern Recognition Applications and Methods, Feb 22-24th, Valetta, Malta, 2020.
- **Technical Program Committee, International Program Committee Member**, 17th International Conference on Informatics on Control, Automation and Robotics, Porto Portugal, July 7-9th, 2020.
- **International Program Committee Member**, 12th International Conference on Neural Computation Theory and Applications, Budapest Hungary 2-4th November 2020.
- **International Program Committee Member**, 12th International Conference on Adaptive and Self Adaptive Systems, Nice France Oct 25th-29th, 2020.
- **Honorary Co-Chair**, 9th IEEE International Advanced Computing Conference, Goa, Dec 6-7th, 2020.
- **International Technical Program Committee Member**, ALLSENSORS, 5th International Conf. on Advances in Sensors, Actuators, Metering and Sensing, Valencia, Spain, Nov. 21-25th 2020.
- **International Technical Program Committee Member**, International Conference of Interdisciplinary Cyber-Physical Systems, December 28-29th 2020.
- **International Technical Program Committee Member**, 2nd International Conference on Communication, Optical and Microelectronics: "The Emerging Trends"-2020 (ICCOMET-2020) during 3rd – 4th April 2020.
- **International Technical Program Committee, International Program Committee Member**, 17th International Conference on Informatics on Control, Automation and Robotics, Porto Portugal, July 7-9th, 2021.
- **International Program Committee Member**, 13th International Conference on Neural Computation Theory and Applications (NCTA 2021), October 25-27th 2021.
- **International Program Committee Member**, 12th International Conference on Adaptive and Self Adaptive Systems, Nice France Oct 25th-29th, 2021.
- **Honorary Co-Chair**, 9th International Advanced Computing Conference, Malta, Dec 18-19th, 2021.
- **International Technical Program Committee Member**, ALLSENSORS, 6th International Conference on Advances in Sensors, Actuators, Metering and Sensing, Nice, France, July 18-22th 2021.
- **International Technical Program Committee Member**, 4th International Conference on Recent Developments in Control, Automation and Power Engineering (RDCAPE 2021), Noida, India, 7-8 October 2021.
- **International Technical Program Committee Member**, 4th IFAC Conference on Embedded Systems, Computational Intelligence and Telematics in Control, Valenciennes, France, July 5-7, 2021.

- **International Technical Program Committee**, 1st International Conference on Advanced Network Technologies and Intelligent Computing (ANTIC-2021), Bhubaneswar, India, 17th & 18th December 2021.
- **International Technical Program Committee**, 16th International Conference on Knowledge, Information, and Creativity Support Systems, Bangkok, Thailand, November 24-26, 2021.
- **International Technical Program Committee**, 18th International Conference on Informatics on Control, Automation and Robotics, Barcelona, Spain, April 24-28th, 2022.
- **International Program Committee Member**, 14th International Conference on Neural Computation Theory and Applications (NCTA 2021), October 24-26th, Malta, 2022.
- **International Technical Program Committee** and served as an Associate Editor for the 17th International Conference on Control, Automation, Robotics and Vision (ICARCV) in 2022, ICARCV 2022- will be held during December 11-13 2022, in Singapore.
- **Associate Editor**, 6th IFAC Conference on Intelligent Control and Automation Sciences (ICONS 2022), Cluj-Napoca, Romania, 13-15 July 2022.
- **International Program Committee**, 14th International Conference on Adaptive and Self Adaptive Systems, 24th-28th April, Barcelona Spain, 2022.
- **Honorary Chair**, 2nd International Conference on Advanced Network Technologies and Intelligent Computing (ANTIC-2022), 22nd to 24th December 2022, Banaras Hindu University, Varanasi, India.
- **Honorary Co-chair**, 12th International Advanced Computing Conference, Hyderabad, 16-17th, December, 2022.
- **Honorary Chair**, 2nd International Conference on Emerging Electronics and Automation (E2A-2022), 16-18th, December, Silchar, India.

Academic Committees:

- Member, Kummer AI and Autonomous Systems Center Search Committee (2021-2022)
- Chair, Dean's Scholar Selection Committee (2022)
- Member, Dept of Engineering Management and Systems Engineering P&T Committee
- Member, Dean's CEC Strategic Vision Committee (2020-2021)
- * Member, Campus Incentive Committee (2017-2018)
- * P&T Chair, Dept of Nuclear Engineering (2018)
- * Chair, Dean's Scholar Selection Committee (Member 2016, 2018, 2019, Chair 2020 & 2021)
- * Member, Search Committee on Autonomous Systems in Mechanical Engineering
- * Member, Tenure Policy Committee (2016-)
- * Search Committee Chair, Controls Strategic Hire (2015-2016)
- * Search Committee Chair, ECE Department Chair (2014-2015)
- * Member, ECE representative of the Budget Affairs Committee (2009-2014)
- * Member, Electronics Faculty Position Recruitment Committee (2012)
- * Member, Public Occasions (2011-2014)
- * Controls Area Coordinator (2011-2015)
- * Member, Dept Executive Committee (2011-2015)
- * Member, Campus Professional Degree Selection Committee (2010-2012)
- * Promotion and Tenure Evaluation Faculty member, Engineering Management and Systems Engineering (2010, 2019, 2020)
- * Dept. P&T Chair (2010-2014)
- * 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 (07-15)
- * Member, UM Patent Committee (06-15)
- * 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-todate)
- * 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

External Examiner for Tenure Decisions: Several from Singapore (Adams, Wijesoma), USA, Jordon and from India