

# Eduardo Almeida

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## Citizenship

U.S. Citizen.

## Research interests

Computer vision, machine learning, pattern recognition, applied probability and statistics: change detection, image-based 3D reconstruction, multiple-view geometry, camera calibration, GPU acceleration.

*To teach a machine to understand the complex 3-d world through the lens of a camera.*

## Honors and Awards

<i>Fellowship</i>	NASA Harriett G. Jenkins Pre-doctoral Fellowship Project (JFPF).	2011-2013
<i>Space Act Award</i>	NASA Inventions and Contributions Board.	Jan 2011
<i>Software Award</i>	NASA Inventions and Contributions Board.	Sep 2010
<i>Fellowship</i>	NASA Rhode Island Space Grant Consortium (RISG).	2009-2010
<i>Distinction Certificate</i>	Mathematical Olympiad, Brazil (Senior level).	1997

## Professional Experience

**Research Assistant** 2006 – 2015

*Brown University* – Providence, RI

Research on camera calibration, 3-d surface estimation and multiple view change detection.

**Machine Vision Intern** Summer 2012

*NASA Jet Propulsion Laboratory* – Pasadena, CA

Design of accurate real-time system for vision guided autonomous navigation based on camera pose estimation, volumetric 3-d surface extraction and GPU acceleration.

**Summer Research Scientist** Summer 2010

*NASA Jet Propulsion Laboratory* – Pasadena, CA

Designed and implemented refinement of zoom lens camera calibration with unknown and time varying internal camera parameters using the CAHVOR camera model.

**Machine Vision Intern** Summer 2009

*NASA Jet Propulsion Laboratory* – Pasadena, CA

Developed an automated 3-d terrain generation process from aerial images.

## Education

**Brown University, Providence, RI**

*Ph.D. in Electrical Engineering* 2006 – 2015

*M.Sc. in Applied Mathematics* 2010

*M.Sc. in Electrical Engineering* 2010

**GPA: 3.88**

**Federal University of Ceara, Fortaleza, CE, Brazil** 2000 – 2004

*B.Sc. in Electrical Engineering* (GPA ~3.8)

## Skills

**Programming Languages:** Matlab, C, C++, OpenCL (NVIDIA and AMD GPUs), Scala.

**Platforms:** Windows, Unix.

**Fluent:** English and Portuguese.

## Publications

**Revisiting Normalized Cross-Correlation for Accurate Camera Pose Estimation and Accurate Real-Time Multiple View Stereo.** PhD thesis, *Brown University*, May 2015.

**Matching Many Identical Features of Planar Urban Facades Using Global Regularity.** In *International Conference on 3D Vision (3DV) Workshops*, Tokyo, Japan, December 2014.

**Axially Symmetric 3D Pots Configuration System using Axis of Symmetry and Break Curve.** In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2013.

**Building a 2.5D Digital Elevation Model from 2D Imagery.** In *NASA Tech Briefs*, April 2013 ([hdl.handle.net/2060/20130012679](http://hdl.handle.net/2060/20130012679)).

**Real-time accurate surface reconstruction pipeline for vision guided planetary exploration using unmanned ground and aerial vehicles.** In *Jet Propulsion Laboratory, NASA*, 2012 ([hdl.handle.net/2014/43198](http://hdl.handle.net/2014/43198)).

**Multimodal Change Detection.** In *Proceedings of United States National Geospatial-Intelligence Agency (NGA) Academic Research Program Symposium (NARP)*, Washington, D.C., September 2008.

## Invited Talks

**A GPU implementation of multiple view stereo**, Vision Systems Inc., Providence, RI, Oct. 17, 2014.

**Change Detection**, Computer Vision Group Seminar, *NASA Jet Propulsion Laboratory*, Pasadena, CA, Jul. 2009.

**Automated 3D-Terrain Generation Process from 2d Aerial Imagery**, Student-Faculty Programs Seminar, *Jet Propulsion Laboratory*, Pasadena, CA, Aug. 20, 2009.

**Change Detection**, Computational Vision Lab Seminar, Host: Prof. Pietro Perona. *California Institute of Technology*, Pasadena, CA, Aug. 25, 2009.

**Internship at the Jet Propulsion Laboratory**, Oral Presentation, Rhode Island Space Grant Consortium Annual Symposium, *Bryant University*, Smithfield, RI, Nov. 14, 2009.

## Graduate Courses taken at Brown University

<i>Department</i>	<i>Courses</i>	<i>Grades</i>
<b>Engineering</b>	Image Understanding	A
	Pattern Recognition and Computer Vision	A
	Mathematical Methods I,      Mathematical Methods II	A, A
	Applied Stochastic Processes	A
	Video Processing	A
	Scientific Programming in C++	A
<b>Mathematics</b>	Differential Geometry	A
	Mathematical Statistics	A
<b>Applied Mathematics</b>	Information Theory	A
	Numerical Solution of Partial Differential Equations I	A
	Real Analysis	A
	Theory of Probability,      Theory of Probability II	B, B
	Hilbert Spaces and Their Applications	A
	Recent Applications of Probability and Statistics	A