François Hogan

Ph.D. Candidate, MIT

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EDUCATION

Massachusetts Institute of Technology *Expected 2019*
PhD Candidate, Mechanical Engineering

University of Michigan *2014*
Visiting Scholar, Aerospace Engineering

McGill University
M.Eng., Mechanical Engineering *2015*
B.Eng., Mechanical Engineering (Honours) *2013*

AWARDS & SCHOLARSHIPS

- Amazon Robotics Best Systems Paper Award for "Robotic pick-and-place of novel objects in clutter with multi-affordance grasping and cross-domain image matching" *2018*
- Best Poster Award at ICRA 2018 workshop on Active touch for perception and interaction *2018*
- Winner of Amazon Robotics Challenge, (Stowing task) *2017*
- 3rd place at Amazon Robotics Challenge (Picking task) *2016*
- MIT Presidential Fellowship (most outstanding students in graduate studies at MIT) *2015*
- Vanier Canada Graduate Scholarship (McGill University) *(Declined)* *2015*
- NSERC 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 – Master's Program (NSERC) *2013–2014*
- Best Aerospace Poster Presentation at McGill Summer Undergraduate Research in Engineering (SURE) poster competition *2013*
- NSERC Undergraduate Student Research Award (NSERC USRA) *2011 & 2013*
- Summer Research in Engineering Award (SURE) *2012*
- Dean's Honour List (McGill University) *2010–2013*
- Hydro-Quebec Entrance Scholarship for Academic Excellence and Leadership (McGill University) *2009*
- Governor General's Award (College Laflèche) *2009*

WORK EXPERIENCE

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

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

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

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," *Multibody 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 Explo- ration, Commonwealth Science Conference, Royal Society, Bangalore, India, November 2528, 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

Programming Languages	Python, C^{++}, Matlab, LaTeX
Software	ROS, Tensorflow, Keras, Gurobi, OpenCV, Onshape

SPORTS AND MISCELLANEOUS

- 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*

REFERENCES

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