

## Ali Agha (full name: Ali-akbar Agha-mohammadi) - CV

NASA-Jet Propulsion Laboratory, Caltech  
T1719-108, 4800 Oak Grove Dr, Pasadena, CA, 91109  
Phone number: 626-840-9140  
Email address: aliagha@jpl.nasa.gov  
Homepage: [https://www-robotics.jpl.nasa.gov/people/Ali\\_Agha/](https://www-robotics.jpl.nasa.gov/people/Ali_Agha/)

### Education and Research Experience

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#### *California Institute of Technology (Caltech), NASA-Jet Propulsion Laboratory, 2016-present*

Robotics Research Technologist  
Task manager, Principle investigator  
Focus: Robotic autonomy, robotic mobility, vision-based high-speed navigation

#### *Qualcomm Research, 2015-2016*

Research Staff Engineer, Robotist  
Started Qualcomm's efforts on robotic autonomy; led motion planning efforts  
Focus: Vision-based SPLAM (simultaneous planning, mapping, and localization) and obstacle avoidance for autonomous aerial vehicles  
Awarded twice for outstanding contributions

#### *Dept. of Aeronautics and Astronautics, Massachusetts Institute of Technology (MIT), 2013-2015*

Postdoctoral researcher  
Laboratory for Information and Decision Systems (LIDS)  
Aerospace Controls Laboratory (ACL)  
Research Focus: Planning under uncertainty for autonomous quad-copters

#### *Dept. of Computer Science and Engineering, Texas A&M University (TAMU), 2009-2013*

PhD in Computer Engineering (Robotics), GPA: 4/4  
Graduate Research Assistant in both *Aerospace Eng. Dept.* and *Computer Science and Eng. Dept.*  
Thesis: "**Sampling-based State Estimation and Stochastic Control for Robot Motion Planning under Motion Uncertainty and Noisy Sensor Measurements**"  
Thesis committee: Suman Chakravorty (Aero Dept.), Nancy Amato (CSE Dept.), P.R. Kumar (ECE), John Junkins (Aero), Dylan Shell (CSE), Ricardo Gutierrez (CSE)

#### *Dept. of Electrical and Computer Engineering, Khaje Nasir Toosi University of Technology, 2005-2008*

M.S. in Electrical Engineering (Control Systems and Robotics)  
Graduate Research Assistant in *ECE Dept.*  
Awarded for the highest GPA in class (out of 23)  
Thesis: "**Design and Implementation of Multi-sensor Fusion methods for Solving Simultaneous Localization And Mapping (SLAM) Problem**"  
Advisor: Hamid D. Taghirad (ECE Dept.)

#### *Dept. of Electrical and Computer Engineering, Tabriz University, 2001-2005*

B.S. in Electrical Engineering (Control Systems and Robotics)  
Awarded for the highest GPA in class (out of 30)  
Thesis: "**Robosoccer: Small-size Soccer Robots for Robocup Competitions**".

### Research Interests

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Robotic Mobility, Robotic Autonomy, Artificial Intelligence  
Robot Motion Planning and Navigation, Robot Localization and Mapping  
Stochastic Control, Estimation and Filtering Theory, Machine Learning

## Research Grants

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### Principal Investigator, and Task Manager

- [1] **Safety-critical Autonomy for Dynamical Space-Robotic Systems under Motion and Perception Uncertainty**, NASA, President's and Director's Fund Program, 17AW0044-105275. Total award: \$400,000, Period of performance: 2017-2018.
- [2] **Fast Traversing Autonomous Rover for Mars Sample Collection**, Caltech Jet Propulsion Laboratory, Mars Program Formulation Office, S60001-17.01.04. Total award: \$62,000, Period of performance: 2017.
- [3] **Look Before You Leap: Machine learning for Predicting Perception Failures**, Caltech Jet Propulsion Laboratory, Data Science LMC Investment Program, S8NDSS-81.17.05. Total award: \$50,000, Period of performance: 2017.
- [4] **Integrated Perception and Planning Under Uncertainty (IP2U2) for Robust Autonomy**, Caltech Jet Propulsion Laboratory, Research and Technology Development Program, R.17.021.088-01STCR. Total award: \$30,000, Period of performance: 2017.

### Co-I

- [5] **Fast Traversing Autonomous Rover for Mars Sample Collection**, Experimental Program to Stimulate Competitive Research (EPSCoR), Total award: \$750,000, Period of performance: 2017-2020.

## Publications and patents

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### Journal Papers under Review

- [1] [Under Review] A. Agha-mohammadi et al., “**SLAP: Simultaneous Localization and Planning for Physical Mobile Robots via Enabling Dynamic Replanning in Belief Space**”, *IEEE Transactions on Robotics (T-RO)*
- [2] [In Preparation] A. Agha-mohammadi et al., “**Asymptotically Optimal, Anytime Algorithm for Motion Planning Under Uncertainty**”
- [3] [In Preparation] A. Agha-mohammadi et al., “**Certainty-aware Mapping and Planning on Occupancy Grids: Toward High-speed Vision-based Quadcopter Navigation**”

### Journal Papers and Book Chapters

- [4] Shayegan Omidshafiei, A. Agha-mohammadi, Christopher Amato, Shih-Yuan Liu, Jonathan P. How and John Vian, “**Decentralized Control of Partially Observable Markov Decision Processes using Belief Space Macro-actions**”, *International Journal of Robotics Research (IJRR)*, vol. 36, no. 2, pp. 231-258, 2017.
- [5] Beipeng Mu, Liam Paull, A. Agha-mohammadi, Jonathan P. How, John J. Leonard, “**Two-Stage Focused Inference for Resource-Constrained Collision-Free Navigation**”, *IEEE Transactions on Robotics (T-RO)*, 99 (1), 1-17, 2017.
- [6] A. Agha-mohammadi, Suman Chakravorty, Nancy Amato, “**Sampling-based Feedback Motion Planning Under Motion Uncertainty and Imperfect Measurements**”, *International Journal of Robotics Research (IJRR)*, 33(2):268-304, February 2014.
- [7] Bernard Michini, Thomas J. Walsh, A. Agha-mohammadi, and Jonathan P. How, “**Bayesian Nonparametric Reward Learning from Demonstration**”, *IEEE Transactions on Robotics (T-RO)*, 31 (2), 369-386, 2015.
- [8] A. Agha-mohammadi, Saurav Agarwal, Suman Chakravorty, “**Periodic-node Graph-based Framework for Stochastic Control of Small Aerial Vehicles**”, *The ASME Journal of Dynamic Systems, Measurement & Control*, Special Issue on Stochastic Models, Control and Algorithms in Robotics, 137 (3), 031005, 2015.
- [9] Shayegan Omidshafiei, A. Agha-mohammadi, Yufan Chen, Nazim Kemal Ure, Shih-Yuan Liu, Brett Lopez, Rajeev Surati, Jonathan P. How and John L. Vian, “**Measurable Augmented Reality for Prototyping Cyberphysical Systems: A Robotics Platform to Aid the Hardware Prototyping and Performance Testing of Algorithms**”, *IEEE Control Systems Magazine (CSM)*, vol. 36, no. 6, pp. 65-87, 2016.
- [10] A. Agha-mohammadi, Sandip Kumar, Suman Chakravorty, “**Motion Planning under Uncertainty**”, Book

Chapter, J. Valasek (Ed.), *Advances in Intelligent and Autonomous Aerospace Systems*, Progress in Astronautics and Aeronautics, *American Institute of Aeronautics and Astronautics (AIAA)*, Reston, VA, 2012.

### Refereed Conference Papers

- [11][Under Review] A. Agha-mohammadi, “**Confidence-aware Occupancy Grid Mapping: Toward High-speed Vision-based UAV Navigation**”.
- [12] Eric Heiden, Karol Hausman, Gaurav S. Sukhatme and A. Agha-mohammadi, “**Planning High-speed Safe Trajectories in Confidence-rich Map**”, in *International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, September 2017.
- [13] Brian Ichter, Edward Schmerling, A. Agha-mohammadi and Marco Pavone, “**Real-Time Stochastic Kinodynamic Motion Planning via Multiobjective Search on GPUs**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 2017.
- [14] Beipeng Mu, Matthew Giamou, Liam Paull, A. Agha-mohammadi, John J. Leonard and Jonathan P. How, “**Information-Based Active SLAM Via Topological Feature Graphs**,” in *IEEE Conference on Decision and Control (CDC)*, Las Vegas, NV, December 2016.
- [15] Shayegan Omidshafiei, A. Agha-mohammadi, Christopher Amato, Shih-Yuan Liu, Jonathan P How, John Vian, “**Graph-based Cross Entropy Method for Solving Multi-Robot Decentralized POMDPs**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016.
- [16] Beipeng Mu, A. Agha-mohammadi, Liam Paull, Matthew Graham, Jonathan How, and John Leonard, “**Two-Stage Focused Inference for Resource-Constrained Collision-Free Navigation**”, in *Robotics: Science and Systems (RSS)*, Rome, Italy, July 2015.
- [17] Shayegan Omidshafiei, A. Agha-mohammadi, Christopher Amato, Jonathan P How, “**Decentralized Control of Partially Observable Markov Decision Processes using Belief Space Macro-actions**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, Washington, May 2015.
- [18] N. Kemal Ure, Shayegan Omidshafiei, Brett Thomas Lopez, A. Agha-mohammadi, Jonathan P. How, John Vian, “**Heterogeneous Multiagent Learning with Applications to Forest Fire Management**”, in *International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, September 2015.
- [19] Shayegan Omidshafiei, A. Agha-mohammadi, Yu Fan Chen, N. Kemal Ure, Jonathan P. How, John Vian, Rajeev Surati, “**Measurable Augmented Reality for Prototyping Cyber-Physical Systems (MAR-CPS)**”, in *AIAA Infotech*, Kissimmee, FL, January 2016.
- [20] A. Agha-mohammadi, Nazim Kemal Ure, Jonathan P. How, John Vian, “**Health-aware Stochastic Planning for Persistent Package Delivery Missions using Quadrotors**”, in *International Conference on Intelligent Robots and Systems (IROS)*, Chicago, Illinois, September 2014.
- [21] A. Agha-mohammadi, Saurav Agarwal, Aditya Mahadevan, Suman Chakravorty, Daniel Tomkins, Jory Denny, Nancy Amato, “**Robust Online Belief Space Planning in Changing Environments: Application to Physical Mobile Robots**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, May 2014.
- [22] A. Agha-mohammadi, Suman Chakravorty, Nancy Amato, “**Graph-based Stochastic Control with Constraints: A Unified Approach with Perfect and Imperfect Measurements**”, in *American Control Conference (ACC)*, Washington, DC, June 2013.
- [23] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Sampling-based Nonholonomic Motion Planning in Belief Space via Dynamic Feedback Linearization-based FIRM**”, in *International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Portugal, October 2012.
- [24] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**On the Probabilistic Completeness of the Sampling-based Feedback Motion Planners in Belief Space**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, Saint Paul, Minnesota, May 2012.

- [25] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**FIRM: Feedback Controller-Based Information-State Roadmap, A Framework for Motion Planning under Uncertainty**”, in *International Conference on Intelligent Robots and Systems (IROS)*, pp.4284-4291, San Francisco, CA, Sep 2011.
- [26] A. Agha-mohammadi, Dezhen Song, “**Robust Recognition of Planar Mirrored Walls Using a Single View**”, in *IEEE International Conference on Robotics and Automation (ICRA)*, pp.1186-1191, Shanghai, China, May 2011.
- [27] A. Tamjidi, Hamid D. Taghirad, A. Agha-mohammadi, “**On the Consistency of EKF-SLAM: Focusing on the Observation Models**”, in *International Conference on Intelligent Robots and Systems (IROS)*, pp.2083-2088, St. Louis, US, Oct. 2009.
- [28] A. Agha-mohammadi, A. Tamjidi, Hamid D. Taghirad, “**A Solution for SLAM through Augmenting Vision and Range Information**”, in *International Conference on Intelligent Robots and Systems (IROS)*, pp.1037-1042, Nice, France, Oct. 2008.
- [29] A. Agha-mohammadi, A. Tamjidi, Hamid D. Taghirad, “**SLAM Based on the LRF Information as the Only Data Source**”, in *International Federation of Automatic Control, (IFAC)*, pp.14657-14662, Seoul, Korea, July 2008.
- [30] A. Agha-mohammadi, Hamid D. Taghirad, A. Tamjidi, and Ehsan Mihankhah, “**Feature-Based Range Scan Matching for Accurate and High Speed Mobile Robot Localization**”, in *European Conference on Mobile Robots (ECMR)*, Freiburg, Germany, pp.253-258, 2007.

#### Workshop Papers/Posters

- [31] Eric Heiden, Karol Hausman, Guarav Sukhatme and A. Agha-mohammadi, “**Safe Trajectory Generation using Confidence-rich Maps,**” in *Southern California Robotics Symposium (SCR)*, Los Angeles, CA, April 2017.
- [32] A. Agha-mohammadi, “**SMAP: Simultaneous Mapping and Planning on Occupancy Grids,**” in *International Conference on Intelligent Robots and Systems (IROS), Workshop on Vision-based High Speed Autonomous Navigation of UAVs*, Daejeon, South Korea, October 2016.
- [33] Christopher Amato, George Konidaris, Shayegan Omidshafiei, A. Agha-mohammadi, Jonathan P. How, Leslie P. Kaelbling, “**Probabilistic Planning for Decentralized Multi-Robot Systems**”, in *Sequential Decision Making for Intelligent Agents, AAAI fall symposium*, Arlington, VA, November 2015.
- [34] A. Agha-mohammadi, Shayegan Omidshafiei, Christopher Amato, Jonathan P. How, “**Graph-based Planning to Solve Multi-agent POMDPs**”, In *Robotics: Science and Systems 2014 Workshop on Distributed Control and Estimation for Robotic Vehicle Networks*, Berkeley, CA, July 2014.
- [35] A. Agha-mohammadi, Saurav Agarwal, Suman Chakravorty, Nancy M. Amato, “**Dynamic Closed-loop Replanning in Belief Space: Toward Handling Dynamically Changing Environments**”, in *Robotics: Science and Systems 2014 Workshop on Information-based Grasp and Manipulation Planning*, Berkeley, CA, July 2014.
- [36] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Online Replanning in Belief Space for Dynamical Systems: Towards Handling Discrete Changes of Goal Location**”, in *IEEE International Conference On Robotics and Automation (ICRA), Workshop on Combining Task and Motion Planning*, Karlsruhe, Germany, May 2013.
- [37] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Medical Needle Steering under Motion and Sensor Noise using Feedback-based Information Roadmaps**”, in *IEEE International Conference On Robotics and Automation (ICRA), Workshop on Medical Needle Steering*, Saint Paul, Minnesota, May 2012.
- [38] Arash Kalantari, Ehsan Mihankhah, A. Agha-mohammadi, “**Resquake, A Tracked Mobile Rescue Robot**”, in *Rescue Robotics Camp, IEEE International Workshop on Safety Security and Rescue Robotics (SSRR)*, Rome, Italy, September 2007.

### Patents (submitted)

- [39] A. Agha-mohammadi, “**Rollocopter: Novel Hybrid Aerial-Ground Vehicle for Failure-Resilient, Energy-Efficient, and Agile Mobility**,” Submitted to The United States Patent and Trademark Office.
- [40] Zhaoyang Lv and A. Agha-mohammadi, “**Holistic Planning with Multiple Intentions for Self-driving Cars**,” Submitted to The United States Patent and Trademark Office.
- [41] Zhaoyang Lv, A. Agha-mohammadi and Amirhossein Tamjidi, “**Motion Planning and Intention Prediction for Autonomous Driving in Highway Scenarios via Factor Graph Representation**,” Submitted to The United States Patent and Trademark Office.
- [42] A. Agha-mohammadi, Kiran Somasundaram and Saurav Agarwal, “**Measurement Fusion for 3D grid Mapping using cause-dependent inverse cause models**,” Submitted to The United States Patent and Trademark Office.
- [43] A. Agha-mohammadi et al., “**Vision-based Autonomous Navigation System for Quadcopters**,” Submitted to The United States Patent and Trademark Office.
- [44] A. Agha-mohammadi, et al., “**RRF: Rapidly Exploring Randomized Feedback Trees for Robot Motion Planning**” 2015. Submitted to The United States Patent and Trademark Office.
- [45] A. Agha-mohammadi, et al., “**Certainty-aware 3D Grid Map and Bayesian Update based on Stereo Vision**” 2015. Submitted to The United States Patent and Trademark Office.
- [46] A. Agha-mohammadi, et al., “**Most Likely Map Computation based on Raw Stereo Vision Measurements**” 2015. Submitted to The United States Patent and Trademark Office.
- [47] A. Agha-mohammadi, et al., “**Stochastic Map-aware Stereo-vision Sensor Model for Robot Navigation in Unknown Environments**” 2015. Submitted to The United States Patent and Trademark Office.
- [48] A. Agha-mohammadi, et al., “**Robot Motion Planning and Exploration using Certainty-aware Stochastic Grid Maps**” 2015. Submitted to The United States Patent and Trademark Office.
- [49] A. Agha-mohammadi, et al., “**Object-focused Active 3D Reconstruction using Monocular Camera: Application to Precision Robotic Grasping**” 2015. Submitted to The United States Patent and Trademark Office.
- [50] A. Agha-mohammadi, et al., “**Active Camera Movement Determination for Object Position and Extent in Three-Dimensional Space**” 2015. Submitted to The United States Patent and Trademark Office.
- [51] A. Agha-mohammadi, “**Parallel Robot Motion Planning Under Uncertainty**” 2015. Submitted to The United States Patent and Trademark Office.
- [52] Jonathan P. How, John Vian, Shayegan Omidshafiei, A. Agha-mohammadi, Yu Fan Chen, N. Kemal Ure, “**Cyber-Physical Systems Prototyping Environment**”, June 2014. Co-submitted with The Boeing Company to The United States Patent and Trademark Office.

### Refereed non-English Papers

- [53] A. Tamjidi, A. Agha-mohammadi, Hamid D. Taghirad, “**Augmenting Vision and LRF Information: Towards Encoder-free SLAM in Unstructured Environments**”, in Proc. *Fifth Machine Vision and Image Processing Conference*, Tabriz, Iran, 2008.
- [54] A. Agha-mohammadi, Majid Nili Ahmadabadi, Taher S. Mirzahasanloo, “**Behavior Learning in Behavior-Based Architectures Using Reinforcement Learning**”, in Proc. *12<sup>th</sup> International CSI Computer Conference (CSICC'07)*, Tehran, Iran, pp.171-174, 2007.
- [55] A. Agha-mohammadi, “**Mobile Robot Localization Using Single Camera**”, in Proc. *10<sup>th</sup> Iranian Student Conference on Electrical Engineering, (ISCEE'07)*, Esfahan, Iran, 2007.

[56] A. Agha-mohammadi, Taher S. Mirzahasano, “**Path Planning Using Recurrent Hopfield Neural Network**”, in Proc. of 10<sup>th</sup> Iranian Student Conference on Electrical Engineering, (ISCEE’07), Esfahan, Iran, 2007.

[57] A. Agha-mohammadi, A. Tamjidi, “**An Introduction to Modified Methods in Ant Colony Systems Optimization and Proposing a New Local Optimizer**”, in Proc. 10<sup>th</sup> Intelligent Systems Conference, Tehran, Iran, pp.460-463, 2005.

### Technical Reports

[58] A. Agha-mohammadi, Nazim Kemal Ure, Jonathan P. How, John Vian, “**Health-aware Stochastic Planning for Persistent Package Delivery Missions using Quadrotors**”, Technical Report, Aerospace Controls Laboratory, Department of Aero/Astro, MIT, Dec 2013.

[59] A. Agha-mohammadi, Saurav Agarwal, Suman Chakravorty, “**Periodic-node Graph-based Framework for Stochastic Control of Small Aerial Vehicles**”, Technical Report, TAMU-EDPL-TR-2014-001, Department of Aerospace Engineering, Texas A&M University, 2014.

[60] A. Agha-mohammadi, Saurav Agarwal, Aditya Mahadevan, Suman Chakravorty, Daniel Tomkins, Jory Denny, Nancy M. Amato, “**Dynamic Real-time Replanning in Belief Space: An Experimental Study on Physical Mobile Robots**”, Technical Report, TR13-007, Department of Computer Science, Texas A&M University, Jul 2013.

[61] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Sampling-based Nonholonomic Motion Planning in Belief Space via Dynamic Feedback Linearization-based FIRM**”, Technical Report, TR12-004, Department of Computer Science and Engineering, Texas A&M University, Mar 2012.

[62] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Periodic-Feedback Motion Planning in Belief Space for Nonholonomic and/or Nonstoppable Robots**”, Technical Report, TR12-003, Department of Computer Science and Engineering, Texas A&M University, Feb 2012.

[63] A. Agha-mohammadi, Suman Chakravorty, Nancy M. Amato, “**Sampling-based Feedback Motion Planning under Motion Uncertainty and Imperfect Measurements**”, Technical Report, TR11-007, Department of Computer Science and Engineering, Texas A&M University, Dec 2011.

[64] A. Agha-mohammadi, Suman Chakravorty, Nancy Amato, “**Probabilistic Completeness of the Belief Space Motion Planners**”, Technical Report, TR11-006, Department of Computer Science and Engineering, Texas A&M University, Nov 2011.

[65] A. Agha-mohammadi, Suman Chakravorty, Nancy Amato, “**FIRM: Feedback Controller-Based Information-State Roadmap, A Framework for Motion Planning Under Uncertainty**”, Technical Report, TR11-001, Department of Computer Science and Engineering, Texas A&M University, Jan 2011

### Dissertations

[66] “**Sampling-based State Estimation and Stochastic Control for Robot Motion Planning under Motion Uncertainty and Noisy Sensor Measurements**”, PhD Dissertation, Department of Computer Science and Engineering, Texas A&M University, Oct 2013.

[67] “**Design and Implementation of Multi-sensor Fusion methods for Solving Simultaneous Localization And Mapping (SLAM) Problem**”, M.Sc. Thesis, Department of Electrical and Computer Engineering, Khaje Nasir Toosi University of Technology, July 2008.

[68] “**Robosoccer: Small-size Soccer Robots for Robocup Competitions**”, B.Sc. Thesis, Department of Electrical and Computer Engineering, Tabriz University, June 2005

## Research Mentoring/ Management Experience

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### Graduate Students

[1] Sung Kim (PhD, CMU), JPL summer Intern, 2017

[2] Max Pflueger (PhD, USC), JPL summer Intern, 2017

- [3] Vincezno Pesce (PhD, Politecnico di Milano), JPL summer-fall Intern, 2017
- [4] Zhaoyang Lv (PhD, GeorgiaTech), Qualcomm Research summer Intern, 2016
- [5] Amir Tamjidi (Masters, Texas A&M), Qualcomm Research summer Intern, 2016
- [6] Lucas Janson, (PhD, Stanford), Qualcomm innovation fellowship program, 2016
- [7] Edward Schmerling, (PhD., Stanford), Qualcomm innovation fellowship program, 2016
- [8] Beipeng Mu, (PhD, MIT), Research Mentoring, 2014-2015
- [9] Shayegan Omidshafiei, (PhD, MIT), Research Mentoring, 2013-2015
- [10] Brett Lopez, (PhD, MIT), MIT-Boeing alliance on multi-robot systems, 2014
- [11] Yu Fan/Steven Chen, (PhD, MIT), MIT-Boeing alliance on multi-robot systems, 2014
- [12] Saurav Agarwal, (PhD, Texas A&M), Research Mentoring, 2013
- [13] Mohammad Rafiei, (PhD, Texas A&M), Research Mentoring, 2013
- [14] Amir Tamjidi, (Master's, Texas A&M), Research Mentoring, 2013

### Undergraduate Students

- [15] Braddley Carey, JPL Intern, 2017
- [16] Emilie Naples, JPL Intern, 2017
- [17] Jose Mendez, JPL Intern, 2017
- [18] Roberto Mendez, JPL Intern, 2017
- [19] Christopher Maynor, Research Mentoring at MIT, 2014
- [20] Mycal Tucker, Research Mentoring at MIT, 2014
- [21] Jesse Alder, Research Mentoring at MIT, 2014
- [22] Ajinkya Jain, Research Mentoring at Texas A&M, 2013
- [23] Fernando Pastor, Research Mentoring at Texas A&M, 2013
- [24] Karan Bagadiya, Research Mentoring at Texas A&M, 2012-2013
- [25] Ammar M. Abbas, Research Mentoring at Texas A&M, 2012
- [26] Cole Jones, Research Mentoring at Texas A&M, 2010
- [27] Kasra Khosousi, Research Mentoring at KN Toosi, 2008

### Visiting faculty member

- [28] Dr. Paul Akangah, JPL visiting faculty member, 2017

## Teaching Experience

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### Texas A&M University

- ECE & CSE Dept., **C++ Programming**, undergraduate course, Teaching Assistant (Spring 2010), Instructor: [Dr. Stroustrup](#) (Creator of the C++ programming language)
- ECE & CSE Dept., **Introduction to Electrical and Computer Engineering (Using Lego Mindstorms Robots)**, undergraduate course, Teaching Assistant (Fall 2009)
- CSE Dept., **Artificial Intelligence**, undergraduate course, Teaching Assistant. (Summer 2009 and Spring 2009)

### K.N. Toosi University of Tech

- ECE Dept., **Robotics**, graduate course, Teaching Assistant. (Spring 2008)
- ECE Dept., **Introduction to Intelligent Systems**, graduate course, Teaching Assistant. (Spring 2008)
- ECE Dept., **Fuzzy Control Systems**, graduate course, Teaching Assistant. (Spring 2007)

### Adiban University of Garmsar

- ECE Dept., **Programming Languages (C++)**, undergraduate course, Lecturer (Fall 2008)
- ECE Dept., **Operating Systems**, undergraduate course, Lecturer (Fall 2008)
- ECE Dept., **Data Structures**, undergraduate course, Lecturer (Fall 2008)
- ECE Dept., **Programming Languages (C++)**, undergraduate course, Lecturer (Spring 2008)
- ECE Dept., **Operating Systems**, undergraduate course, Lecturer (Spring 2008)
- ECE Dept., **Data Structures**, undergraduate course, Lecturer (Spring 2008)

### Azad University of Behbahan

- EE Dept., **Electronic Circuits**, undergraduate course, Lecturer (Fall 2006)
- EE Dept., **Electrical Circuits**, undergraduate course, Lecturer (Fall 2006)
- EE Dept., **Electrical Machines**, undergraduate course, Lecturer (Fall 2006)

## Idea Institute

**Matlab Programming** (+ Some Toolboxes, such as Neural Networks, Fuzzy Logic, and Genetics Algorithms, Math Symbolic, Image Processing, Image Acquisition and ...), Instructor (Fall 2007)

## Tabriz University

ECE Dept., **Microcontrollers Programming (8051 & AVR)**, Free classes for interested students (2002-2004)

## Selected Research Highlighted in Media

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- Article: "Helping robots handle uncertainty algorithm for planning multirobot collaborations makes complex models practical" by Larry Hardesty, MIT news, 2015.
- Article: "Augmented Reality Room Shows What Robots Are Thinking" By Evan Ackerman, IEEE spectrum, 2014.
- Article on our Measurable Augmented Reality system is featured on the cover page of MIT: <http://news.mit.edu/2014/system-shows-robot-intentions-1029>
- Article: "Projecting a robot's intentions: A new spin on virtual reality helps engineers read robots' minds" by Jennifer Chu, MIT news, 2014.
- Article on our planning method for package delivery under uncertainty is featured on the cover page of MIT: <http://web.mit.edu/site/spotlight/4123>
- Article: "Delivery by drone" by Jennifer Chu, MIT news, 2014
- Article: "MIT Researchers Are Now Able To Watch Robots Think", by Eric Hopton, RedOrbit, 2014.
- Article: "Delivery drones will monitor their own health" by Katie Collins, Wired, 2014
- Our "persistent package delivery using quadrotors" is featured in Boeing press release on announcing MIT as the recipient of the 2013 Boeing Supplier of the Year Award (April 22, 2014) for the Leader's Choice: Innovation category. (See [this link](#) and [Boeing Press Release](#)).
- Article: "Here's What Your Robot Is Thinking When It Slams into a Wall" by Jordan Pearson, Vice, 2014.
- Article: "MIT Visualizes What Robots Are Thinking", by Mark Wilson, Fast Company, 2014.
- Article: "Measurable virtual reality reveals robots' intentions", by Ben Coxworth, Gizmag, 2014.
- Article: "MIT Creates a Visualization System to Track the Way Robots Think", by Shannon Nargi, BostInno, 2014.
- Article: "MIT's robot VR rig lets them read the mind of a machine", by Graham Templeton, Geek, 2014.
- Article: "Self-charging stations, smarts, make for a more efficient delivery drone" by Nidhi Subbaraman, BetaBoston and Boston Globe, 2014
- Article: "How delivery drones could monitor their own health" by Tanya Lewis, Yahoo! news and LiveScience, 2014
- Article: "Delivery drones closer to reality with self-monitoring quadcopters", by Lucy Incgam, Factor Magazine, 2014
- Article: "Delivery drones will need to recognize when they are not fit to fly, and this algorithm could help", by Signe Brewster, GigaOM, 2014
- Article: "MIT students figure out how to make delivery-by-drone a reality", by Ruth Reader, VentureBeat news, 2014
- Article: "MIT breakthrough brings delivery drones closer to reality", by Eric Hopton, Red Orbit, 2014
- Article: "Novel way to monitor drone's parameters", by Ians, The economic times, 2014
- Article: "Drones could monitor their health during package delivery", by TechSwarm, 2014
- Article: "MIT's new algorithm could make drone delivery an actual reality", by Lauren Landry, BostInno
- Article: "MIT algorithm lets delivery drones monitor their health in real-time", by Nick Lavars, GizMagazin
- >>> For more media coverage, please visit: <http://people.lids.mit.edu/aliagha/Web/media.htm>

## Professional Activities

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### Workshop organizing committee:

- Robotics Science and Systems (RSS) workshop on "[POMDPs in Robotics: State of The Art, Challenges, and Opportunities](#)", MIT, Cambridge, MA, 15<sup>th</sup> Jul 2017.
- Southern California Robotics Symposium (SCR), USC, Los Angeles, CA, 14<sup>th</sup> Apr 2017, <http://socal-robotics.org/>
- Southern California Robotics Symposium (SCR), UCSD, San Diego, CA, 22<sup>nd</sup> Apr 2016, <http://socal-robotics.org/>



- MURI (Multidisciplinary University Research Initiative) workshop on "[Nonparametric Bayesian Models to Represent Knowledge and Uncertainty for Decentralized Planning](#)", MIT, Cambridge, MA, 23<sup>rd</sup> Jan 2014.
- MURI (Multidisciplinary University Research Initiative) workshop on "[Nonparametric Bayesian Models to Represent Knowledge and Uncertainty for Decentralized Planning](#)", MIT, Cambridge, MA, 30<sup>th</sup> Sep 2014.

**Associate Editor/ Program Committee for the Following Conferences:**

- AE for IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2015
- PC for Robotics: Science and Systems (RSS), 2017
- PC for Autonomous Agents and MultiAgent Systems (AAMAS), 2017

**Reviewer for the Following Journals and Conferences:**

- [J1] International Journal of Robotics Research (IJRR)
- [J2] IEEE Transaction on Robotics (TRO)
- [J3] Autonomous Robots
- [J4] ASME Journal of Dynamic Systems, Measurement and Control
- [J5] Journal of Aerospace Information Systems (JAIS)
- [J6] Computer Animation and Virtual Worlds (CAVW)
- [C1] Robotics: Science and Systems (RSS)
- [C2] IEEE International Conference on Robotics and Automation (ICRA)
- [C3] Workshop on the Algorithmic Foundations of Robotics (WAFR)
- [C4] IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- [C5] American Control Conference (ACC)
- [C6] International Federation of Automatic Control World Congress (IFAC)
- [C7] AAAI Conference on Artificial Intelligence (AAAI)
- [C8] IEEE International Symposium on Mixed and Augmented Reality (ISMAR)
- [C9] Computer Animation and Virtual Worlds (CAVW)
- [C10] International Conference on Motion in Games (MIG)
- [C11] Conference on Computer Animation and Social Agents (CASA)
- [C12] IEEE International Conference on Mechatronics and Automation (ICMA)
- [C13] Advanced Intelligent Mechatronics (AIM)
- [C14] International Conference on Intelligent Autonomous Systems (IAS)
- [C15] International Symposium on Multi-Robot and Multi-Agent Systems (MRS)

**Workshop committee member/ session chair/ student volunteer:**

- Workshop on "Robot Learning and Planning" at Robotics: Science and Systems (RSS) conference, University of Michigan, Ann Arbor, MI, June 18-22, 2016.
- Session chair, Regular Session: "**Machine Learning and Probabilistic Reasoning for Intelligent UAS**", *AIAA Infotech @ Aerospace, AIAA Science and Technology*, San Diego, California, Jan 2016.
- IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems) 2011 organization team
- Workshop on "[Quality Software: A Festschrift for Bjarne Stroustrup](#)", College Station, TX, April 27-28, 2012
- Session chair, Regular Session Mo/Vt16: "**SLAM: Theory**", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'09), St. Louis, US, Oct 2009.

**Serving as a Thesis Committee Member:**

- Reader member on PhD dissertation defense committee, Brandon Luders, Dept. of Aeronautics and Astronautics at MIT, May 2014
- Reader member on PhD dissertation defense committee, Nazim Kemal Ure, Dept. of Aeronautics and Astronautics at MIT, Jan 2015

**Member of the Following Societies and Groups:**

- IEEE Member (2008-present)
- IEEE RAS Member (2012-present)
- Member of [LIDS \(Laboratory for Information and Decision Systems\)](#) at MIT (2013-2015)
- Member of [ACL \(Aerospace Controls Laboratory\)](#) at MIT (2013-2015)
- Member of [GTA \(Graduate Teaching Academy\)](#) at Texas A&M University (2009-2013)
- Member of [Center for Mechanics and Control](#), Aero Dept., Texas A&M University (2010-2013)
- Member of [Parasol lab.](#), CSE Dept., Texas A&M University (2010-2013)
- Member of [NetBot lab.](#), CSE Dept., Texas A&M University (2009-2010)

- Member of the [Resquake](#) team (A robotics team building rescue robots for Robocup competitions. My responsibility was designing SLAM algorithms in rescue environments for autonomous robots) – (2006-2007)
- Member of Advanced Robotic & Automated Systems ([ARAS](#)), Dept. of ECE, K.N. Toosi Uni. of Tech. (2006-2007)
- Founder of the Robosoccer team, Tabriz University. (2004-2005)
- Founder of an educational team in Tabriz University, APEK8051. The team was conducting free classes for interested students in mobile robotics related topics and microcontroller (such as 8051, AVR, PIC) programming. (2004-2005)

#### **Awards in Robotic Contests**

- Second Place - Advanced Autonomy, International Robotics Contest, Robocup 2007, Iran Open, Rescue Robots, real league. (2007)
- First Place - Advanced Mobility, International Robotics Contest, Robocup 2007, Iran Open, Rescue Robots, real league. (2007)
- Participated in International Robotics Contest, Robocup'07, Atlanta, Rescue real league. (2007)
- Second Place in Intelligent Mice Robotics Contest, Tabriz University (2002)

#### **Outreach and open robotics demos for public**

- MIT Aeronautics and Astronautics centennial [symposium](#), Oct 22<sup>nd</sup>-24<sup>th</sup> 2014
- Robotics demo for the students in the Discover Aerospace Freshman Pre-Orientation Program, Aug 22<sup>nd</sup>, 2014
- Robotics demo for Boeing company after MIT received Boeing's Supplier of the Year" Award in the university/innovation category, May 6<sup>th</sup> 2014
- Public open house for Aero/Astro 100-year anniversary (MIT), April 23<sup>rd</sup>-24<sup>th</sup> 2014
- Open-house demo for prospective graduate students of the department of Aero-Astro at MIT, Mar 14<sup>th</sup>, 2014.