

# AAMIR AHMAD

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Date of Birth : 04-04-1986

## Education

- **Institute for Systems and Robotics, Instituto Superior Técnico, Lisbon, Portugal** —
  - PhD (*with Merit*) in Electrical and Computer Engineering
  - PhD obtained with the *European Doctorate Certificate*
  - **Supervisor:** Prof. Dr. Pedro Manuel Urbano de Almeida Lima
  - **Thesis:** An Integrated Bayesian Approach to Multi-Robot Cooperative Perception
  - **Duration:** January 2010 - April 2013; Graduation Date: April 23, 2013
  - **Members of the Jury (PhD Thesis Committee):**
    - \* Prof. Dr. Wolfram Burgard
    - \* Prof. Dr. Mário Alexandre Teles de Figueiredo
    - \* Prof. Dr. José Alberto Rosado dos Santos Victor
    - \* Prof. Dr. Pedro Manuel Urbano de Almeida Lima
    - \* Prof. Dr. Vítor Manuel Ferreira dos Santos
  - **Research Keywords:**
    - \* Robot Localization, Object Recognition and Tracking.
    - \* Multi-robot systems and cooperative perception.
    - \* Active cooperative perception.
    - \* Bayesian methods for cooperative robot localization and object tracking.
    - \* Nonlinear optimization techniques for robot localization and object tracking.
- **Indian Institute of Technology (IIT), Kharagpur** —
  - Bachelor of Technology (*with Honours*) in Civil Engineering
  - Thesis: Design and implementation of a six-legged robot and map generation of a cluttered environment using on-board sonar range finder.
  - Course Duration: 8 semesters (July 2004 - July 2008)
  - Graduation Date: July, 2008

## Research Experience

- **Max Planck Institute for Biological Cybernetics, Tübingen, Germany**
  - Expected starting date: *September 2014*.
  - My project proposal submitted to the **European Commission through Intra-European Fellowships for career development (IEF) - Marie Curie Actions 2013**, was positively evaluated and approved for funding.

- **Institute for Systems and Robotics, Instituto Superior Técnico, Lisbon, Portugal**
  - *(March 2013 - present)* Research grantee in the FP7 European project RoCKIn: Robot Competitions Kick Innovation in Cognitive Systems and Robotics (FP7-EU-601012).
  - *(February 2010 - February 2013)* Research grantee in the project PCMMC: PCMMC: Perception-Driven Coordinated Multi-Robot Motion Control (FCT PTDC/EEA-CRO/100692/2008) and worked under the guidance of Prof. Pedro U. Lima towards my PhD thesis.
  - *(January 2009 - January 2010)* Project grantee in the FP6 European project URUS: Ubiquitous Networking Robotics in Urban Settings (FP6-EU-IST-045062). Worked for the development of Linux device drivers for touch screens.
  - *(July 2008 - present)* Researcher and team member in the ‘RoboCup Middle Sized League’ team ‘SocRob’. Participations: National Level: Róbotica (RoboCup Portuguese Open) 2009, 2010, 2011, 2012 and 2013. International Level: RoboCup 2009 (Graz, Austria), RoboCup 2011(Istanbul, Turkey).
  - *(May 2007 - July 2007)* Research intern and team member in the ‘RoboCup Middle Sized League’ team ‘SocRob’ from Portugal in RoboCup 2007 held at Georgia Tech, Atlanta.
- **Autonomous Intelligent Systems Research Laboratory, Albert-Ludwigs-University Freiburg, Germany**
  - *(May 11, 2012 - August 10, 2012)* Research intern under the guidance of Prof. Dr. Wolfram Burgard. Worked towards the development of graph optimization-based approach for cooperative robot localization and object tracking.
- **Autonomous Systems Laboratory, R&D unit of Instituto Superior de Engenharia do Porto (ISEP) and the Engineering School of Porto Polytechnic, Oporto, Portugal**
  - *(May 15, 2011 - June 15, 2011)* Research intern under the guidance of Prof. Eduardo Silva. Worked towards 3-D tracking of a known-sized spherical object using a single dioptric camera.
- **Indian Institute of Technology, Kharagpur, India**
  - *(July 2007 - July 2008)* Worked towards the completion of B-Tech thesis titled “Design and implementation of a six-legged robot and map generation of a cluttered environment using on-board sonar range finder”.

## Projects

- **(Mar 2013 - present)** European project RoCKIn: Robot Competitions Kick Innovation in Cognitive Systems and Robotics (FP7-EU-601012)
- **(Feb 2010 - Feb 2013)** Portuguese project PCMMC: Perception-Driven Coordinated Multi-Robot Motion Control (FCT PTDC/EEA-CRO/100692/2008)
- **(Jan 2009 - Jan 2010)** European project URUS: Ubiquitous Networking Robotics in Urban Settings (FP6-EU-IST-045062)

## Publications

### Published Journal Articles

1. **Multi-Robot Cooperative Spherical-Object Tracking in 3D Space Based on Particle Filters**, *Aamir Ahmad and Pedro Lima*, Robotics and Autonomous Systems (RAS) Journal, Vol. 61, Issue 10, October, pp. 1084-1093, ISSN 0921-8890, 2013  
(Available Online: <http://www.sciencedirect.com/science/article/pii/S0921889013000535>).

### Submitted Journal Articles

1. **3D to 2D Bijection for Spherical Objects Under Equidistant Fisheye Projection**, *Aamir Ahmad, João Xavier, José Santos-Victor, Pedro Lima* Submitted to: Elsevier Journal of Computer Vision and Image Understanding.
2. **Formation Control Driven by Cooperative Object Tracking**. *Pedro Lima, Aamir Ahmad, André Dias, A. G. S. Conceição, António Paulo Moreira, Eduardo Silva, Luís Almeida, Luís Oliveira, Tiago P. Nascimento* Submitted to: Robotics and Autonomous Systems Journal.

### Published Book Chapters

1. **Cooperative Localization Based on Visually Shared Objects** Book Name: *RoboCup 2010: Robot Soccer World Cup XIV*, Springer-Verlag, Berlin, Heidelberg 350-361. Series: Lecture Notes in Computer Science, Vol.6556 Subseries: Lecture Notes in Artificial Intelligence. *Authors: Pedro Lima, P. Santos, R. Oliveira, Aamir Ahmad and J. Santos* Editors: Ruiz-del-Solar, Javier; Chown, Eric; Ploeger, Paul G.

### Published Conference Papers

1. **Cooperative Robot Localization and Target Tracking based on Least Square Minimization**, *Aamir Ahmad, Gian Diego Tipaldi, Pedro Lima and Wolfram Burgard*, Proc. of the 2013 IEEE International Conference on Robotics and Automation (ICRA 2013), Karlsruhe, Germany
2. **Perception-Driven Multi-Robot Formation Control**, *Aamir Ahmad, Tiago Nascimento, André G. S. Conceição, Antonio Paulo Moreira and Pedro Lima*, Proc. of the 2013 IEEE International Conference on Robotics and Automation (ICRA 2013), Karlsruhe, Germany
3. **Unknown-Color Spherical Object Detection and Tracking**, *A. Troppan, E. Guerreiro, F. Celliberti, G. Santos, Aamir Ahmad and Pedro Lima*, in Proceedings of Robotica 2013 - 13th International Conference on Autonomous Robot Systems and Competitions, Lisbon, Portugal, 2013
4. **Multi-Robot Cooperative Object Tracking Based on Particle Filters**, *Aamir Ahmad and Pedro Lima*, Proc. of European Conference on Mobile Robots, Örebro, Sweden, 2011  
→ Voted by the reviewers and the conference participants as one of the best papers presented.
5. **Cooperative Localization Based on Visually Shared Objects**, *Pedro Lima, P. Santos, R. Oliveira, Aamir Ahmad and J. Santos*, Proc. of RoboCup 2010 Symposium, Singapore, 2010
6. **Background Subtraction Based on Rank Constraint for Point Trajectories**, *Aamir Ahmad, Alessio Del Bue and Pedro Lima*, Proc. of RecPad 2009 - 15th Portuguese Conference on Pattern Recognition, Aveiro, Portugal, 2009

7. **Probabilistic Roadmap Method and Real Time Gait Changing Technique Implementation for Travel Time Optimization on a Designed Six-legged Robot**, *Aamir Ahmad and Nirjhar Dhang*, Proc. of ISR 2008 - 39th International Symposium on Robotics, Seoul, South Korea, 2008

### Published Technical Reports

1. Messias, J., **Ahmad, A.**, Reis, J., Serafim, M., Lima, P. (2013): SocRob-MSL 2013 Team Description Paper. Middle Sized League in RoboCup 2013, Eindhoven, The Netherlands.
2. Messias, J., **Ahmad, A.**, Reis, J., Grego, F., Sousa, J., Lima, P. (2011): ISocRob-MSL 2011 Team Description Paper. Middle Sized League in RoboCup 2011, Istanbul, Turkey.
3. Lima, P., Messias, J., Santos, J., Estilita, J., Barbosa, M., **Ahmad, A.**, Carreira, J. (2009): ISocRob-MSL 2009 Team Description Paper. Middle Sized League in RoboCup 2009, Graz, Austria.

### Other Scientific Activities

- **Member of the Institute for Systems and Robotics (ISR) Scientific Board at Instituto Superior Técnico, Lisbon.**
- **Elected as a Member of the Organizing Committee**, Middle Size League, RoboCup 2014, João Pessoa, Brazil.
- **Member of the Program Committee**, International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2014, Paris, France.
- **Member of the Program Committee**, European Conference on Mobile Robots (ECMR) 2013, Barcelona, Spain.
- **RP (Responsible Person) for RoboCup Challenge at India 2009 and 2010.**
- **Governor, Technology Robotics Society (TRS) at IIT Kharagpur, India (July 2007 to April 2008)**

### Awards, Recognition and Grants

- My publication **Multi-Robot Cooperative Object Tracking Based on Particle Filters** was selected as one of the best papers in the European Conference on Mobile Robots (ECMR) 2011, Örebro, Sweden. It was invited to be published in a special issue of Robotics and Autonomous Systems (RAS) journal.
- Research grantee fellowship in the project RoCKIn. Funding Agency: FP7-EU-601012. Duration: March 2013 - present.
- RoboCup MSL team 'ISocRob' finished as runner-up in Róbotica 2011, the Portuguese national open for robotics competitions.
- Research Grantee Fellowship in the project PCMMC. Funding Agency: FCT PTDC/EEA-CRO/100692/2008. Duration: 2010-2013.

- Research Grantee Fellowship in the project URUS. Funding Agency: FP6-EU-IST-045062. Duration: 2009.
- Intern Scholarship at ISR, IST, Lisboa. Funding Agency: N14/ESA Financial code: IST/ISR No 1601. Duration: 2008

## Communications in Conferences

- International Conference on Robotics and Automation (ICRA) 2013, Karlsruhe, Germany.
- European Conference on Mobile Robots, Örebro, Sweden, 2011.
- RoboCup Symposium 2013, Eindhoven, The Netherlands; RoboCup Symposium 2011, Istanbul, Turkey; RoboCup Symposium 2010, Singapore; RoboCup Symposium 2009, Graz, Austria.
- Robótica (2013 Lisbon), (2012 Guimarães), (2011 Lisbon), (2010 Leiria), (2009 Castelo Branco), Portugal.
- 15th Portuguese Conference on Pattern Recognition 2009, University of Aveiro, Portugal.
- International Symposium on Robotics, Seoul, Korea 2008