

Joao Pedro Barreto

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Dept. of Electrical and Computer Engineering
Faculty of Science and Technology
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Personal Information

Date of Birth: November 26, 1974

Place of Birth: Coimbra, Portugal

Nationality: Portuguese (BI 10259152, Passport H033567)

Education

01/2004 Ph.D. in Electrical Eng.
University of Coimbra, Portugal
(greatest distinction with congratulations of the board)

02/2001 PAPCC in Electrical Eng. (similar to M.S.)
University of Coimbra, Portugal

07/1997 'Licenciatura' in Electrical Eng. (5 years program similar to B.E.)
University of Coimbra, Portugal
(average score: 18.3 out of 20)

Professional Experience

- Since 09/2004** Assistant Professor
Dept. of Electrical and Computer Engineering
Faculty of Science and Technology, University of Coimbra, Portugal
- From 04/2003 to 08/2004** Postdoctoral Research Fellow
Dept. of Computer and Information Science
SEAS, University of Pennsylvania, USA
- From 09/1998 to 03/2003** Teaching Assistant
Dept. of Electrical and Computer Engineering
Faculty of Science and Technology, University of Coimbra, Portugal
- From 09/1997 to 08/1998** Teaching Assistant
Dept. of Electrical Engineering
ESTG, Polytechnic Institute of Leiria, Portugal

Visiting Positions

- From 04/2005 to 08/2005** Visiting Scholar
Dept. of Computer and Information Science
SEAS, University of Pennsylvania, USA
- From 01/2002 to 05/2002** Visiting Ph.D. Student
Group MOVI, INRIA Rhone-Alpes, France

Awards and Distinctions

- National Prize for the best Graduate Student by the Portuguese Professional Association of Electrical Engineers (1998)
- Finalist in the Portuguese Physics Olympiads (1992)
- Finalist in the Portuguese Mathematical Olympiads (1989)

Professional Activities

- **Management/Coordination Positions**

- President/Coordinator of the Pedagogical Council of the Dept. of Electrical and Computer Engineering, University of Coimbra (since 10/2005)

- **Conference/Workshop Organizer**

- *Workshop on Omnidirectional Vision, Camera Networks and Non-Classical Cameras*, to be held in conjunction with ICCV2007, Rio de Janeiro, Brazil

- **Conference/Workshop Program Committee Member**

- ECCV - European Conference on Computer Vision 2006
- CVPR - IEEE Int. Conf. on Computer Vision and Pattern Recognition 2004, 2005, 2006, 2007
- ICCV - IEEE Int. Conf. on Computer Vision 2007
- ICPR - IEEE Int. Conf. on Pattern Recognition 2006
- OMNIVIS - Workshop on Omnidirectional Vision, Camera Networks and Non-Classical Cameras 2004, 2005
- SIBGRAPI - Brazilian Symposium on Computer Graphics and Image Processing 2006

- **Journal Reviewer**

- IEEE Trans. on Pattern Analysis and Machine Intelligence
- Int. Journal on Computer Vision
- Computer Vision and Imaging Understanding
- Image and Vision Computing
- IEEE Trans. on Robotics
- Int. Journal on Robotics Research
- IEEE Robotics and Automation Magazine
- IEEE Trans. on Intelligent Transportation Systems
- IEEE Trans. on Control Systems Technology
- Integrated Computer Aided Engineering
- Photogrammetric Engineering and Remote Sensing
- IET Computer Vision

- **Conference Reviewer**

- ICRA - IEEE Int. Conf. on Robotics and Automation 2007
- IROS - IEEE Int. Conf on Intelligent Robotic Systems 2003, 2006
- AAC - IEEE American Control Conference 2007
- CDC - IEEE Conf. on Decision and Control 2006

- **Activities on Transfer of Technology**

- Participation as technology provider in the 2006 edition of the *Curso de Empreendedorismo de Base Tecnológica* organized by GATS, University of Coimbra.

Invited Research Presentations

- **University of Picardie**, Amiens, France. *Image Geometry in Non-Conventional Central Projection Cameras*. May, 2006
- **Deutsch Telekom**, Berlin, Germany. *Image Geometry in Non-Conventional Central Projection Cameras using Lifting of Coordinates*. May, 2006
- **Toyota Technological Institute**, Chicago, USA. *Calibration of Wide-Area Camera Networks for Tele-Immersion*. June, 2005.
- **Instituto Superior Tecnico**, Lisboa, Portugal. *The Radial Fundamental Matrix and its Application in the Calibration of Wide Area Camera Networks*. March, 2005.
- **Universidade Nova**, Lisboa, Portugal. *Fundamental Matrix for Dioptric Cameras with Radial Distortion*. February, 2005
- **University of Maryland**, College Park, USA. *A Unifying Theory for Central Projection Systems*. March, 2004.
- **University of Pennsylvania**, Philadelphia, USA. *Projective Interpretation of Catadioptric Image Formation*. November, 2002.
- **INRIA Rhone-Alpes**, Grenoble, France. *Geometric Properties of Catadioptric Vision Systems*. January, 2002.

Courses Taught

- **Graduate Program (UCoimbra)**
 - Computational Methods for Estimation, Detection and Identification (Spring 2006)
- **Undergraduate Program (UCoimbra)**
 - Affine and Projective Geometry (Fall 2005, 2006)
 - Computer Architecture (Fall 2005, 2006)
 - Real-Time Systems (Fall 1998, 1999, 2006)
 - Digital Control (Spring 2001)
 - Waves and Propagation (Spring 1999, 2000, 2001)
- **Undergraduate Program (IPLeiria)**
 - Digital Control (Spring 1998)
 - Introduction to Control Systems (Fall 1997, Spring 1998)
 - Introduction to Electromagnetics (Fall 1997)

Students Supervision

• Undergraduate Students

- Jose Roquette. Fall 2006 - present. Work Topic: Visual odometry and 3D reconstruction.
- Daniel Alonso. Fall 2006 - present. Work Topic: Interaction with 3D models using augmented reality
- Luis Ribeiro. Fall 2006 - present. Work Topic: Measuring angles and distances using a cell-phone camera.
- Joao Santos. Fall 2005-Fall 2006. Work topic: Measuring angles and distances using a cell-phone camera.
- Nuno Ferreira, Rui Ferreira and Sergio Esteves. Fall 2000-Fall 2001. Work topic: Active tracking of multiple moving targets
- Diogo Marques, Luis Perdigoto e Pedro Coelho. Fall 1999-Fall 2000. Work topic: Design and development of an active vision systems.

Participation in Research Projects

- Perception on Purpose (EU STREP, FP6-IST, 2005)
- Human-Machine Gestual Interface in Collaborative Environments (FCT Portugal, 2005)
- Advanced Interaction using Facial Information (FCT Portugal, 2005)
- Estimation and Identification of Camera Models (FCT Portugal, 2002)
- Omnidirectional Vision for Navigation and Control (FCT Portugal, 2001)

Publications

• Book Chapters

- [A-1] Joao P. Barreto. "Unifying Image Plane Liftings for Central Catadioptric and Dioptric Cameras". Imaging Beyond the Pin-hole. K Daniilidis and A. Leonardis (Ed.). Kluwer Academic Publisher, 2005.
- [A-2] Joao P. Barreto, F. Martin and R. Horaud. "Visual Servoing/Tracking Using Central Catadioptric Images". Experimental Robotics VIII. B. Siciliano and P.Dario (Ed). Springer Verlag, 2003
- [A-3] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "Evaluation of the Robustness of Visual Behaviors through Performance Characterization". Robust Vision for Robust Vision Based Control of Motion (Chapter 12). M. Vincze and G. Hager (Ed). IEEE Press, 2000
- [A-4] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "Improving 3D Active Visual Tracking". Computer Vision Systems. H. Christensen, Henrik I. (Ed). Lecture Notes in Computer Science, Vol. 1542, Springer Verlag, 1999.

• Journals

- [B-1] Joao P. Barreto. "Unifying Geometric Representation for Central Projection Systems". **Computer Vision and Image Understanding**. 103(3), September 2006. (ISI IF 2005: 1.468)
- [B-2] Joao P. Barreto and Helder Araujo. "Fitting Conics to Paracatadioptric Projection of Lines". **Computer Vision and Image Understanding**, 101(3), pp. 151–165, March 2006. (ISI IF 2005: 1.468)
- [B-3] Joao P. Barreto and Helder Araujo. "Geometric Properties of Central Catadioptric Line Images and Their Application in Calibration". **IEEE Trans. On Pattern Analysis and Machine Intelligence**, 27(8), pp. 1237–1333, August 2005. (ISI IF 2005: 3.810)
- [B-4] Joao P. Barreto and Helder Araujo. "General Framework for Selecting World Coordinate Systems in Perspective and Catadioptric Imaging Applications". **International Journal on Computer Vision**, 57(1), April 2004. (ISI IF 2005: 3.657)
- [B-5] L. Perdigoto, D. Marques, J. P. Barreto, J. Batista and H. Araujo. "Active Vision System for Tracking Two Targets in 3D". *Robotica*, number 45, October, 2001

• Proceedings (Refereed)

(5 in top conferences ICCV, CVPR and ECCV, as in most areas of CS those conferences are as important as journals)

- [C-1] Joao P. Barreto, Rahul Swaminathan and Jose Roquette. *Non Parametric Distortion Correction in Endoscopic Medical Images*. 3DTV-CON The True Vision, Capture, Transmission and Display of 3D Video. Kos, Greece, May 2007..
- [C-2] Joao P. Barreto and Kostas Daniilidis. "Epipolar Geometry of Central Projection Systems using Veronese Maps". **IEEE Int. Conf. on Computer Vision and Pattern Recognition**. New York, June 2006. (acceptance ratio: $\pm 25\%$)
- [C-3] Joao P. Barreto and Kostas Daniilidis. "Fundamental Matrix for Cameras with Radial Distortion". **IEEE Int. Conf. on Computer Vision**. Beijing, October 2005. (acceptance ratio: 20%)
- [C-4] Joao P. Barreto and Kostas Daniilidis. "Unifying Image Plane Liftings for Central Catadioptric and Dioptric Cameras". *Int. Work. on Omnidirectional Vision, Camera Networks and Non-Classical Cameras*. Prague, May 2004.
- [C-5] Joao P. Barreto and Kostas Daniilidis. "Wide Area Multiple Camera Calibration and Estimation of Radial Distortion". *Int. Work. on Omnidirectional Vision, Camera Networks and Non-Classical Cameras*. Prague, May 2004.
- [C-6] Joao P. Barreto and Helder Araujo. "Paracatadioptric Camera Calibration Using Lines". **IEEE Int. Conf. on Computer Vision**. Nice, October 2003. (acceptance ratio: 20.6%)
- [C-7] Joao P. Barreto and Helder Araujo. "Direct Least Square Fitting of Paracatadioptric Line Images". *Int. Work. on Omnidirectional Vision, Camera Networks and Non-Classical Cameras*. Madison, Wisconsin, June 2003.
- [C-8] Joao P. Barreto and Helder Araujo. "Geometric Properties of Central Catadioptric Line Images". **European Conf. on Computer Vision**. Copenhagen, May 2002. (acceptance ratio: 37.7%)
- [C-9] Joao P. Barreto and Helder Araujo. "Issues on the Geometry of Central Catadioptric Imaging". **IEEE Int. Conf. on Computer Vision and Pattern Recognition**. Hawaii, USA, December 2001. (acceptance ratio: 23%)
- [C-10] S. Chroust, J. P. Barreto, H. Araujo and M. Vincze. "Comparison of Control Structures for Visual Servoing". **IEEE Int. Conf. on Advanced Robotics**. Budapest, August 2001.
- [C-11] J. P. Barreto, J. Batista and H. Araujo. "Model Predictive Control to Improve Visual Control of Motion:

Applications in Active Tracking of Moving Targets". IEEE Int. Conf. on Pattern Recognition. Barcelona, September 2000

- [C-12] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "*Mathematical Analysis for Visual Tracking Assuming Perspective Projection*". Int. Symposium on Intelligent Robots and Systems. Reading, July 2000
- [C-13] J. P. Barreto, J. Batista and H. Araujo. "*Solutions for Visual Control of Motion. Active Tracking Applications*". IEEE Mediterranean Conference on Control and Automation. Patra, Greece, July 2000
- [C-14] J. P. Barreto, J. Batista and H. Araujo. "*Control Issues to Improve Visual Control of Motion: Application in Active Tracking of Moving Targets*", 11th Portuguese Conference on Pattern Recognition, Porto 2000.
- [C-15] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "*Tracking Multiple Targets in 3D*". IEEE Int. Conf. on Intelligent Robots and Systems. Korea, October 1999
- [C-16] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "*Control Performance Issues in a Binocular Active Vision System*". IEEE Int. Conf. on Intelligent Robots and Systems. Victoria, Canada, October 1998.
- [C-17] J. P. Barreto, P. Peixoto, J. Batista and H. Araujo. "*Performance Characterization of Visual Behaviors in Active Vision Systems*". Int. Symposium on Intelligent Robots and Systems. Edinburgh, July 1998.
- [C-18] J. P. Barreto, A. Trigo, P. Menezes, J. Dias and A. T. de Almeida. "*FBD - Free Body Diagram Method. Kinematic and Dynamic Modeling of a Six Legged Robot*". IEEE Int. Work. on Advanced Motion Control Coimbra, Portugal. July 1998

- **Thesis**

- [G-1] Joao P. Barreto. "*General Central Projection Systems: Modeling, Calibration and Visual Servoing*". PhD Thesis. University of Coimbra. April 2003.
- [G-2] Joao P. Barreto. "*Solutions for Visual Control of Motion: Application in Active Vision Tracking*". PAPCC Report. University of Coimbra. November 2000.
- [G-3] Joao P. Barreto e Antonio Trigo. "*Modeling the Dynamics of a Six Legged Robot*". Senior Project. University of Coimbra. September 1997.