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Professional Preparation

Education

- Ph.D. Mechanical Engineering, Sharif University of Technology, Tehran, 1999.
- MSc. Mechanical Engineering, Sharif University of Technology, Tehran, 1993.
- BSc. Mechanical Engineering, KNT University of Technology, Tehran, 1991.

Employment History

Academic Experience

Jul 2016 - Present	Associate Professor, Mechanical and Aerospace Engineering, University of Alabama in Huntsville (UAH)
Jan 2010 – Jul 2016	Assistant Professor, Mechanical and Aerospace Engineering, University of Alabama in Huntsville (UAH)
Aug 2005 – Dec 2009	Assistant Professor, Mechanical Engineering Department, University of Alberta, Edmonton, Alberta, Canada
Jan 2002 – Aug 2005	Visiting Assistant Professor, Mechanical Engineering Department, Villanova University, Villanova PA, USA
Jan 2000 – Jan 2002	Post-Doctorate Fellow, Mechanical Engineering Department, Villanova University, Villanova PA, USA
Sept 1993 – Sept 1996	Instructor, Sharif University of Technology, Tehran, Iran
Sept 1993 – Sept 1996	Instructor, KNT University of Technology, Tehran, Iran

Industrial Experience

Jun 1998 – Dec 1999	Part-Time Design Engineer, R&D Department, Dana Automotive Research Center, Tehran, Iran
Sept 1995 – May 1998	Part-Time Design Engineer, Automotive Industries Research and Innovation Center, Tehran, Iran

Awards

Outstanding Junior Professor Award, College of Engineering, UAH, 2014.

Summer Faculty Fellowship Program, 2016, NASA, Marshall Space Flight Center (MSFC), 2016.

Teaching and Student Supervision

Courses taught

UAH (2010 – present)

Course	Semesters	Average enrollment	Student evaluation score
MAE364 – Kinematics of Machines	3	34 (undergraduate)	Ave.: 93%; Min: 87%; Max: 97%
MAE/CE 271 – Statics	2	39 (undergraduate)	Ave.: 92%; Min: 89%; Max: 94%
MAE/CE 272 – Dynamics	17	58 (undergraduate)	Ave.: 90%; Min: 63%; Max: 96%
MAE 695ST – Intro to Robotics	6	14 (graduate)	Ave.:97%; Min: 95%; Max: 100%
MAE 695ST – Advanced Robotics	5	13 (graduate)	Ave.: 96%; Min: 90%; Max: 100%

University of Alberta (2005 - 2009)

Course	Semesters	Average enrollment	Student evaluation score
Mec E 250 – Engineering Mechanics: Dynamics	3	31 (undergraduate)	Ave.: 4.5/5.0; Min: 3.9/5.0; Max: 4.8/5.0
Mec E 301 – Mechanical Engineering Laboratory I (Mechanical Measurements)	4	66 (undergraduate)	Ave.: 4.0/5.0; Min: 3.8/5.0; Max: 4.3/5.0
Mec E 362 – Mechanics of Machines	2	92 (undergraduate)	Ave.: 3.2/5.0; Min: 2.8/5.0; Max: 3.6/5.0
Mec E 651 – Advanced Robotics	1	6 (graduate)	Ave.: 4.9/5.0; Min: 4.9/5.0; Max: 4.9/5.0

Villanova University (2002 - 2005)

Course	Semesters	Average enrollment	Student evaluation score
ME 2900 - ME Laboratory I	3	20 (undergraduate)	N/A
ME 3900 - ME Laboratory II	3	20 (undergraduate)	N/A
ME 4102 - System Dynamics	1	25 (undergraduate)	N/A
ME 4902 - ME Laboratory III	3	20 (undergraduate)	N/A
ME 5201 - Introduction to Finite Elements	3	25 (undergraduate)	N/A
ME 7040 - Introduction to Finite Element Analysis	3	8 (graduate)	N/A
ME 8200 - Elasticity & Stress Analysis	2	8 (graduate)	N/A

Contributions to the courses taught**UAH (2010 – present)**

- *MAE 364 (Kinematics and Dynamics of Machines)*: Developed 8 online quizzes (a total of 90 multiple-choice questions) using the free online “Kahoot!” educational system to teach MAE364 concepts via interaction with the students in class. Shared “Kahoot!” quizzes with Dr. Daniel Armentrout to use in his MAE364 classes in parallel to mine.
- *MAE/CE 272 (Dynamics)*: revised the order of the material discussed in class for a better flow and continuity; prepared 12 new exercise series with complete problem solving instructions explaining method of solution to be used by the students during the class time; prepared solution to 48 homework problems reflecting the specific methods that were taught in class rather than using the generic/incomplete solutions off of the textbook's solution manual; adapted the course material for CANVAS.
- *MAE695ST (Advanced Robotics)*: offered the graduate course that I had developed at the University of Alberta (Mec E 651) for the first time at UAH.
- *MAE695ST (Introduction to Robotics, Kinematics and Dynamics)*: offered a new graduate course that I developed with consultation with ECE/MAE colleagues to complement the related existing courses

University of Alberta (2005 - 2009)

- *Mec E 301 (Mechanical Measurement Laboratory)*: developed 10 PowerPoint lecture presentations with total number of 180 slides to take full advantage of the Smart Classroom features; developed 8 data sheet booklets for 8 experiments to be used by the students during the experiments to organize and speed up data collection (containing 59 data tables in 23 pages); developed the course material for WebCT (online course management).
- *Mec E 362 (Theory of Machines and Mechanisms)*: reorganized the order of the material discussed in class for a better consistency with the co-requisite Mec E 360 course requirements; developed 20 templates for graphical method of solution; developed 6 bundles of solved practice problems as students extra study material (45 pages); developed the course material for WebCT (online course management).
- *Mec E 651 (Advanced Robotics)*: developed this completely new graduate course in the advanced robotics field; developed material for fourteen 3.0 hour lectures; developed 300 pages of course notes including the design of 30 problems and their solution; developed the course material for WebCT (online course management).

Student supervision

Gray background indicates completed. **S**: Spring semester; **M**: Summer semester; **F**: Fall semester.

UAH (2010 - Present)

Name	Deg.	Duration	Co-supervisor	Thesis/Project
Noman A. Mohammad	MSc	F18-present	N/A	<i>Thesis</i> : Adaptive control of a robotic lawnmower
Nishanth Goli	PhD	F18-Present	N/A	<i>Thesis</i> : Reinforcement learning control of a quad-rotor UAV
Thiago Alves	PhD	S17-F19	Tommy Morris (95%)	<i>Thesis</i> : Cyber-security of cyber-physical systems – Power plants
Rishabh Das	PhD	S17-M20	Tommy Morris (95%)	<i>Thesis</i> : Cyber-security of cyber-physical systems – Robotic systems
Zhenglai Shen	PhD	F17-present	Hongyu Zhou (50%)	<i>Thesis</i> : Reinforcement learning control of building HVAC
Yawen He	PhD	F17-present	Hongyu Zhou (50%)	<i>Thesis</i> : Reinforcement learning control of building HVAC
Xiaoshan Wang	MSc	S17-F19	N/A	<i>Thesis</i> : Nonlinear control of quadcopters
Joshua Hill	PhD	S17-present	N/A	<i>Thesis</i> : Nonlinear discrete sliding mode control
Jeremy Rice	PhD	S16-present	N/A	TBD
Robert Stough	PhD	F16-present	N/A	<i>Thesis</i> : Nonlinear control of solar sails
Khomsun Singhirunnusorn	PhD	S16-S20	Ramazan Aygun (%50)	<i>Thesis</i> : 360-Deg Vision-Based Localization with Application to Mobile Robots
Brain Bae	PhD	F15-S20	N/A	<i>Thesis</i> : Reinforcement learning control of a quad-rotor UAV
Joseph Martin	MSc	F15-S16	N/A	<i>Thesis</i> : Vision-based control of UAVs
Swaroop Kotike	MSc	S15-F16	N/A	<i>Thesis</i> : Self-leveling lunar rover
Chandra Panathula	PhD	F14-F17	Yuri Shtessel (50%)	<i>Thesis</i> : Ultra-high accuracy sensor signal reconstruction

Name	Deg.	Duration	Co-supervisor	Thesis/Project
Jerry Sweafford	PhD	S13-Present	N/A	<i>Thesis:</i> Robust walking control for a biped robot
Semih Dinc	PhD	F12-F16	Ramazan Aygun (%50)	<i>Thesis:</i> Vision-based control of ground robot
Sai Susheel Praneeth Kode	MSc	S13-S15	N/A	<i>Thesis:</i> Discrete sliding mode control of ground robots
John Alcorn	BSc	F14	N/A	<i>Honors thesis:</i> Neural networks for control
Karan Thakur	MSc	F11-F13	N/A	<i>Thesis:</i> Vision-based control of undersea robot
Lauren Griggs	MSc	S11-S13	N/A	<i>Thesis:</i> Control of arm robotic prosthesis
Christopher Nolen	MSc	S11-S13	N/A	<i>Thesis:</i> Disturbance rejection for a humanoid gait
Joshua Hill	MSc	S10-F11	N/A	<i>Thesis:</i> Control of walking for a humanoid
Yaswanth Siramdasu	MSc	S10-S12	N/A	<i>Thesis:</i> Control of unmanned boats
Chandra Panathula	MSc	S10-S12	Yuri Shtessel (30%)	<i>Thesis:</i> Sliding-free control of lunar rover
Richard Dyar	BSc	M13	N/A	<i>Project:</i> Lunar rover hardware systems
Kirby Viall	BSc	M11	N/A	<i>Project:</i> Obstacle avoidance software coding
Charles Boyles	BSc	M10	N/A	<i>Project:</i> Robotics Research Lab Start-up/Setup
Patrick Giddens	BSc	M10	N/A	<i>Project:</i> Robotics Research Lab Start-up/Setup
Dwiti Patel	BSc	M10	N/A	<i>Project:</i> Robotics Research Lab Start-up/Setup
Joel Grissom	BSc	M10	N/A	<i>Project:</i> Robotics Research Lab Start-up/Setup

University of Alberta (2005 - 2009)

Name	Deg.	Duration	Co-supervisor	Thesis/Project
Alejandro Martinez	MSc	S10-S14	Dr. Robert Koch (%50)	<i>Thesis:</i> Dynamic identification of an unmanned helicopter
Sepehr Khaligh	PhD	S09-S14	Dr. Robert Koch (%50)	<i>Thesis:</i> Coordination and control of multiple unmanned aerial vehicles
Mehdi Saffarian	MSc	S07-S09	N/A	<i>Thesis:</i> Model predictive formation control for autonomous helicopters
Guang Yang	MSc	S05-S07	N/A	<i>Thesis:</i> Trajectory-tracking controller design for an autonomous helicopter
Junzhao Zhao	MSc	S05-S07	N/A	<i>Thesis:</i> An indoor laboratory testbed for helicopter control design verification
Christopher van Kleek	MSc	S07-S09	Dr. R. Koch (30%)	<i>Thesis:</i> Decentralized formation controller design for strings of autonomous boats
Daniel Schoerling	MSc	F07-F08	N/A	<i>Thesis:</i> Sliding mode controller design for multiple surface vessels in 2D formations
Michael Dawson	MSc	S09-S11	Dr. J. Carey (50%)	<i>Thesis:</i> Development of intelligent robotic lower limb prosthesis with semi-active controls
Richard Renaud	BSc	M09	N/A	<i>Project:</i> Dynamic and aerodynamic

Name	Deg.	Duration	Co-supervisor	Thesis/Project
				identification of a helicopter
Brendan Ferguson	BSc	M09	N/A	<i>Project:</i> Development of a moment of inertia testbed
Shawn Prasad	BSc	M09	N/A	<i>Project:</i> Identification of a spatial actuation mechanism
Ben Topinka	BSc	M09	N/A	<i>Project:</i> Development of a 6DOF force/moment measurement testbed
Caleb Schulz	BSc	M09	Dr. J. Carey (50%)	<i>Project:</i> Design of a prosthetic robotic arm
Michael Dawson	BSc	M08	N/A	<i>Project:</i> Moment of inertia measurements testbed for autonomous vehicles
Matthew Bourassa	BSc	M08	Dr. Moussa (50%)	<i>Project:</i> An indoor laboratory testbed for helicopter rotor aerodynamic force measurements
Jason Meers	BSc	M07	Dr. C. Lange (40%)	<i>Project:</i> Aerodynamic analysis of a helicopter rotor in hovering and forward flight
Tania Wood	BSc	M07	N/A	<i>Project:</i> Selection, purchase, assembly of a helicopter for flight tests
Matthew Bourassa	BSc	M07	N/A	<i>Project:</i> On-board flight computer and inertial sensors integration and packaging
Michael Dawson	BSc	M07	N/A	<i>Project:</i> Assembly and flight test of the Maxi-Joker II unmanned helicopter
Andrew Browne	BSc	M06	N/A	<i>Project:</i> Construction of a small six-legged walking robot
Elizabeth Otto	High Sch.	M09	N/A	<i>Project:</i> High school student helping Renaud
Miruna Marin	High Sch.	M09	N/A	<i>Project:</i> High school student helping Dawson

Villanova University (2002 - 2005)

Name	Deg.	Duration	Co-supervisor	Thesis/Project
Rineesh Sidhareddy	MSc	S03-S05	Dr. C. Nataraj (10%)	<i>Thesis:</i> Modeling and trajectory-tracking control of unmanned surface vessels
Mehdi Nikkhah	MSc	S03-S05	Dr. H. Ashrafioun (50%)	<i>Thesis:</i> Robust control design for under-actuated biped walking robots

Student exam committee member

UAH (2010 – present)

- 20 PhD students and 5 Master's students.

University of Alberta (2005 - 2009)

- 11 PhD students and 7 Master's students.

Service

Professional Development

UAH (2010 - present)

- UAH/COE Retention and Persistence Workshop, UAH (Fall 2019)
- Responsible Conduct of Research (RCR) - C - Conflicts of Interests, UAH (Fall 2015)
- Responsible Conduct of Research (RCR) – Case Studies in Research Misconduct, UAH (Fall 2015)
- NIH Financial Conflict of Interest (FCOI), UAH, (Web Based) (Fall 2012)
- U of MT: Section 1 - Ethical Issues, UAH, (Web Based) (Fall 2012)
- Responsible Conduct of Research (RCR) - A - Research Misconduct, UAH (Fall 2011)
- Responsible Conduct of Research (RCR) - B - Conflict of Interest, UAH (Fall 2011)
- Responsible Conduct of Research (RCR) - Introduction, UAH, (Web Based) (Fall 2011)

University of Alberta (2005 - 2009)

To improve the students perception of my teaching, I attended the following seminars and workshops:

- Workshop by University of Alberta's University Teaching Services (UTS).
- New Faculty Forum, seminar on “Learning Objectives.”
- Mechanical Engineering Graduate Students Association (MEGSA) and the Department of Mechanical Engineering, seminars on “Excellence in Engineering Learning and Teaching.”

Committee Service

UAH (2010 - present)

- 2028 Strategic Planning Committee Member (Educational), College of Engineering (Spring 2020).
- Civil and Environmental Engineering Lecturer Search Committee Member (Spring 2020).
- Civil and Environmental Engineering Tenure-Track Search Committee Member (Spring 2020).
- Mechanical and Aerospace Engineering First-Year Reappointment Committee Chair (1 position) (2020).
- CEE Tenure, Promotion, and Reappointment Committee Member (3 faculty members) (2019).
- ECE Tenure, Promotion, and Reappointment Committee Member (4 faculty members) (2019).
- Mechanical and Aerospace Engineering Search Committee Member (2017).
- Mechanical and Aerospace Engineering Graduate Committee Member (2016 – present).
- Mechanical Engineering Graduate Coordinator (2016 – present).
- Mechanical and Aerospace Engineering Search Committee Member (2016).
- Electrical and Computer Engineering Search Committee Member (2014 – 2015).
- Mechanical and Aerospace Engineering Search Committee Member (2014 – 2015).
- Mechanical Engineering Graduate Committee Member (2010 – present).
- Aerospace Engineering Undergraduate Committee Member (2012 – 2014).

- Associate Dean of Undergraduate Studies Search Committee Member (Spring 2011).

University of Alberta (2005 - 2009)

- Mechanical Engineering Graduate Committee (2006 – 2009).
- Faculty of Engineering Nomination Committee (2007 – 2009).

Public service

UAH (2010 - present)

- Invited presentation: Vision-Based Small Satellite Formation Control: A Feasibility Analysis, NASA Marshall Space Flight Center (MSFC) - Summer Faculty Fellowship Program, Presentation: October 11, 2016.
- Invited presentation: An [almost] invisible controller for the unexpected unexpected! IEEE Joint Robotics & Automation - Controls Systems (JRACS) Society, April 17, 2015.
- Invited presentation: Unmanned Systems - From Research to Applications, UAH Alumni Association, Alumni Lunch & Learn, March 11, 2013.
- Invited presentation: UAH Unmanned Systems Research, NASA/Army/Industry/Academia Systems and Software Engineering Forum, July 26, 2011.
- Invited presentation: Careers in robotics, Sci-Quest's Career Quest (Robotics), February 22, 2010.

Editorial service

- Editorial board member of Journal: *Nonlinear Engineering - Modeling and Application* (4 issues per year), since 2011.
- Editorial board member of Journal: *Nonlinear Dynamics and Control* (4 issues per year), since 2016.

Organizing conferences

UAH (2010 - present)

- Session chair of Dynamics and Controls Track, ASME's International Mechanical Engineering Congress and Exposition (IMECE 2011), November 2011, Denver, CO.
- International committee member, the 13th, 14th, and 15th Conference on Control and Applications (CA), International Association of Science and Technology for Development (IASTED), July 2011: Vancouver, BC, Canada; June 2012: Crete, Greece, June 2012; August 2013: Honolulu, HI, USA.

University of Alberta (2005 - 2009)

- Co-organizer, special session, the ASME Conference on Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS), September 2009, Santa Barbara, CA, USA.
- International committee member, the 10th, 11th, and 12th conference on Control and Applications, International Association of Science and Technology for Development (IASTED), Quebec City, QC, May 2008; Cambridge, UK, July 2009; Montreal, QC, Canada, July 2010.
- I co-organized the Symposium on Nonlinear Modeling and Control of Smart Material Systems for the International Nonlinear Science and Complexity Conference (Beijing, China), August 7-12, 2007.

Funding review

- NSF Panel for REU Research Site: Reviewed 9 proposals (2014)

- NSERC (NSF of Canada) Mechanical Engineering Grant Selection Committee (GSC) (2007-2009)

Paper and book reviews

Fall 2019	IFAC - 2020 World Congress Dynamic Systems, Measurement, and Control
Spring 2017	Nonlinear Engineering - Modeling and Application
Spring 2012	Journal of Mechanical Design
Spring 2010	Automatica IET Control Theory & Applications Journal Control Engineering Practice Robotica International Journal of Robust and Nonlinear Control IEEE Transactions on Control System Technology
Spring 2009	ASME's Computers and Information in Engineering Conferences
Spring 2008	International Journal of Vehicle Systems Modeling and Testing Springer Journal of Vibration and Control
Spring 2007	Shock and Vibration Journal IEEE Journal of Oceanic Engineering
Spring 2006	Transactions of the Society for Modeling and Simulation International
Spring 2005 - Spring 2009	IEEE RAS/EMBS International Conference on Biomedical Robotics ASME's International Mechanical Engineering Conferences and Expositions (IMECE) ASME's International Design Engineering Technical Conferences IEEE/RSJ International Conferences on Intelligent Robots and Systems IEEE Conferences on Decision and Control IEEE Multi-Conferences on Systems and Control
Spring 2005 - Spring 2015	Journal of Control and Intelligent Systems IEEE American Control Conferences
Spring 2005 - Spring 2018	IEEE Transactions on Robotics

Research

Research support

UAH (2010 - present)

Applicants	Title of proposal, funding source & program	Amount	Years of tenure
Awarded – Federal, State, and International			
C-k Kang (PI); F. Fahimi; R. Griffin; D. Landrum; T. Lee; B. Mesmer; G. Zhang (Co-Is)	Marsbee - Swarm of Flapping Wing Flyers for Enhanced Mars Exploration <i>NASA – NIAC 2018 – Phase I</i>	\$125,000 (15%)	2018
H. Zhou (PI), F. Fahimi (Co-I)	Self-adaptation in building skins to changing external and internal conditions through responsive meta-materials and reinforcement learning control <i>NSF</i>	\$365,022 (50%)	2017-2020
T. Morris (PI), H. Zhou, F. Fahimi, R. Gaede, K. Chittur (Co-Is)	Virtual Industrial Control Systems for Cyber-security Engineering Education <i>NSF</i>	\$500,000 (20%)	2016-2019
F. Fahimi (PI), S. Dinc (PhD fellow)	An analytical solution to vision based trajectory tracking system using 3D models of targets <i>Alabama - EPSCoR</i>	\$25,000	2015-2016
Dr. Ameer Abdullah Tourir (PI), F. Fahimi (Co-I), and 3 other Co-Is	3D formation control in a heterogeneous multi-robot system using swarm intelligence in a hazardous environments <i>National Science, Technology and Innovation Plan (NSTIP) (Kingdom of Saudi Arabia) (with King Saud University)</i>	\$500,399 (10%)	2015-2017 (<i>King Saud University never honored the grant!</i>)
F. Fahimi (PI), J. Sweafford (PhD fellow)	Feedback control for disturbance reduction and stability improvement in biped walking robot <i>NASA - Alabama Space Grant Consortium program</i>	\$37,000	2015-2016 (Renewed)
F. Fahimi (PI), R. Aygun (Co-I)	REU site: Fundamental research topics related to unmanned systems <i>NSF – Engineering Education Centers program</i>	\$297,791 (50%)	2014-2017
F. Fahimi (PI), J. Sweafford (PhD fellow)	Feedback control for disturbance reduction and stability improvement in biped walking robot <i>NASA - Alabama Space Grant Consortium program</i>	\$37,000	2014-2015 (First Year)
P. Farrington (PI), F. Fahimi (Co-I), and 3 other Co-Is	Collaborative research: Planning grant: I/UCRC for advanced vehicle manufacturing <i>NSF – I/UCRC program</i>	\$11,500 (20%)	2014-2015
Awarded – Internal UAH Sources			
F. Fahimi (PI)	Implementation of a Self-Leveling Suspension Controller on a Legged Rover <i>UAH -Honors College Mini-grant</i>	\$313	2017
F. Fahimi (PI), R. Aygun (Co-I)	Artificial Intelligence for Ground Robots for Autonomous Coverage of Designated Areas <i>UAH – RCEU 2018</i>	\$3200	2018
F. Fahimi (PI), R. Aygun (Co-I)	Human-robot cooperation via artificial robotic vision <i>UAH – CCFR</i>	\$5,000 (50%)	2015-2016 (Renewed)
F. Fahimi (PI), R.	Human-robot cooperation via artificial robotic vision	\$5,000	2014-2015

Applicants	Title of proposal, funding source & program	Amount	Years of tenure
Aygun (Co-I)	UAH – CCFR	(50%)	(First year)
F. Fahimi	Coordination & control for groups of unmanned helicopters UAH – JFDR	\$10,008	2012-2013
F. Fahimi	Research projects on autonomous vehicles and controls UAH – Graduate Research Assistant Support	\$114,000	2011-2013

University of Alberta (2005 - 2009)

Applicants	Title of proposal, funding source & program	Amount	Years of tenure
Awarded – Federal, and Industrial			
F. Fahimi	Testbeds for autonomous vehicle identification NSF (of Canada) – Research Tools & Instruments Grant program	\$19,885	2009
J. Carey (PI), F. Fahimi (Co-I), J. Hebert et. al. (GlenroseHospital)	Development of myoelectric training tool for above elbow arm amputees Glenrose Rehabilitation Hospital – Clinical Research Fund	\$10,000 (50%)	2008-2009
S. Behzadipour (PI), F. Fahimi (Co-I).	Infrastructure for the Advanced Robotics Research Laboratory Canada Foundation for Innovation	\$143,605 (50%)	2007-2008
F. Fahimi.	Control of autonomous vehicle group formations NSF (of Canada) - Discovery Grant Program	\$95,000	2006-2009

Villanova University (2002 - 2005)

Applicants	Title of proposal, funding source & program	Amount	Years of tenure
Awarded - Federal			
F. Fahimi (Senior Personnel)	Real-time trajectory planning for groups of unmanned marine vehicles US Navy, Office of Naval Research (ONR)	\$75,000 (100%)	2004-2005

Collaborators

UAH: Dr. Shtessel (Electrical and Computer Engineering), Dr. Aygun (Computing Science).

University of Alberta: Drs. Koch, Carey, Behzadipour, Moussa, Nadler, Lipsett, Flynn (Department of Mechanical Engineering); Dr. Jagersand (Department of Computer Science).

Glenrose Rehabilitation Hospital: Appointed Research Affiliate (2007-2009).

Other Institutions: Dr. Jazar (RMIT, Melbourne, Australia).

Patents

Patents Pending:

- Remote Control Lawn Mower – Battery Powered (UAH Docket No.: UAH-P-18004)
- Remote Control Lawn Mower – Generator Powered and Autonomous (UAH Docket No.: UAH-P-18005)
- Remote Control Lawn Mower – Generator Powered (UAH Docket No.: UAH-P-18006)

- Remote Control Lawn Mower – Battery Powered and Autonomous (UAH Docket No.: UAH-P-18007)

List of publications

Underline indicates the student coauthor. Asterisk indicates the presenter of the conference papers.

Book

Fahimi, F., *Autonomous robots: Modeling, path planning, and control*, Springer, New York, Nov 2008, 345 pages. (<http://www.springer.com/engineering/book/978-0-387-09537-0>)

Journal publications

- [1] Bae H. W., Fahimi, F., “A single-loop online reinforcement learning trajectory tracking controller for autonomous quadrotors,” *International Journal of Robust and Nonlinear Control*, under preparation, January **2021**.
- [2] Singhirunnusorn, K., Fahimi, F., Aygun, R., “A single camera 360-degree realtime vision-based localization method with application to mobile robot trajectory tracking,” *IET Computer Vision*, submitted, December **2020**.
- [3] Bae H. W., Fahimi, F., “A single-loop MIMO trajectory tracking controller for autonomous quadrotors: The control point concept,” *Robotica*, accepted, October **2019**.
- [4] Sweafford, J., Fahimi, F., “Model-free online reinforcement learning control of a robotic manipulator,” *Mechatronic Systems and Control*, v 47, pp. 136-143, January **2019**.
- [5] Fahimi, F., “Vision-based CubeSat closed-loop formation control in close proximities,” *Nonlinear Engineering*, v 8, n 1, pp. 609-618, January **2019**.
- [6] Fahimi, F., Kotike, S., Rameshbabu, R., “A self-leveling higher order sliding mode controller for a leg-wheeled robot with experiments,” *Mechatronic Systems and Control*, v 46, n 3, pp. 132-140, June 14, **2018**.
- [7] Bluman, J. E., Pohly, J. A., Sridhar, M. K., Kang, C-k., Landrum, D. B., Fahimi, F., Aono, H., “Achieving bioinspired flapping wing hovering flight solutions on Mars via wing scaling,” *Bioinspiration and Biomimetics*, v 13, n 4, June 26, **2018**.
- [8] Singhirunnusorn, K., Fahimi, F., Aygun, R., “Single-Camera Pose Estimation using Mirage,” *IET Computer Vision*, v 12, n 5, pp. 720-727, August 1, **2018**.
- [9] Dinc, S., Fahimi, F., and Aygun, R., “Mirage: An $O(n)$ time analytical solution to 3D camera pose estimation with multi-camera support,” *Robotica*, v 35, n 12, pp. 2278-2296, December **2017**.
- [10] Dinc, S., Fahimi, F., and Aygun, R. “Vision-based trajectory tracking for mobile robots using mirage pose estimation method,” *IET Computer Vision*, v 10, n 5, pp. 450-458, August **2016**.
- [11] Khaligh, S. P., Fahimi, F., and Koch, C. R., “A system identification strategy for nonlinear model of small-scale unmanned helicopters,” *Journal of the American Helicopter Society*, v 61, n 4, October **2016**.
- [12] Nolen, C., and Fahimi, F., “Configuration control approach for external disturbance compensation of simulated humanoid robots,” *International Journal of Robotics and Automation*, v 31, n 2, p 93-99, **2016**.
- [13] Khaligh, S., Fahimi, F., Koch, R., “A fast inverse kinematic solution for the nonlinear actuating mechanisms of a small-scale helicopter,” *Multibody System Dynamics*, v 35, n 3, p 257-275, March 27, **2015**.
- [14] Fahimi, F., and Kode, S.S.P., “A universal trajectory tracking controller for mobile robots via model-free on-line reinforcement learning,” *Control and Intelligent Systems*, vol 43, no. 1, pp. 56-64, **2015**.
- [15] Hill, J., Fahimi, F., “Active disturbance rejection for walking bipedal robots using the acceleration of the upper limbs,” *Robotica*, vol. 33, no. 2, pp. 264-281, **2015**.
- [16] Khaligh, S. P., Fahimi, F., and Koch, C. R., “Control oriented modeling for nonlinear trajectory

- tracking control of small unmanned helicopters,” *Journal of Intelligent & Robotic Systems*, v 73, n 1–4, pp 209-217, **2014**.
- [17] Khaligh, S., Fahimi, F., and Koch, R. C., “A HIL testbed for initial controller gain tuning of a small unmanned helicopter,” *Journal of Intelligent and Robotic Systems*, vol. 73, no. 1-4, pp. 289-308, **2014**.
- [18] Panathula, C. B., Fahimi, F., Shtessel, Y. B., “Slip eliminator for robots on slippery 3D terrains,” *Control and Intelligent Systems*, vol. 42, no. 2, pp. 167-175, **2014**.
- [19] Griggs, L., Fahimi, F., “Introduction and testing of an alternative control approach for a robotic prosthetic arm,” *The Open Biomedical Engineering Journal*, vol. 8, pp. 93-105, **2014**.
- [20] Siramdasu, S., and Fahimi, F., “Nonlinear dynamic model identification methodology for real robotic surface vessels,” *International Journal of Control*, vol. 86, no. 12, pp. 2315-2324, **2013**.
- [21] Fahimi, F., “Full drive-by-wire dynamic control for 4-wheel-steer all-wheel-drive vehicles,” *Vehicle System Dynamics*, vol. 51, no. 3, pp. 360-376, March 1, **2013**.
- [22] Siramdasu, Y., Fahimi, F., “Incorporating input saturation for surface vessel control with experiments,” *Control and Intelligent Systems*, vol. 41, no. 1, pp. 49-55, **2013**.
- [23] Van Kleeck, C., and Fahimi, F., “Alternative trajectory-tracking control approach for marine surface vessels with experimental verification,” *Robotica*, vol. 31, no. 1, pages 25-33, **2013**.
- [24] Panathula, C. B., Fahimi, F., Shtessel, Y. B., “Nonlinear model predictive control versus linear time-variant control for mobile robots prone to input saturation,” *Nonlinear Engineering - Modeling and Application*, vol. 1, no.1, **2012**.
- [25] Dawson, M., Fahimi, F., Carey, J., “The development of a myoelectric training tool for above-elbow amputees,” *The Open Biomedical Engineering Journal*, **2012**, vol. 6, pages 5-15.
- [26] Dawson, M., Carey, J., Fahimi, F., “Myoelectric training systems,” *Expert Review of Medical Devices*, September **2011**, vol. 8, no. 5, Pages 581-589.
- [27] F. Fahimi, M. Saffarian, “The control point concept for nonlinear trajectory-tracking control of autonomous helicopters with fly-bar,” *International Journal of Control*, v 84, n 2, **2011**, p 242-252.
- [28] Schoerling, D., Van Kleeck, C., Fahimi, F., Koch, C. R., Ams, A., and Löber, P., “Experimental test of a robust formation controller for marine unmanned surface vessels,” *Autonomous Robots*, v 28, n 2, **2010**, p 213-230.
- [29] Saffarian, M., and Fahimi, F., “Non-iterative nonlinear model predictive approach applied to the control of helicopters' group formation,” *Robotics and Autonomous Systems*, v 57, n 6-7, **2009**, p 749-757.
- [30] Saffarian, M., and Fahimi F., “A model predictive framework for autonomous formation flight of helicopter groups,” *Control and Intelligent Systems*, v 37, n 4, **2009**, pages 1-7.
- [31] Fahimi, F., Nataraj, C., Ashrafiuon, H., “Real-time obstacle avoidance for multiple mobile robots,” *Robotica*, v 27, n , **2009**, p 189-191.
- [32] Fahimi, S.V.S. Rineesh, C. Nataraj, 2008, “Formation controllers for under-actuated surface vessels and zero-dynamics stability,” *International Journal of Intelligent Systems and Control*, **2008**, v 36, n 3, p 1-11.
- [33] Fahimi, F., “Full formation control for autonomous helicopter groups,” *Robotica*, v 26, n 2, March, **2008**, p 143-156.
- [34] Fahimi, F., “Sliding mode formation control for under-actuated surface vessels,” *IEEE Transactions on Robotics*, v 23, n 3, June, **2007**, p 617-622.
- [35] Fahimi, F., “Non-linear model predictive formation control for groups of autonomous surface vessels,” *International Journal of Control*, v 80, n 8, August, **2007**, p 1248-1259.

- [36] Nikkhah, M., Ashrafiuon, H., Fahimi, F., “Robust control of under-actuated bipeds using sliding modes,” *Robotica*, v 25, n 3, May, **2007**, p 367-374.
- [37] Fahimi, F., Browne, A., “Stiquito controlled! Making a truly autonomous robot,” *IEEE Control Systems Magazine*, v 26, n 2, **2005**, p 92-94.
- [38] Fahimi, F., Ashrafiuon, H., Nataraj, C., “Obstacle avoidance for spatial hyper-redundant manipulators using harmonic potential functions and the mode shape technique,” *Journal of Robotic Systems*, v 20, n 1, January, **2003**, p 23-33.
- [39] Fahimi, F., Ashrafiuon, H., Nataraj, C., “An improved inverse kinematic and velocity solution for spatial hyper-redundant robots,” *IEEE Transactions on Robotics and Automation*, v 18, n 1, February, **2002**, p 103-107.
- [40] Meghdari, A., Fahimi, F., “On the first-order decoupling of dynamical equations of motion for elastic multi-body systems as applied to a two-link flexible manipulator,” *Multi-body System Dynamics*, v 5, n 1, **2001**, p 1-20.
- [41] Esmailzadeh, E., Fahimi, F., “Optimal adaptive active suspensions for a full car model,” *Vehicle System Dynamics*, v 27, n 2, February, **1997**, p 89-107.

Peer-reviewed conference publications (* indicates the presenter)

- [1] Gaede, R. Morris, T., Lei, Y., Zhou, H., Alves, T., Das, R., “Work-in-Progress: Layering Cybersecurity on Domain Engineering Instruction,” *2019 ASEE Annual Conference & Exposition*, Tampa, Florida, June 15 - 19, **2019**.
- [2] Pohly, J.*, Kang, C.-k., Sridhar, M., Landrum, D. B., Fahimi, F., Bluman, J., Aono, H., Lee, T., “Scaling Bioinspired Mars Flight Vehicles for Hover,” *2019 AIAA Science and Technology Forum and Exposition*, San Diego, California, 7-11 Jan **2019**.
- [3] Pohly, J.*, Kang, C.-k., Sridhar, M. K., Landrum, D. B., Fahimi, F., Bluman, J., Aono, H., Liu, H., “Payload and power for dynamically similar flapping wing hovering flight on mars,” *2018 AIAA Atmospheric Flight Mechanics Conference*, n 209999, **2018**.
- [4] Dinc, S., Aygun, R. S., Fahimi, F., “An efficient pose recovery algorithm for vision based trajectory tracking applications,” *2018 International Conference on Information and Computer Technologies, ICICT 2018*, p 107-110, May 9, **2018**.
- [5] Bluman, J. E.*, Kang, C-K, Landrum, D. B., Fahimi, F., Mesmer, B., “Marsbee – Can a bee fly on mars?,” *AIAA SciTech Forum - 55th AIAA Aerospace Sciences Meeting*, **2017**.
- [6] Dinc, S.*, Aygun, R. S.; Fahimi, F., “GPU-Based robust image registration for composite translational, rotational and scale transformations,” *Proceedings of the 2015 IEEE International Symposium on Multimedia*, p 339-342, March 25, **2016**.
- [7] Dinc, S., Sigdel, M., Dinc, I., Sigdel, S.M., Fahimi, F., Aygun, R. *, “Depth-color image registration for 3D surface texture construction using kinect camera system,” *IEEE SoutheastCon 2014*, March 13-16, (Lexington, KY), **2014**.
- [8] Nolen, C.*, and Fahimi, F., “External disturbance compensation for humanoid robots via a configuration control approach,” *Proceedings of the ASME 2013 International Mechanical Engineering Conference and Exposition, IMECE2013-65021*, November 13-21, **2013**.
- [9] Dinc, S., Fahimi, F.*, Aygun, R., “Vision-based trajectory tracking approach for mobile platforms in 3D world using 2D image space,” *Proceedings of the ASME 2013 International Mechanical Engineering Congress and Exposition, IMECE2013-64969*, November 15-21, **2013**.
- [10] Khaligh, S. P., Martinez, A., Fahimi, F.*, and Koch, C. R., “A HIL testbed for small unmanned helicopter’s initial controller gain tuning,” *International Conference on Unmanned Aircraft Systems (ICUAS)*, p 383-391, **2013**.

- [11] Fahimi, F.*, and Thakur, K., “An alternative closed-loop vision-based control approach for unmanned aircraft systems with application to a quadrotor,” *International Conference on Unmanned Aircraft Systems (ICUAS)*, p 353-358, **2013**.
- [12] J. Traum*, C. Carmen, and F. Fahimi, “Design and development of a lunar rover in association with the google™ lunar X-prize competition,” *63rd International Astronautical Congress*, Naples, Italy, 12 pages, October **2012**.
- [13] Panathula, C. B., Fahimi, F.*, and Shtessel, Y. B., “Model predictive traction control for robots on slippery 3D terrains,” in proceedings of the *2012 IEEE American Control Conference*, (Montreal, Quebec, Canada), pp. 4257–4262, June **2012**.
- [14] Siramdasu, Y., and Fahimi, F.*, “Incorporating input saturation for under-actuated surface vessel trajectory tracking control,” in proceedings of the *2012 IEEE American Control Conference*, (Montreal, Quebec, Canada), pp. 6203–6208, June **2012**.
- [15] Siramdasu, Y., Fahimi, F.*, “Test of sliding mode controller for trajectory tracking of an under-actuated surface vessel,” *ASME 2011 International Mechanical Engineering Congress and Exposition*, (Denver, CO, USA), Nov 11-17, **2011**, 8 pages.
- [16] Hill, J., Fahimi, F.*, “Active disturbance rejection for bipedal walk of a humanoid using the motion of the arms,” *ASME 2011 International Mechanical Engineering Congress and Exposition*, (Denver, CO, USA), Nov 11-17, **2011**, 8 pages.
- [17] Pilarski, P.M.*, Dawson, M.R., Degris, T., Fahimi, F., Carey, J.P., and Sutton, R.S., “Human training for online myoelectric prosthesis control using actor-critic reinforcement learning,” *Proceeding of the 2011 IEEE International Conference on Rehabilitation Robotics*, (Zurich, Switzerland), June 27–July 1, **2011**, 7 pages.
- [18] Schoerling, D., Van Kleeck, C., Fahimi, F.*, and Koch, R., “Experiments with robust formation controller for under-actuated surface vessels,” *The IASTED International Conference on Control and Applications (CA 2009)*, July **2009**, 8 pages.
- [19] Khaligh, S. P., Fahimi, F.*, Saffarian, M., “Comprehensive aerodynamic modeling of a small autonomous helicopter rotor at all flight regimes,” *AIAA Modeling and Simulation Technologies Conference*, **2009**.
- [20] Saffarian, M., Fahimi, F.*, “Zero dynamics study of a model helicopter considering the effect of the control point,” *Proceedings of IMECE 2008*, ASME International Mechanical Engineering Congress and Exposition, September 31 - November 6, **2008**, Boston, USA.
- [21] Saffarian, M., Fahimi, F.*, “Control of helicopters' formation using non-iterative nonlinear model predictive approach,” *Proceedings of the American Control Conference*, June **2008**, 8 pages.
- [22] Yang, G., Fahimi, F.*, “Decentralized autonomous control for a string of cooperative helicopters,” *Proceedings of the Tenth IASTED International Conference on Control and Applications*, May, **2008**, p 36-41.
- [23] Zhao, J., Fahimi, F.*, “Laboratory testbed for formation control of groups of autonomous helicopters,” *Proceedings of the Tenth IASTED International Conference on Control and Applications*, May, **2008**, p 30-35.
- [24] Saffarian, M.*, Fahimi, F., “A comprehensive kinematic analysis of a model helicopter's actuating mechanism,” *Collection of Technical Papers - 46th AIAA Aerospace Sciences Meeting*, v 4, Collection of Technical Papers - 46th AIAA Aerospace Sciences Meeting, January, **2008**.
- [25] Fahimi, F.*, “Nonlinear model predictive formation control for groups of autonomous surface vessels,” *Proceedings of the Ninth IASTED International Conference on Control and Applications*, May, **2007**, p 15-20.
- [26] Saffarian, M.*, Fahimi, F., “Flight control of helicopter groups using nonlinear model predictive

- control,” *Proceedings of the Ninth IASTED International Conference on Control and Applications*, May, **2007**, p 51-56.
- [27] Saffarian, M., Fahimi, F., “Control of helicopters' formation using non-iterative nonlinear model predictive approach,” *Proceedings of the American Control Conference*, pp.3707-3712, June 2008.
- [28] Fahimi, F.*, “Towards full formation control of an autonomous helicopters group,” *IEEE Aerospace Conference Proceedings*, 2007 IEEE Aerospace Conference Digest, **2007**, p 4161347.
- [29] Saffarian, M.*, Fahimi, F., “A novel leader-follower framework for control of helicopter formation,” *IEEE Aerospace Conference Proceedings*, 2007 IEEE Aerospace Conference Digest, **2007**, p 4161587.
- [30] Saffarian, M.*, Fahimi, F., “A control framework for configurable formation flight of autonomous helicopters,” *Collection of Technical Papers - 45th AIAA Aerospace Sciences Meeting*, v 3, Collection of Technical Papers - 45th AIAA Aerospace Sciences Meeting, January, **2007**, p 1915-1926.
- [31] Fahimi, F.*, “Sliding mode formation control for under-actuated autonomous surface vehicles,” *Proceedings of the American Control Conference*, v **2006**, 2006, p 4255-4260.
- [32] Fahimi, F., Rineesh, S. V. S.*, Nataraj, C., “Formation control of under-actuated robotic boats,” ASME, Dynamic Systems and Control Division (Publication) DSC, v 74 DSC, n 2 PART B, *Proceedings of the ASME Dynamic Systems and Control Division 2005*, **2005**, p 1607-1615.
- [33] Nikkhah, M.*, Ashrafiun, H., Fahimi, F., “Sliding mode control of under-actuated biped robots,” ASME, Dynamic Systems and Control Division (Publication) DSC, v 74 DSC, n 2 PART B, *Proceedings of the ASME Dynamic Systems and Control Division 2005*, **2005**, p 1361-1367.
- [34] Fahimi, F.*, Nataraj, C., Ashrafiun, H., “Obstacle avoidance for groups of mobile robots using potential field technique,” ASME, Dynamic Systems and Control Division (Publication) DSC, v 73, n 2 PART B, *Proceedings of the ASME Dynamic Systems and Control Division 2004*, **2004**, p 1179-1186.
- [35] G. Nakhaie Jazar, M. Mahinfalah, M. Rastgaar Aagaah, and F. Fahimi, “Vehicles and nonlinear suspensions,” in *American Society of Mechanical Engineers, Design Engineering Division (Publication) DE*, vol. 116, (Washington, DC, United States), pp. 831 836, **2003**.
- [36] G. N. Jazar, M. R. Aagaah, M. Mahinfalah, and F. Fahimi, "Analysis of solitary waves in arteries," in *Proceedings of the ASME Design Engineering Technical Conference*, vol. 5 C, (Chicago, IL, United States), pp. 2173 - 2180, **2003**.
- [37] Fahimi, F.*, Ashrafiun, H., Nataraj, C., “Inverse kinematic solution for universal-jointed hyper-redundant robots,” *Proceedings of the ASME Design Engineering Technical Conference*, v 5 B, **2002**, p 1447-1454.
- [38] Fahimi, F.*, Ashrafiun, H., Nataraj, C., “Obstacle avoidance for 2D hyper-redundant manipulators using harmonic potential functions and the mode shape technique,” *Proceedings of the ASME Design Engineering Technical Conference*, v 6 B, **2001**, p 1919-1925.