Bernardo Aceituno-Cabezas

Graduate Student

Massachusetts Institute of Technology (MIT), Room 3-070
Cambdridge, MA 02139, USA
aceituno@mit.edu • http://aceituno.mit.edu • 857 999 5892

Education

Massachusetts Institute of Technology — Cambridge, MA
Master of Science (SM) in Mechanical Engineering — September 2018 - Present
Advisor: Alberto Rodriguez

Universidad Simón Bolívar — Caracas, VE
Degree in Electronics Engineering — September 2012 - July 2018
Advisor: Gerardo Fernández

Experience

Research Assistant — Cambridge, MA
MCube Laboratory, MIT — September 2018 - Present

- Developed a convex-combinatorial optimization model for planar caging.
- Developed a mathematical framework for planar grasping under bounded uncertainty with formal certificates of success.

Visiting Researcher — Genoa, IT
Dynamic Legged Systems Laboratory, IIT — July 2017 - August 2017

- Developed a simultaneous contact and motion planning algorithm for non-gaited multi-legged robot locomotion in challenging terrain, using mixed-integer optimization.
- Carried experiments in a hydraulic quadruped robot HyQ, optimizing robust gaits over a variety of challenging terrain tracks.

Undergraduate Researcher — Caracas, VE
Mechatronics R&D Group, C Laboratory, USB — June 2016 - February 2017

- Developed a non-gaited legged locomotion planning framework, using mixed-integer optimization for contact and gait planning with terrain heuristics.
- Extended a robust walking motion planning algorithm based on contact wrench cone and convex optimization (SOCP) to multilegged locomotion.

Professional Service

Reviewer of IEEE ICRA — 2018 - Present
Reviewer of IEEE RA-L — 2018 - Present
Reviewer of IEEE IROS — 2017 - Present
Reviewer of IEEE CASE — 2017 - Present
Reviewer of ISRR — 2019 - Present
President of MIT GAME — 2019-Present
Secretary General of the USB EECS Student Council — 2015-2016

Teaching Experience

Teaching Assistant for "Robotics" (EC3804) — Caracas, VE
Instructor: Juan C. Grieco — January 2017 - March 2017

Teaching Assistant "Digital Circuits" (EC1723) — Caracas, VE
Instructor: Marta Perez — April - June 2016

Awards and Honors

WAFR 2018 Robo-Guru Fellowship Merida, MX
December 2018
Awarded to attend and mentor a group of 5 undergraduate students from Stanford University and the Georgia Institute of Technology attending the 2018 Workshop on the Algorithmic Foundation of Robotics (WAFR).

Best Student Award Caracas, VE
December 2017
Given for an outstanding academic and extracurricular undergraduate career, issued by Universidad Simón Bolívar.

Outstanding Thesis Award Caracas, VE
October 2017
Given for an outstanding bachelor's thesis with significant contributions to its field, resulting on peer-reviewed publications.

IROS Travel Award Vancouver, BC
August 2017
To attend IROS 2017 in Vancouver (Canada), issued by the IEEE Robotics and Automation Society.

President's List Caracas, VE
June 2017
Recognized as part of the top 1% students of the entire junior class of 2016/2017.

USB Excellence Award Caracas, VE
September 2014
Given for an outstanding academic and extracurricular performance, issued by Universidad Simón Bolívar. *(last time awarded)*

Groups and Societies

MIT Graduate Association of Mechanical Engineers (GAME) 2019 - Present
Institute of Electrical and Electronic Engineers (IEEE) 2016 - Present
IEEE Robots and Automation Society (IEEE-RAS) 2016 - Present
IEEE-RAS TC in Model-based Optimization for Robotics 2017 - Present

Pre-Prints

Publications

[1] **Bernardo Aceituno-C**, Hongkai Dai, and Alberto Rodriguez. A Convex-Combinatorial Model for Planar Caging. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Macau, November 2019. [url]

[2] **Bernardo Aceituno-C**, Jose Ballester, and Alberto Rodriguez. Certified Grasping. In *International Symposium on Robotics Research*, Hanoi, Vietnam, October 2019.

[3] **Bernardo Aceituno-C**, Carlos Mastalli, Hongkai Dai, Michele Focchi, Andreea Radulescu, Darwin G. Caldwell, Jose Cappelletto, Juan C. Grieco, Gerardo Fernández, and Claudio Semini. Simultaneous Contact, Gait and Motion Planning for Robust Multi-Legged Locomotion via Mixed-Integer Convex Optimization. In *IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 2018.
Also in *IEEE Robotics and Automation Letters (RA-L)*, 2018. [url] [video]

[4] **Bernardo Aceituno-C**, Hongkai Dai, Jose Cappelletto, Juan C. Grieco, and Gerardo Fernández. A Mixed-Integer Convex Optimization Framework for Robust Multilegged Robot Locomotion Planning over Challenging Terrain. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, September 2017. [url]

Workshop Papers and Abstracts

[1] **Bernardo Aceituno-C**, Hongkai Dai, Carlos Mastalli, Michele Focchi, Andreea Radulescu, Darwin G. Caldwell, Jose Cappelletto, Juan C. Grieco, Gerardo Fernández, and Claudio Semini. A Mixed-Integer Convex Formulation for Simultaneous Contact, Gait and Motion Optimization on Multi-Legged Robots, In *IROS 2017 Workshop on Frontiers in Contact-rich Robotic Interaction: Modeling, Optimization and Control Synthesis*, Vancouver, BC, September, 2017. [url]

[2] **Bernardo Aceituno-C**, Hongkai Dai, and Gerardo Fernández. Mixed-Integer Convex Optimization of Non-Gaited Multi-Legged Walking Sequences, In *RSS 2017 Workshop on Challenges in Dynamic Legged Locomotion*, Cambridge, MA, July 2017. [url]

Technical Reports

[1] **Bernardo Aceituno-C**, Jose Cappelletto, Juan C. Grieco, and Gerardo Fernández. A Generalized Mixed-Integer Convex Program for Multilegged Footstep Planning on Uneven Terrain. Technical Report. arXiv:1612.02109v2 [cs.RO]. [arXiv]

Theses

[1] **Bernardo Aceituno-C**. A Mixed-Integer Convex Optimization Framework for Multilegged Locomotion on Uneven Terrain. *Bachelor's Thesis*, Caracas, VE, September 2017.

Invited Talks and Presentations

[1] Certified Grasping. In *New England Manipulation Symposium (NEMS)*, New York, NY, June 2019.

[2] Caging as Optimization. In *KTH Robotics Seminar*, Stockholm, Sweden, April 2019.

[3] Caging as Optimization. In *MIT Mechanical Engineering Student Seminar*, Cambridge, MA, December 2018.

[4] Simultaneous Contact, Gait and Motion Planning for Robust Multi-Legged Locomotion via Mixed-Integer Convex Optimization. In *MIT Mechanical Engineering Research Exhibition*, Cambridge, MA, October 2018.

[5] Simultaneous Contact, Gait and Motion Planning for Robust Multi-Legged Locomotion via Mixed-Integer Convex Optimization. In *IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 2018.

[6] A Mixed-Integer Convex Optimization Framework for Robust Multilegged Robot Locomotion Planning over Challenging Terrain. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, September 2017.

[7] A Mixed-Integer Convex Optimization Framework for Robust Multilegged Locomotion over Challenging Terrain. In *Istituto Italiano di Tecnologia Robotics Seminar*, Genoa, IT, August 2017.