Hassan Zargarzadeh, PhD
Curriculum Vitae

University Address	**Contact Information**
Lamar University	Office: 409-880-7007
Philip M. Drayer Department of Electrical Engineering	Email: h.zargar@lamar.edu
211 Red Bird Lane, Beaumont, TX 77710-0029	

Professional Experience:

August 2015 – Present	**Assistant Professor**
	Philip M. Drayer Department of Electrical Engineering
	Lamar University
	Beaumont, TX
August 2014 – July 2015	**Assistant Professor**
	Department of Polytechnic Studies
	Southeast Missouri State University (SEMO)
	Cape Girardeau, MO
August 2013 – July 2014	**Faculty and Graduate Academic Advisor**
	Department of Electrical and Computer Engineering
	Southern Illinois University (SIU)
	Carbondale, IL
August 2012 – May 2013	**Faculty**
	Department of Polytechnic Studies
	Southeast Missouri State University (SEMO)
	Cape Girardeau, MO

Education:

2010-2013   Missouri University of Science and Technology, Rolla, Missouri
Ph.D. in Electrical Engineering
Dissertation: *Optimal Control of a Class of Discrete and Continuous-Time Nonlinear Systems*
Research Advisor: Prof. Jagannathan Sarangapani

2006-2009   Iran University of Science and Technology, Tehran, Iran

M.S. in Electrical Engineering
Thesis: *Chaos and Bifurcation in Gyroscopic Systems*
Research Advisor: Prof. M. R. Jahed Motlagh

1995-2000   Tehran Polytechnic (Amir Kabir University), Tehran, Iran

B.S. in Electrical Engineering
Thesis: *Design, Implementation, and Control of a Very Accurate (12.5μm) Manipulator for the Purpose of Planar Trajectory Tracking and Magnetic Sampling*
Research Advisor: Prof. Ahmad Afshar

Research Experience:

2015-present   Lamar University, Beaumont TX

Position: Assistant Professor
1) Initiated research on autonomous mobile robots.
2) Initiated research on advanced control of power electronics systems with application to solar ennergy.

2014-2015   Southeast Missouri State University, Cape Girardeau, Missouri

Position: Assistant Professor
3) Initiated research on the automation and control of chemical processes, which will be funded by a company in St. Louis, MO.
4) Conducted research on an automatic electric vehicle charging system to assist the handicapped.

2013-2014   Southern Illinois University, Carbondale, Illinois

Position: Faculty and Graduate Academic Advisor
1) Conducted collaborative research to develop novel practical methods by which to track the maximum power point of photovoltaic cells.
2) Conducted research on adaptive extremum seeking methods applied to homogenous charge compression ignition (HCCI) engines.
3) Conducted research on the dynamics and control of an innovative class of rigid, spherical robots with the ability to jump over obstacles.

2010-2013   Missouri University of Science and Technology, Rolla, Missouri

Position: Research Assistant
1) Developed theoretical, novel methods by which to control nonlinear systems in discrete and continuous-time representation under uncertain system dynamics. This research resulted in novel methods for the optimal control of several classes of nonlinear systems.
2) Applied the developed optimal control methods to a new class of HCCI engines in the Combustion and Spray Dynamics Laboratory of the Mechanical Engineering Department[1]. The research resulted in methods for minimizing the cost of HCCI control and maximizing fuel efficiency.
3) Implemented the theoretical results on a helicopter UAV in the Embedded Control Systems and Networking Laboratory of the ECE Department. This military-supported research resulted in optimal control of the under-actuated dynamics of the helicopter in the presence of uncertainties and unmeasured states.

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[1] http://web.mst.edu/~combust/

4) Designed a <u>hybrid nonlinear adaptive</u> controller for a multiport converter. While all available methods by which to stabilize such converters are linear, the proposed nonlinear controller can eliminate some signal measurements and avoid input saturation.

2006-2009   Iran University of Science and Technology, Tehran, Iran
Position: Research Assistant
1) Studied the dynamics and attitude control of spacecraft when torque is provided by flying wheels rather than thrusters. The research resulted in the discovery of the chaotic behavior of such systems, and under-actuated control methods by which to stabilize the line-of-sight.

Proposal Samples:

1) H. Zargarzadeh (PI)*, Robot Playmates as Therapists*, <u>to be submitted</u> to National Robotics Initiatives program supported by NSF and NIH as a collaborative research between the electrical engineers and therapeutic scientists.
2) H. Zargarzadeh (PI)*, Assistive Robots for Charging Plug-in Vehicles*, <u>to be submitted</u> to National Robotics Initiatives program supported by NSF and NIH as a collaborative research between the electrical engineers and therapeutic scientists (the research is currently being conducted at SEMO supported by a company in St. Louis).
3) R. Ahmadi, H. Zargarzadeh (Co-PI), *A Novel Energy Management Strategy for Plug-in Hybrid Electric Vehicles*, Southern Illinois, University Seed Grants, 2014. <u>Awarded for $48000</u>.
4) H. Zargarzadeh (PI), B. Deken, ET366 Laboratory Redesign for Learning Outcome Enhancement, Southeast Missouri State University, Funding for Results (FFR), <u>submitted</u>.

Teaching Experience:

2015-present   Lamar University, Beaumont, Texas
Position: Assistant Professor
Fall 2015: ELEN4351, Control Engineering
Fall 2015: ELEN5301, Power Electronics

2012-2013 and 2014-present   Southeast Missouri State University, Cape Girardeau, Missouri
Position: Assistant Professor
Fall 2012: ET160/162, Basic Electricity & Electronics
Fall 2012: ET164, AC Principles & Circuits
Fall 2012: ET245, Logic Circuits
Fall 2012: ET367, Motor Control & Drive Systems
Spring 2013: ET160/162, Basic Electricity & Electronics
Spring 2013: ET366, Microcontrollers (I developed this course)
Spring 2013: ET260, Electronic Circuits Design & Analysis I
Spring 2013: ET365, Power Systems
Fall 2014: ET160/162, Basic Electricity & Electronics
Fall 2014: ET164, AC Principles & Circuits
Fall 2014: ET245, Logic Circuits
Fall 2014: ET367, Motor Control & Drive Systems

2013-2014   Southern Illinois University, Carbondale, Illinois

Position: Faculty
Fall 2013: ECE356, Systems and Controls
Fall 2013: ECE593w, Advanced Topics in Software Engineering
Spring 2014: ECE356, Systems and Controls
Spring 2014: ECE530, Engineering Data Acquisition

2012   Missouri University of Science and Technology, Rolla, Missouri
Position: Teaching Assistant
Summer 2012: EE231, Modern Control Engineering

2007-2008   Iran University of Science and Technology, Tehran, Iran
Position: Teaching Assistant
Fall & Spring 2008: Control Systems Lab

1999   SAIPA Co. (automobile manufacturer), Tehran, Iran
Position: Intern
Summer 1999: PLC programming using ladder diagrams

Administrative Positions:

2013-2014   Southern Illinois University (SIU), Carbondale, Illinois
Position: Graduate Academic Advisor, September 2013 – July 2014

Awards and Honors:

1) Best presenter runner-up at sixth annual poster presentation of ISC-supported research, Rolla, MO, November 4, 2010.
2) Excellent student (top 3%) among all students in master's program at Iran University of Science and Technology, Iran, 2008.
3) Among top 800 (of 12,000) students in the nationwide M.S. entrance exam, Iran, 2006.
4) Among top 100 (of one million) students in the nationwide university entrance exam, Iran, 1995.
5) Top student in scientific competitions of the Khuzestan province, Iran, 1994.

Research Fields of Interest:

Nonlinear and Chaotic Dynamical Systems
Discrete-Time and Continuous-Time Adaptive Neural Network Based Control
Robust Optimal Adaptive Control for Nonlinear Systems
Strict Feedback Systems Control
Nonlinear Adaptive Hybrid Control Systems with Applications to Power Electronics Systems
Applied to Hybrid Vehicles
Extremum Seeking for Nonlinear Systems Applied to Maximum Power Point Tracking of
Photovoltaic Cells
Optimal Control of Non-Minimum Phase Linear Systems applied to Boiler Systems
Aerospace and Unmanned Aerial Vehicle Navigation (UAV) Control Systems
Mechanical Under-Actuated Control Systems
Output Feedback Control of Homogeneous Charge Combustion Ignition (HCCI) Engines

Professional Experience and Leadership:

Advisor (2013-2014), Southern Illinois University Robotics Club ([Facebook Link](#))

Advisor (2014-present), Robotics Club of SEMO ([Facebook link](#))

Technical Advisor (2012 and 2013), FIRST Local Robotics Competitions

Member, IEEE (2006-present)

Reviewer, *IEEE CDC and ACC Conferences*

Reviewer, *Transactions of the Institute of Measurement and Control*

Reviewer, *IEEE Transactions on System, Man and Cybernetics*

Reviewer, *IEEE Transactions on Neural Network and Learning Systems*

Reviewer, *International Journal of Adaptive Control and Signal Processing*

Industrial Experience:

Panam Azma, Tehran, Iran, 2001-2005

Position: Production Manager
1) Designed, implemented, and produced numerous intelligent air disinfecting systems based on UVC lamps

Kaveh Group Co., Tehran/Saveh, Iran, 1999-2001

1) Position: PLC Programmer

Programming Skills:

MATLAB/SIMULINK

PLC ladder programming

Microcontrollers' C and Assembly language

Visual Basic programming

Protel (for printed circuit board design)

Microcontroller Programming Skills:

PIC, AVR, and 8051 microcontroller series

C2000 digital signal processors (DSPs)

ARM Cortex-A8 processor by Texas Instruments

Publications:

Book Chapters:

[1] H. Zargarzadeh, Q. Yang, S. Jagannathan, "Online Optimal Control of Nonaffine Nonlinear Discrete-Time Systems without Using Value and Policy Iterations," in *Reinforcement Learning and Approximate Dynamic Programming for Feedback Control*, IEEE Press, 2012.

[2] D. Nodland, H. Zargarzadeh, A. Gosh, and S. Jagannathan, "Neural Network-Based Optimal Control of an Unmanned Helicopter," in *Advanced Intelligent and Autonomous Aerospace* Systems, AIAA, 2013.

Six 6 Most Recent Peer Reviewed Journal Papers:

[3] Ramezani, Zahra, Mohammad Mehdi Arefi, Hassan Zargarzadeh, and Mohammad Reza Jahed-Motlagh. "Neuro observer-based control of pure feedback MIMO systems with unknown control direction." *IET Control Theory & Applications* (2016).

[4] Ramezani, Zahra, Mohammad Mehdi Arefi, Hassan Zargarzadeh, and Mohammad Reza Jahed-Motlagh. "Neuro-adaptive backstepping control of SISO non-affine systems with unknown gain sign." *ISA transactions* (2016).

[5] Zargarzadeh, Hassan, Travis Dierks, and Sarangapani Jagannathan. "Optimal control of nonlinear continuous-time systems in strict-feedback form." *IEEE transactions on neural networks and learning systems* 26, no. 10 (2015): 2535-2549.

[6] Zargarzadeh, H., T. 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* 28, no. 3-5 (2014): 305-324.

[7] Nodland, David, Arpita Ghosh, H. Zargarzadeh, and S. Jagannathan. "Neuro-optimal control of an unmanned helicopter." *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology* (2012).

[8] Nodland, David, Hassan Zargarzadeh, and Sarangapani Jagannathan. "Neural network-based optimal adaptive output feedback control of a helicopter UAV." *IEEE transactions on neural networks and learning systems* 24, no. 7 (2013): 1061-1073.

Six Recent Peer Reviewed Conference Papers:

[9] Khatibi, Mohammad, Turaj Amraee, Hassan Zargarzadeh, and Mohammadreza Barzegaran. "Comparative analysis of dynamic model reduction with application in power systems." In *2016 Clemson University Power Systems Conference (PSC)*, pp. 1-6. IEEE, 2016.

[10] Ahmadi, Reza, and Hassan Zargarzadeh. "A new discrete-in-time extremum seeking based technique for maximum power point tracking of photovoltaic systems." In *2015 IEEE Applied Power Electronics Conference and Exposition (APEC)*, pp. 1751-1756. IEEE, 2015.

[11] Zargarzadeh, Hassan, Sarangapani Jagannathan, and James A. Drallmeier. "Extremum-seeking for nonlinear discrete-time systems with application to HCCI engines." In *2014 American Control Conference*, pp. 861-866. IEEE, 2014.

[12] Al-Jodah, Ammar, Hassan Zargarzadeh, and Maythem K. Abbas. "Experimental verification and comparison of different stabilizing controllers for a rotary inverted pendulum." In *Control System, Computing and Engineering (ICCSCE), 2013 IEEE International Conference on*, pp. 417-423. IEEE, 2013.

[13] Zargarzadeh, Hassan, Qinmin Yang, and S. Jagannathan. "Online optimal control of nonaffine nonlinear discrete-time systems without using value and policy iterations." *Reinforcement Learning and Approximate Dynamic Programming for Feedback Control* (2013): 221-257.

[14] Zargarzadeh, Hassan, Travis Dierks, and Sarangapani Jagannathan. "Optimal adaptive control of nonlinear continuous-time systems in strict feedback form with unknown internal dynamics." In *2012 IEEE 51st IEEE Conference on Decision and Control (CDC)*, pp. 4127-4132. IEEE, 2012.