

# François Hogan

*Ph.D. Candidate, MIT*



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## EDUCATION

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<b>Massachusetts Institute of Technology</b> PhD Candidate, Mechanical Engineering	<i>Expected 2019</i>
<b>University of Michigan</b> Visiting Scholar, Aerospace Engineering	<i>2014</i>
<b>McGill University</b> M.Eng., Mechanical Engineering	<i>2015</i>
B.Eng., Mechanical Engineering (Honours)	<i>2013</i>

## AWARDS & SCHOLARSHIPS

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- **Amazon Robotics Best Systems Paper Award** – “Robotic pick-and-place of novel objects in clutter with multi-affordance grasping and cross-domain image matching” *2018*
- **Best Poster Award** – ICRA 2018 workshop on Active touch for perception and interaction *2018*
- **Winner** – Amazon Robotics Challenge (Stowing task) *2017*
- **3rd place** – Amazon Robotics Challenge (Picking task) *2016*
- **MIT Presidential Fellowship** – Most outstanding students in graduate studies at MIT *2015*
- **Vanier Graduate Scholarship** – The Vanier Canada Graduate Scholarship program helps Canadian institutions attract highly qualified doctoral students. *(Declined) 2015*
- **Postgraduate Scholarship-Doctoral Program** – NSERC PGS *2015–2018*
- **Commonwealth Science Award** – Royal Society *2014*
- **Graduate Excellence Fellowship Award** – McGill University *2013–2015*
- **Master’s Research Scholarship** – FQRNT *2014–2015*
- **Alexander Graham Bell Canada Graduate Scholarship** – NSERC Master’s Program *2013–2014*
- **Best Aerospace Poster Presentation** – McGill Summer Undergraduate Research in Engineering (SURE) poster competition *2013*
- **Undergraduate Student Research Award** – NSERC *2011 & 2013*
- **Summer Research in Engineering Award** – McGill University *2012*
- **Dean’s Honour List** – McGill University *2010–2013*
- **Hydro-Quebec Entrance Scholarship** – Academic Excellence and Leadership (McGill University) *2009*
- **Governor General’s Award** – Awarded to the student graduating with the highest average of his program (College Laflèche) College Laflèche *2009*

## WORK EXPERIENCE

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- AI Intern** 2018  
*Kindred.ai* Toronto, ON, Canada
- Conducted research on Reinforcement Learning algorithms for real-world robotic systems
  - Contributed to the release of SenseAct, a reinforcement learning open-source toolkit for robots
  - Designed and manufactured robots for benchmarking reinforcement learning algorithms
- Mechanical Engineer** 2015  
*CM-Labs Simulations Inc.* Montreal, QC, Canada
- Modelled mechanical systems undergoing contact interactions
  - Analyzed mechanical specifications of complex mechanical systems
  - Programmed python and C++ programs within SCRUM/AGILE environment

## TEACHING EXPERIENCE

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- Teaching Assistant** 2014  
*University of Michigan, Intermediate Dynamics (AERO 540)* Ann Arbor, MI
- Conducting tutorials and holding office hours
  - Preparing and giving lectures in absence of professor
  - Grading homework assignments and term projects
- Teaching Assistant** 2013  
*McGill University, Aircraft Performance and Stability (MECH 532)* Montreal, QC
- Grading homework assignments and term projects
  - Invigilating and grading midterms

## ROBOTIC COMPETITIONS

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- Amazon Picking Challenge (Winner Stow Task)** 2017  
*Team Member MIT-Princeton, Team Lead: Grasping* Nagoya, Japan
- Developed grasp planning algorithms for picking unknown objects in cluttered environments
  - Systems implementation of motion planning, collision avoidance, and calibration software
- Pictures and videos available: <http://arc2017.mit.edu>
- Amazon Picking Challenge (3rd in Stow Task, 4th in Pick Task)** 2016  
*Team Member MIT-Princeton, Team Lead: Grasping and suction* Leibzig, Germany
- Developed grasp planning algorithms for picking objects within a constrained shelf setting
- Pictures and videos available: <http://apc.cs.princeton.edu/>

## PUBLICATIONS

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### Refereed Journal Publications

- [J1] **F R. Hogan** and A. Rodriguez, "Reactive Planar Manipulation with Hybrid Model Predictive Control," Submitted to *International Journal of Robotics Research*.
- [J2] A. Zeng, S. Song, K.T. Yu, E. Donlon, **F R. Hogan**, et al., "Robotic Pick-and-Place of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching," Submitted to *International Journal of Robotics Research*.
- [J3] **F. R. Hogan** and J. R. Forbes, "Modeling of a Rolling Flexible Spherical Shell," *Journal of Applied Mechanics*. Vol. 83, No. 9, 2016, pp. 091010-(1-12). doi:10.1115/1.4033720.

- [J4] **F. R. Hogan** and J. R. Forbes, “Trajectory Tracking, Estimation, and Control of a Pendulum-Driven Spherical Robot,” *Journal of Guidance, Control, and Dynamics*. Vol. 39, No. 5, 2016, pp. 1118–1124. doi: 10.2514/1.G001458.
- [J5] **F. R. Hogan** and J. R. Forbes, “Modeling of a Rolling Flexible Circular Ring,” *Journal of Applied Mechanics*. Vol. 82, No. 11, 2016, pp. 111003-1(1–14). doi: 10.1115/1.4031115.
- [J6] **F. R. Hogan** and J. R. Forbes, “Modeling of Spherical Robots Rolling on Generic Surfaces,” *Multi-body System Dynamics*. Vol. 32, No. 4, 2014. doi 10.1007/s11044-014-9438-3.
- [J7] **F. R. Hogan**, J. R. Forbes, and T. D. Barfoot, “Rolling Stability of a Power-Generating Tumbleweed Rover,” *Journal of Spacecraft and Rockets*. Vol. 51, No. 67, 2014, pp. 1895–1906. doi:10.2514/1.A32883.

#### Refereed Conference Publications

- [RC1] **F. R. Hogan\***, M. Bauza\*, and A. Rodriguez, “A Data-Efficient Approach to Precise and Controlled Pushing,” *Conference on Robot Learning (CoRL)*, Zurich, Switzerland, 2018.
- [RC2] **F. R. Hogan\***, M. Bauza\*, and A. Rodriguez, “Tactile Regrasp: Grasp Adjustments via Simulated Tactile Transformations,” *International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018.
- [RC3] **F. R. Hogan**, E. R. Grau, and A. Rodriguez, “Reactive Planar Manipulation with Convex Hybrid MPC,” *International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, 2018.
- [RC4] A. Zeng, S. Song, K.T. Yu, E. Donlon, **F. R. Hogan**, M. Bauza, D. Ma, O. Taylor, M. Liu, E. Romo, N. Fazeli, F. Alet, N. C. Dafle, R. Holladay, I. Morona, P. Q. Nair, D. Green, I. Taylor, W. Liu, T. Funkhouser, A. Rodriguez, “Robotic Pick-and-Place of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching,” *International Conference on Robotics and Automation*, Brisbane, Australia, 2018. **Best Amazon Systems Paper**.
- [RC5] **F. R. Hogan** and A. Rodriguez, “Feedback Control of the Pusher-Slider System: A Story of Hybrid and Underactuated Contact Dynamics,” *In Proceedings of the 12th International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, San Francisco, CA, 2016.
- [RC6] **F. R. Hogan** and J. R. Forbes, “Trajectory Tracking of a Pendulum-Driven Spherical Robot,” *Proc. of ASME 2015 Dynamic Systems and Control Conference (DSCC)*, Columbus, OH, 2015.
- [RC7] **F. R. Hogan**, J. R. Forbes, and Alex Walsh, “Dynamic Modeling of a Flexible Rolling Sphere,” *Proc. 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control*, Boston, MA, 2015.

#### Seminar Presentations

- [SP1] **F. R. Hogan**, Reactive Control for Planar Manipulation, NCTU Robotics Seminar, Taipei, Taiwan, December 20, 2017.

#### Workshop Presentations

- [WP1] **F. R. Hogan** and A. Rodriguez, Hybrid Controller Design for Planar Manipulation Tasks, IEEE International Conference on Robotics and Automation (ICRA): Sensor-Based Object Manipulation for Collaborative Assembly, Singapore, May, 2017.
- [WP2] **F. R. Hogan** and A. Rodriguez, “Planar Pushing: Real-Time Control With Contact Dynamics,” *IEEE International Conference on Robotics and Automation (ICRA): Exploiting Contact and Dynamics in Manipulation*, Stockholm, Sweden, May, 2016.

#### Poster Presentations

- [PP1] **F. R. Hogan** and A. Rodriguez, Reactive Planar Manipulation with Convex Hybrid MPC, National Robotics Initiative, Washington DC, 2017.

- [PP2] **F. R. Hogan** and A. Rodriguez, Planar Pushing: Real Time Control with Contact Dynamics, Northeast Robotics Colloquium, Ithaca, New York, 2016.
- [PP3] **F. R. Hogan** and A. Rodriguez, Closed-Loop Manipulation with Contact Dynamics, National Robotics Initiative, Washington DC, 2016.
- [PP4] **F. R. Hogan** and A. Rodriguez, Flexible Modelling of a Tumbleweed Rover for Martian Exploration, Commonwealth Science Conference, Royal Society, Bangalore, India, November 25-28, 2014.
- [PP5] **F. R. Hogan** and J. R. Forbes, Dynamic Modelling and Stability Analysis of a Martian Tumbleweed Rover, 2013 McGill Summer Undergraduate Research in Engineering (SURE) Poster Presentation, Montreal, QC, August 15, 2013. **Best Aerospace Poster Award.**
- [PP6] **F. R. Hogan**, M. Legrand, A. Batailly and S. Jones, Development of Robust Eigenvalue Solver for Sparse Matrices, 2012 McGill Summer Undergraduate Research in Engineering (SURE) Poster Presentation, Montreal, QC, August 16, 2013.
- [PP7] **F. R. Hogan**, Designing Micro Wind Turbines for Portable Power Generation, 2011 McGill Summer Undergraduate Research in Engineering (SURE) Poster Presentation, Montreal, QC, August 11, 2013.

## TECHNICAL STRENGTHS

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<b>Programming Languages</b>	Python, C++, Matlab, $\LaTeX$
<b>Software</b>	ROS, Tensorflow, Keras, Gurobi, OpenCV, Onshape

## SPORTS AND MISCELLANEOUS

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- Named “National Athlete of the Year” (Gala Sport Hommage Mauricie) 2009
- Named “Junior Triathlete of the Year” (Triathlon Canada) 2009
- Bruny Surin Award for Athletic Excellence (Fondation Bruni Surin) 2009
- Winner of the 2008 edition of “Science On Tourne” 2008
- Named “Junior Triathlete of the Year” (Triathlon Quebec) 2008
- National Triathlon Team Member (Triathlon Canada) 2007
- Hydro-Quebec Award for Excellence in Sports 2007
- Bourse d’Études Jeune Athète (Journal de Montréal) 2006