

# Ermano A Arruda

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## EDUCATION

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**PhD Student at the University of Birmingham (UoB), School of Computer Science, UK** 2015 - Present  
*Control and perception for robust manipulation from demonstration.*

Current research focus: robot manipulation, active perception, computational vision, reinforcement learning.

**Bachelor in Computer Science, Center for Informatics (CIn), Federal University of Pernambuco (UFPE), Brazil - GPA: 9.03/10.0** 2010 - 2015

Algorithms and Data Structures (96%), Intelligent Systems (91%), Linear Algebra (80%), Communication Infrastructure (98%), Data and Information Management (91%), Graphical Processing (95%), Computer Language Paradigms (99%), etc.

**Affiliate Computer Science and Software Engineering (Occasional), University of Birmingham, UK - 78%** 2013 - 2014

Intelligent Robotics (85%), Advanced Robotics (91%), Parallel Programming (87%), Computational Vision (75%), Operating Systems with C/C++ (80%), Machine Learning (74%), Neural Computation (70%), etc.

## PUBLICATIONS

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- Ermano Arruda\*, Michael J Mathew\*, Marek Kopicki, Michael Mistry, Morteza Azad, Jeremy L Wyatt, *Uncertainty Averse Pushing with Model Predictive Path Integral Control*. In Proceedings of IEEE International Conference on Humanoid Robots (Humanoids), 2017.
- Ermano Arruda, Jeremy Wyatt, Marek Kopicki, *Active vision for dexterous grasping of novel objects*. In Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS), 2016.
- Lucas Figueiredo, Edvar Vilar Neto, Ermano Arruda, João Marcelo Teixeira, Veronica Teichrieb, *Fishtank Everywhere: Improving Viewing Experience Over 3D Content*, In Proceedings of the 16th International Conference on Human-Computer Interaction, Crete, Greece, June 22-27, 2014. Springer.

## AWARDS

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**First place at ISMAR Off-site Tracking Competition 2015, Fukuoka, Japan.** 2015  
*Implemented a monocular visual odometry system with additional sparse bundle adjustment for camera trajectory optimisation.*

**Member of the winning team CESAR-VoxarLabs at LARC/CBR – Latin American and Brazilian Robotics Competition, RoboCup@Home.** 2014  
*Implemented an object-tracking and detection system based on state-of-the-art long-term tracking algorithm Tracking-Learning-Detection (TLD).*

**AnimAR application – Grand Prize Winner for Metaio’s GotHeARt Competition (InsideAR 2013, Munich, Germany).** 2013  
*Augmented Reality android application for storyboard design and animation.*

## TECHNICAL SKILLS

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<b>Databases</b>	Oracle DBMS, PostgreSQL
<b>Development Tools</b>	VS Code, Visual Studio, Eclipse, QtCreator, Android Studio, Sublime, CMake
<b>Programming Languages</b>	C/C++, Python, Java, Lua, C#, Haskell, Matlab, R, Javascript, Unix shell
<b>Web</b>	Python with Django Framework, HTML/CSS
<b>Version Control</b>	Git, SVN
<b>Other</b>	Robot Operating System (ROS)

## LANGUAGES

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- English (Fluent), Portuguese (Native)

## PROJECTS

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**PaCMan project - Active perception for robotic grasping** 2016

- Focused on next-best-view planning for improving grasp performance. Responsible for the final integrated demo of the PaCMan project with active vision system for next-best-view planning. See <http://www.pacman-project.eu>.

**ToyDQN, implementation of the Deep Q Network (DQN) algorithm for a few toy examples - Lua, Torch7, Love2d** 2016

- An open-source personal summer project on deep reinforcement learning available at <https://github.com/eaas3/DeepQLearning>.

**Simple Tracking and Mapping (STAM), visual odometry algorithm - C/C++, OpenCV** 2015

- A monocular visual odometry system with additional sparse bundle adjustment for trajectory optimisation. The system ranked first place at the International Symposium on Mixed and Augmented Reality (ISMAR) 2015 Off-site Tracking Competition.

**SLAM\_X, A Graph-based SLAM system for mobile robots - Robot Operating System (ROS), C/C++, PCL, OpenCV** 2015

- Final year project on SLAM techniques with applications on robot perception. The system was quantitatively evaluated on the TUM RGB-D SLAM Benchmark dataset. Video demonstration available at [https://youtu.be/-ZV9gk\\_Hw84](https://youtu.be/-ZV9gk_Hw84).

**VoxarBrain, I-Zak's brain, the robot who won LARC/CBR RoboCup@Home Competition - C/C++, OpenCV, PCL** 2015

- Worked on object tracking, recognition and pose estimation for the I-Zak robot.

**Call a Metting, Call a Meeting Robot Task - C/C++, Python, Java, Robot Operating System (ROS), OpenNI** 2013

- Implemented the vision node with ROS, which included person recognition algorithm with false positive filtering based on shape similarity using a k-nearest-neighbour classifier.

**AnimAR, android application for storyboard design and animation - Android, OpenCV and MetaioSDK** 2013

- Implemented an algorithm for extracting rectified animation frames from storyboard pages for creating animations.

## PROFESSIONAL EXPERIENCE

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**Honda Research Institute (HRI)** Offenbach, Germany

*Internship* September 2018 - November 2018

- Have investigated, implemented and deployed approaches for generative grasp synthesis on a 6-DoF Kinova JACO 2 platform with a Kinova 3-finger gripper KG-3. The project was also part of my PhD research.

**School of Computer Science - University of Birmingham** Birmingham, UK

*Teaching Associate - Software Workshop I* October 2015 - April 2016

- Small group teaching and exercise marking on introductory programming course with Java at the University of Birmingham.

**VoxarLabs** Recife, Pernambuco, Brazil

*Research Internship* September 2012 - October 2015

- Worked on tracking for virtual and augmented reality interaction in projects such as AnimAR and FishTankVR.
- Contributed to the VoxarBrain project, a joint project involving the Voxar Robotics team in partnership with the Recife Center for Advanced Studies and Systems (CESAR, in Portuguese).

**Center for Informatics (CIn) - Federal University of Pernambuco** Recife, Pernambuco, Brazil

*Graphical Processing* January 2013 - September 2013

*Algorithm & Data Structures* August 2011 - September 2013

*Introduction to Programming* February 2011 - August 2011

- Gave revision lectures, elaborated programming puzzles, supervised projects, and marked exercises.

## EXTRA CURRICULAR EXPERIENCE

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**University of Birmingham Drone Forum - IT Innovation Centre** 2016 - 2017

- Focused on engaging researchers, students, and hobbyists by creating an environment for discussion, research, and development of drone-related technologies and applications.

**Programme of Tutorship and Education (PET) - Federal University of Pernambuco** 2012 - 2015

- Taught basic informatics to the community and university staff, performed department tours for high school visitors. Also promoted environmental and social campaigns such as food donation, blood donation, and recycling digital waste.
- Organized workshops and tutorials to the students of the Center for Informatics (CIn).