

# Alberto Candela Garza

Graduate Student & Research Assistant

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## Education

- 2017 - Present **Carnegie Mellon University**, Pittsburgh, PA, USA  
Ph.D. in Robotics. Expected graduation: August 2020  
Advisor: David Wettergreen
- 2015 - 2017 **Carnegie Mellon University**, Pittsburgh, PA, USA  
M.S. in Robotics. *GPA: 4.04 / 4.33*  
Advisor: David Wettergreen
- 2010 - 2015 **Mexico Autonomous Institute of Technology (ITAM)**, Mexico City, Mexico  
B.S. in Mechatronics Engineering (accredited by ABET). *Summa Cum Laude. GPA: 9.81 / 10.0*  
B.S. in Industrial Engineering (accredited by ABET). *Summa Cum Laude. GPA: 9.73 / 10.0*

## Research Interests

Space robotics, science autonomy, AI, machine learning, computer vision, imaging spectroscopy, systems engineering.

## Honors and Awards

- 2017 IROS Best Paper Award on Cognitive Robotics Finalist
- 2015 Fulbright Fellowship
- 2015 Mexico National Science & Technology Council (CONACYT) Fellowship
- 2015 ITAM Alumni Research Thesis Award
- 2015 National Association of Engineering Faculties and Schools (Mexico): Award for Excellence
- 2015 Highest GPA in the ITAM class of 2015
- 2014 Reforma Newspaper: Recognized as one of the best college students in Mexico
- 2014 PACE – General Motors: Computer Aided Design Competition, 1st place
- 2013 Proyecta 10000 Grantee: Summer research internship at the University of California, Davis
- 2010 Baillères Fellowship: Given to the best student of each program at ITAM, covering full tuition

## Research and Academic Experience

- 2016 & 2017 **NASA Jet Propulsion Laboratory, California Institute of Technology**, Pasadena, CA, USA  
(Summer) *JPL Graduate Fellow Program, 382B Imaging Spectroscopy Group: Science, Algorithms, Calibration*  
Development of autonomous robotic exploration algorithms based on reflectance spectroscopy measurement models, spatial statistics, and probabilistic inference for mineralogical and geologic classifications.
- 2015 - Present **Carnegie Mellon University**, Pittsburgh, PA, USA  
*Research Assistant, Planetary Robotics Laboratory, Field Robotics Center*  
Development and implementation of machine learning and computer vision techniques for science autonomy applied to planetary robotic exploration
- 2013 **University of California**, Davis, CA, USA  
(Summer) *Summer Research Intern, Nuclear Physics Group, Physics Department*  
Modeling, simulation, and statistical analysis of a proposed fixed-target nuclear collision experiment in the second largest particle accelerator in the world: RHIC, at the Brookhaven National Laboratory, USA

2012 - 2014 **Mexico Autonomous Institute of Technology (ITAM)**, Mexico City, Mexico

*Research Assistant, Digital Systems Department*

- Robotics Lab: Electromechanical design and control of omnidirectional robots for the RoboCup Small Size League Soccer Competition
- Telecommunications Innovation Lab: Development of a visual-servoing system for quadcopters with the purpose of improving stabilization and the automatic tracking of objects of interest

*Teaching Assistant, Digital Systems Department*

## Professional Experience

2014 (1 year) **General Motors Company**, Mexico City, Mexico

*ITAM - General Motors Collaboration, Product Engineering Department*

- Design and development of a new car infotainment system
- Design and simulation of a new car suspension system

## Extracurricular Activities

2014 - Present Drone/quadcopter hobbyist.

2013 - 2014 RoboCup Small Size League, ITAM Eagle Knights

- Qualified to RoboCup Eindhoven 2013
- Qualified to RoboCup João Pessoa 2014

2013 Startup Weekend Mexico City, Organizer

2012 RoboCup Mexico City 2012, Organizer

2004 - Present Classical Guitar, 1 recorded album (2009)

## Computing and Software

*Operating Systems* Windows, Linux, MAC OS.

*Programming Languages* C/C++, Java, Python, MATLAB/Simulink, IDL, R, Visual Basic, SQL, LISP, Unix & OS Shell

*Office* Microsoft Office (Excel, Word, Powerpoint, Access, etc.), LaTeX, OpenOffice, SAP

**Languages** English (Fluent), Spanish (Native), German (Beginner)

## Publications

- Candela, A., Wettergreen, D. "Automatic Experimental Design Using Deep Generative Models of Orbital Data". *International Symposium on Artificial Intelligence, Robotics and Automation in Space*, 2018. In progress.
- Candela, A., Gulick, V., Cady, S., Wettergreen, D. "Extracting Multimodal and Multiscale Biosignature Features Using Deep Learning". *International Symposium on Artificial Intelligence, Robotics and Automation in Space*, 2018. In progress.
- Thompson, D. R., Candela, A., Wettergreen, D., Noe Dobre E., Swayze, G., Clark, R., Greenberger, R. "Spatial Spectroscopic Models for Remote Exploration". *Astrobiology*, Vol. 18, Issue 8, 2018 (in press, available on request).
- Candela, A. "Adaptive Spectroscopic Exploration Driven by Science Hypotheses for Geologic Mapping". *Master's thesis*. Tech. report. CMU-RI-TR-17-62, 2017.
- Candela, A., Thompson, D. R., Noe Dobre E., Wettergreen, D. "Planetary Robotic Exploration Driven by Science Hypotheses for Geologic Mapping". *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2017. **Best Paper Award on Cognitive Robotics Finalist**.
- Gautam, S., Roy B. S., Candela, A., Wettergreen, D. "Science-Aware Exploration Using Entropy-Based Planning". *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2017.
- Candela, A. "Quadcopter Vision-based-Control for Stabilization and Object Tracking". *Bachelor's thesis*. Tech. report. ITAM, 000264618, 2015.
- Candela, A. "Monte Carlo Study of  $\sqrt{s_{NN}} = 3$  GeV Au + Au and Au + Al Fixed Target Collisions at STAR". *Tech. report. REU Program 2013, Physics Department, UC Davis*, 2013. Available: <http://london.ucdavis.edu/~reu/REU13/Papers/candela.pdf>

## Talks

- Candela, A. "Artificial Intelligence for Rover Autonomous Navigation". 1st Congress on Mexico Toward Mars (México Hacia Marte), Mexican Space Agency, 2017.
- Candela, A., Possani, A. "Automatic Object Tracking Using a Quadcopter". 3rd Mexican Symposium on Unmanned Aerial Vehicles (III SIMEVANT), 2015.