Alberto Candela Garza

Ph.D. Student & Research Assistant

Carnegie Mellon University, The Robotics Institute
5000 Forbes Ave, Pittsburgh, PA 15213
albertoc@andrew.cmu.edu

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). *Highest Honors. GPA: 9.81 / 10.0* B.S. in Industrial Engineering (accredited by ABET). *Highest Honors. GPA: 9.73 / 10.0*

Research Interests

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

Honors and Awards

2018	Lewis and Clark Field Scholar in Astrobiology
2017	IEEE/RSJ 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 Experience

2016, 2017, & 2018 (3 Summers)	**NASA Jet Propulsion Laboratory, California Institute of Technology**, Pasadena, CA, USA *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 (Summer)	**University of California**, Davis, CA, USA *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 Experience

2017 - 2018 **Carnegie Mellon University**, Pittsburgh, PA, USA

Teaching Assistant, Robotics Department

- 16-811 Math Fundamentals for Robotics (Fall 2017)
- 16-831 Statistical Techniques in Robotics (Spring 2018)

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

- 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 7, 2018.
- Candela, A., Thompson, D.R., Wettergreen, D. “Automatic Experimental Design Using Deep Generative Models of Orbital Data*”. International Symposium on Artificial Intelligence, Robotics and Automation in Space*, 2018.
- Candela, A., Thompson, D. R., Noe Dobrea, 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. “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

Theses

- 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. “Quadcopter Vision-based-Control for Stabilization and Object Tracking”. *Bachelor´s thesis.* Tech. report. ITAM, 000264618, 2015.

Talks

- Candela, A. “Generative Models of Orbital and In Situ data for Autonomous Science”. Field Robotics Center Seminar, Robotics Institute, Carnegie Mellon University, 2018.
- Candela, A. “Artificial Intelligence for Autonomous Rover Navigation”. 1st Congress on Mexico Toward Mars (México Hacia Marte), Mexican Space Agency, 2017.
- Candela, A. “Adaptive Spectroscopic Exploration Driven by Science Hypotheses for Geologic Mapping”. Field Robotics Center Seminar, Robotics Institute, Carnegie Mellon University, 2017.
- Candela, A., Possani, A. “Automatic Object Tracking Using a Quadcopter”. 3rd Mexican Symposium on Unmanned Aerial Vehicles (III SIMEVANT), 2015.