Nima Fazeli

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Position: Ph.D. Candidate at Massachusetts Institute of Technology
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Education:

- **Massachusetts Institute of Technology** — Expected 2019
  Ph.D. Mechanical Engineering Department
- **University of Maryland, College Park** — 2014
  M.Sc. Mechanical Engineering Department
- **University of Alberta** — 2012
  M.Sc. Mechanical Engineering Department – transferred to UMD to complete degree
- **Amirkabir University of Technology (Tehran Polytechnic)** — 2011
  B.Sc. Mechanical Engineering Department

Research Experience:

- **Manipulation and Mechanisms at MIT (MCube Lab)** — MIT
  Graduate Research Assistant — 2014 – Present
- **Laboratory for Control and Information Systems** — UMD
  Graduate Research Assistant — 2012 – 2014
- **Advanced Robotics and Control Lab** — UoA
  Graduate Research Assistant — 2011 – 2012
- **Controls and Intelligent Machines Lab** — Amirkabir University
  Undergraduate Research Assistant — 2010 – 2011
- **Iran Aerospace Research Institute** — Tehran, Iran
  Undergraduate Research Intern — 2010 - 2010

Awards & Honours:

Best Cognitive Robotics Paper – IROS 2018
Awarded to "Augmenting Physical Simulators with Stochastic Neural Networks ...".

Best Systems Paper – 2018 Amazon Robotics Best Paper Awards in Manipulation 2017
Awarded to "Robotic Pick-and-Place of Novel Objects in Clutter ...".

Selected for ISRR 2017 Doctoral Consortium 2017
Awarded to top attending PhD candidates and paid for conference and travel.

Sontheimer Travel Award in Mechanical Engineering 2017
Awarded to 2 MIT Mechanical Engineering Graduate Students Annually.

1st Place – Amazon Robotics Challenge Stowing Task 2017
Role: Sensor integration, contact detection algorithm, object disambiguation algorithm.

Best Student Paper Finalist – IROS 2016
Top 5 of 800 submissions, *"More Than a Million Ways to be Pushed ..."*.

3rd Place – Amazon Picking Challenge 2016
Role: System software architecture, system integration, motion/action primitive algorithms.

2nd Place – Amazon Picking Challenge 2015
Role: System software architecture, system integration, motion/action primitive algorithms.

ISRR 2015 Paper Selected to for Special Issue of IJRR 2015
Paper: *"Identifiability Analysis of Planar Rigid-Body Frictional Contact"*.

Rohsenow Fellowship 2014
Awarded to 1 MIT Mechanical Engineering Graduate Students Annually.

Academic Excellence Award – University of Maryland College Park 2013
Awarded to top 5 UMD Mechanical Engineering Graduate Students Annually.

Best Student Paper Finalist – 5th ASME DSCC 2012
Top 5 of 52 nominated, *"Active Non-Intrusive System Identification for Cardiovascular Monitoring ..."*.

Recipient of the Dynamic Systems and Controls Conference Travel Grant Award 2012
Awarded to top students attending and paid for conference and travel.

Ranked 1st in undergraduate class & member of Amirkabirs Honors Students Program 2007-2011
Class of 114 students.

Publications & Talks:

Under Review:

U1 N. Fazeli, J. Wu, M. Oller, Z. Wu, J. B. Tenenbaum, and A. Rodriguez, "See, Feel, Act: Learning Complex Manipulation Skills with Causal Structure and Multi-sensory Fusion," *Science Robotics*, 2018

U2 A. Zeng *et al.*, "Robotic Pick-and-Place of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching," *International Journal of Robotic Research (IJRR)*, 2018

U3 A. Ajay, M. Bauza, J. Wu, N. Fazeli, J. B. Tenenbaum, A. Rodriguez, and L. P. Kaelbling, "Combining Physical Simulators and Object-Based Networks for Control," *IEEE International Conference on Robotics and Automation (ICRA)*, 2019

Refereed Journal Articles:

J1 N. Fazeli, R. Kolbert, R. Tedrake, and A. Rodriguez, "Parameter and Contact Force Estimation of Planar Rigid-bodies Undergoing Frictional Contact," *The International Journal of Robotics Research (IJRR)*, vol. 36, no. 13-14, pp. 1437–1454, 2017

J2 C.-S. Kim, N. Fazeli, M. S. McMurtry, B. A. Finegan, and J.-O. Hahn, "Quantification of Wave Reflection using Peripheral Blood Pressure Waveforms," *IEEE Journal of Biomedical and Health Informatics*, vol. 19, no. 1, pp. 309–316, 2015

J3 C.-S. Kim, N. Fazeli, and J.-O. H. Hahn, "Data-Driven Modeling of Pharmacological Systems using Endpoint Information Fusion," *Computers in Biology and Medicine*, vol. 61, pp. 36 – 47, 2015

J4 M. Abdollahzade, C.-S. Kim, N. Fazeli, B. A. Finegan, M. S. McMurtry, and J.-O. Hahn, "Data-driven Lossy Tube-load Modeling of Arterial Tree: In-human Study," *Journal of Biomechanical Engineering*, vol. 136, no. 10, p. 101011, 2014

J5 N. Fazeli, C.-S. Kim, M. Rashedi, A. Chappell, S. Wang, R. MacArthur, M. S. McMurtry, B. Finegan, and J.-O. Hahn, "Subject-specific Estimation of Central Aortic Blood Pressure via System Identification: Preliminary In-human Experimental Study," *Medical & Biological Engineering & Computing*, vol. 52, no. 10, pp. 895–904, 2014

J6 M. Rashedi, N. Fazeli, A. Chappell, S. Wang, R. MacArthur, M. S. McMurtry, B. A. Finegan, and J.-O. Hahn, "Comparative Study on Tube-load Modeling of Arterial Hemodynamics in Humans," *Journal of Biomechanical Engineering*, vol. 135, no. 3, p. 031005, 2013

J7 N. Fazeli and J.-O. Hahn, "Estimation of Cardiac Output and Peripheral Resistance using Square-wave Approximated Aortic Flow Signal," *Frontiers in Physiology*, vol. 3, p. 298, 2012

Conference Proceedings:

C1 A. Ajay, J. Wu, N. Fazeli, M. Bauza, L. P. Kaelbling, J. B. Tenenbaum, and A. Rodriguez, "Augmenting Physical Simulators with Stochastic Neural Networks: Case Study of Planar Pushing and Bouncing," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018, **Best Cognitive Robotics Paper**

C2 A. Zeng *et al.*, "Robotic Pick-and-Place of Novel Objects in Clutter with Multi-affordance Grasping and Cross-domain Image Matching," *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1–8, 2018, **Best Systems Paper – Amazon Manipulation Awards**

C3 N. Fazeli, S. Zapolsky, E. Drumwright, and A. Rodriguez, "Learning Data-efficient Rigid-body Contact Models: Case Study of Planar Impact," *1st Annual Conference on Robotic Learning (CoRL)*, vol. 78, 2017

C4 N. Fazeli, S. Zapolsky, E. Drumwright, and A. Rodriguez, "Fundamental Limitations in Performance and Interpretability of Common Planar Rigid-Body Contact Models," *International Symposium of Robotic Research (ISRR)*, 2017

C5 N. Fazeli, E. Donlon, E. Drumwright, and A. Rodriguez, "Empirical Evaluation of Common Contact Models for Planar Impact," in *IEEE International Conference on Robotics and Automation (ICRA))*, pp. 3418–3425, 2017

C6 K.-T. Yu, M. Bauza, N. Fazeli, and A. Rodriguez, "More than a Million Ways to be Pushed. A High-Fidelity Experimental Data Set of Planar Pushing," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2016, **Best Paper Finalist**

C7 K.-T. Yu, N. Fazeli, N. Chavan-Dafle, O. Taylor, E. Donlon, G. D. Lankenau, and A. Rodriguez, "A Summary of Team MIT's Approach to the Amazon Picking Challenge 2015," *arXiv preprint arXiv:1604.03639*, 2016

C8 N. Fazeli, R. Tedrake, and A. Rodriguez, "Identifiability Analysis of Planar Rigid-body Frictional Contact," in *Robotics Research/International Symposium of Robotic Research 2015*, pp. 665–682, Springer, 2015, **Selected for Special Issue of IJRR**

C9 C.-S. Kim, N. Fazeli, M. S. McMurtry, B. A. Finegan, and J.-O. Hahn, "Quantification of Wave Reflection using Peripheral Blood Pressure Waveforms," *IEEE Journal of Biomedical and Health Informatics*, vol. 19, no. 1, pp. 309–316, 2015

C10 M. Abdollahzade, C.-S. Kim, N. Fazeli, J.-O. Hahn, M. S. McMurtry, and B. Finegan, "Lossy Transmission Line Modeling of of Arterial Tree in Time Domain," in *36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 2014

C11 M. Rashedi, N. Fazeli, A. Chappell, S. Wang, R. MacArthur, M. S. McMurtry, B. Finegan, and J.-O. Hahn, "Modeling and System Identification of Arterial Hemodynamics in Humans," in *ASME Dynamic Systems and Control Conference (DSCC)*, 2013

C12 N. Fazeli and J.-O. Hahn, "Active Non-Intrusive System Identification for Cardiovascular Monitoring: Part II Development of System Identification Algorithm," in *ASME Dynamic Systems and Control Conference (DSCC)*, 2013

C13 N. Fazeli, C.-S. Kim, and J.-O. Hahn, "Non-invasive Estimation of Central Blood Pressure Waveform using a Dual Diametric Cuff System: a Preliminary Study," in *ASME Conference on Frontiers in Medical Devices: Applications of Computer Modeling and Simulation*, 2013

C14 N. Fazeli, C. S. Kim, and J.-O. Hahn, "Quantification of Wave Reflection in the Arterial Tree via Diametric Blood Pressure Waveform Measurement," in *American Control Conference (ACC), 2013*, 2013

C15 N. Fazeli, M. Rashedi, A. Chappell, S. Wang, R. MacArthur, M. S. McMurtry, B. Finegan, and J.-O. Hahn, "Subject-specific Estimation of Aortic Blood Pressure via System Identification: Preliminary in-human Experimental Study," in *American Control Conference (ACC), 2013*, pp. 740–745, IEEE, 2013

C16 N. Fazeli, H.-C. Kim, and J.-O. Hahn, "Active Non-Intrusive System Identification for Cardiovascular Monitoring: Part IExcitation and Measurement Protocol Design," in *ASME Dynamic Systems and Control Conference (DSCC)*, pp. 543–551, 2012, **Best Paper Finalist**

Talks:

T1 N. Fazeli, "See, Feel, Act: Learning Complex Manipulation Skills using Causal Structure and Multi-Sensory Fusion," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)– Workshop on Examining Sensing Modalities for Robust and Dexterous Object Manipulation*, 2018

T2 N. Fazeli, "Towards High Fidelity Stochastic Simulators with Data-Augmented Models," *Robotic Sciences and Systems – Workshop on Learning and Inference in Robotics: Integrating Structure, Priors and Models*, 2018

T3 N. Fazeli, "Empirical Evaluation of Common Contact Models for Planar Impact," *New England Manipulation Symposium (NEMS)*, 2017

T4 N. Fazeli, "Identifiability Analysis of Planar Rigid-Body Frictional Contact," *New England Manipulation Symposium (NEMS)*, 2015

Theses:

1. N. Fazeli, "An Active Non-Intrusive System Identification Approach for Cardiovascular Health Monitoring," *Masters thesis submitted to the Department of Mechanical Engineering – University of Maryland at College Park*, 2014
2. N. Fazeli, "Active Vibration Attenuation of Vehicle Engine to Chassis using Adaptive FX-LMS Algorithms," *Bachelors thesis submitted to the Department of Mechanical Engineering – Amirkabir University of Technology*, 2011

Media Coverage:

Amazon Picking Challenge 2015-2017
Featured in MIT Technology Review, MIT News, BetaBoston, EPR Retail News, Machine Design ...
See, Feel, Act: Learning Complex Manipulation Skills 2018
Feature up-coming in MIT News and MIT Technology Review.
Fundamental Limitations of Rigid-body Contact Models 2016
Highlight feature on MIT's Mechanical Engineering website and Twitter.

Mentorship & Teaching Experience:

Mentorship:

Anurag Ajay . . . . . 2017 – 2018
Early career PhD Candidate with CSAIL, MIT – Resulting Publications [C1, U3].
Miquel Oller Oliveras . . . . . 2017 – 2018
1 year visiting undergrad from UPC, Spain – Resulting Publications [U1].
Isabella Morona . . . . . 2017 & 2018
Summer visiting high-school student.

Teaching Assistant:

2.120 - Introduction to Robotics – MIT . . . . . Fall 2016
ENME 462 - Vibrations, Controls and Optimization – UMD . . . . . Spring 2013
ENME 808 - Data-Driven Modeling and Estimation in Dynamical Systems – UMD . . Spring 2014

Community Services:

Committees:

Organizing committee of Robocon at MIT . . . . . 2016 & 2017
President of the Persian Student Association at MIT 2015-2016
Student Assistant Organizer of the National Robotics Initiative - PI Meeting 2015
Orientation Chair for Graduate Association of Mechanical Engineers at MIT 2015-2016
Co-chair: Sys. ID. and Therapeutic Control in Bio-Systems Session at DSCC 2013 2013
Executive Board of the Iranian Student Foundation 2013-2014
Organizing committee of 5th National Student MechE Conference at Amirkabir 2009
Amirkabir Robotics Club 2008-2009

Review Services Awards:

Elsevier Recognition Certificate of Reviewing: Computers in Biology and Medicine . . . May 2016
Elsevier Recognition Certificate of Reviewing: Biomedical Signal Processing and Control June 2015