

Curriculum Vitae

AAMIR AHMAD

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Education

- **PhD (*with Merit*) in Electrical and Computer Engineering, University of Lisbon, Portugal.** (Jan 2010 - April 2013)
 - Institute for Systems and Robotics, Instituto Superior Técnico, University of Lisbon.
 - 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.
 - **Members of the Jury (PhD Thesis Committee):** Prof. Dr. Wolfram Burgard; Prof. Dr. Mário Figueiredo; Prof. Dr. José Santos-Victor; Prof. Dr. Pedro Lima; and Prof. Dr. Vítor Santos.
- **Bachelor of Technology (*with Honours*) in Civil Engineering, Indian Institute of Technology (IIT), Kharagpur, India.** (July 2004 - July 2008)
 - **Thesis:** Design and implementation of a six-legged robot and map generation of a cluttered environment using on-board sonar range finder.

Research Experience

- **Research Scientist** (September 2016 - Current) – *Perceiving Systems Department, Max Planck Institute for Intelligent Systems, Tübingen, Germany.*
 - **Project Leader**, Max Planck Grassroots Project MAVOCAP/AirCap
https://ps.is.tuebingen.mpg.de/research_projects/aircap.
- **Marie Curie Postdoctoral Fellow** (September 2014 - August 2016) – **Max Planck Institute for Biological Cybernetics, Tübingen, Germany.** Project Funded by the European Commission through the Intra-European Fellowships for career development (IEF) - Marie Curie Actions 2013.
- **Postdoctoral Fellow** (March 2013 - August 2014) – **Institute for Systems and Robotics, Instituto Superior Técnico, Lisbon, Portugal.** FP7 European project RoCKIn: Robot Competitions Kick Innovation in Cognitive Systems and Robotics.
- **PhD Student and Researcher Positions** (Jul 2008 - Feb 2013)
 - **Institute for Systems and Robotics, Instituto Superior Técnico, Lisbon, Portugal.**
 - * Jan 2009 - Feb 2013 – Research grantee in the Portuguese and European projects.
 - * Jul 2008 - Aug 2014 – Researcher and team member in the RoboCup Middle Size 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), RoboCup 2013 (Eindhoven, Holland).
 - **Autonomous Intelligent Systems Research Laboratory, Albert-Ludwigs-University Freiburg, Germany.**
 - * May 2012 - Aug 2012 – Research intern with Prof. Dr. Wolfram Burgard. Developed a pose graph optimization approach for multirobot cooperative perception (see article [12] in publication list).
 - **Autonomous Systems Laboratory, R&D unit of Instituto Superior de Engenharia do Porto (ISEP) and the Engineering School of Porto Polytechnic, Oporto, Portugal.**
 - * May 2011 - Jun 2011 – Research intern with Prof. Eduardo Silva. Worked on vision-based target tracking (see article [4] in publication list).

Research Projects

- Sep 2016 - current – **Project Leader**, Max Planck Grassroots Project MAVOCAP/AirCap: Micro Aerial Vehicles-based Outdoor motion CAPture.
- Sep 2014 - Aug 2016 – **Lead Researcher**, Marie Curie IEF project TRaVERSE: Towards Very Large Scale Human-Robot Synergy (PIEF-GA-2013-626050).
- Mar 2013 - Aug 2014 – **Researcher**, European project RoCKIn: Robot Competitions Kick Innovation in Cognitive Systems and Robotics (FP7-EU-601012).
- Feb 2010 - Feb 2013 – **Researcher**, Portuguese project PCMMC: Perception-Driven Coordinated Multi-Robot Motion Control (FCT PTDC/EEA-CRO/100692/2008).
- Jan 2009 - Jan 2010 – **Researcher**, European project URUS: Ubiquitous Networking Robotics in Urban Settings (FP6-EU-IST-045062).

Invited talks

- Deep Neural Network-based Cooperative Visual Tracking through Multiple Flying Robots, **2018 GPU Technology Conference (GTC)**, San José, USA.
- Cooperative Perception, "**Lucia**" **PhD School on AI and Robotics**, Sep 4-8, 2017, Lisbon, Portugal.
- Human-Multirobot Interaction in Cooperative Perception-based Search and Rescue Missions, **IEEE ICRA Workshop on Human Multi-Robot Systems Interaction**, June 2, 2017, Singapore.
- Cooperative Robot Localization and Target Tracking based on Least Squares Minimization, **LARSyS Summer School on Multi-agent Systems**, July 8-11, 2014, Lisbon, Portugal.

Awards and Grants

- **[Funding]** Max Planck Grassroots Project MAVOCAP/AirCap, 2017 **funding amount: 20K EUR**.
- **[Award]** Publication **Moving-horizon Nonlinear Least Squares-based Multirobot Cooperative Perception** was selected among the ten best papers in the European Conference on Mobile Robots 2015; It was invited and published in *Robotics and Autonomous Systems (RAS)* journal, 2016.
- **[Funding]** Project Proposal TRaVERSE was successfully evaluated for the Marie Curie Intra-European Fellowship (~10% acceptance rate) in 2013 **funding amount: ~110K EUR**.
- **[Award]** Publication **Multi-Robot Cooperative Object Tracking Based on Particle Filters** was selected among the ten best papers in the European Conference on Mobile Robots 2011; It was invited and published in *Robotics and Autonomous Systems (RAS)* journal, 2013.
- **[Funding]** Winner of the Mobility Grant 2011 from the Portuguese Robotics Society (SPR) **funding amount: 1K EUR**.

Other Scientific Activities

- **Member of the Scientific Board of ISR** at Instituto Superior Técnico, Lisbon, April 2013 - August 2014.
- **Elected 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) 2016 and 2014 and the European Conference on Mobile Robots (ECMR) 2013, Barcelona.
- **Served as a reviewer** for several prestigious Journals and International Conferences, e.g., IEEE-RAM, RAS, IEEE-RAL, IEEE-TIE, Soft Computing, Autonomous Robots, ICRA, IROS, ECMR, AAMAS.
- **Responsible Person** for RoboCup Challenge at India 2009 and 2010.
- **Governor** of Technology Robotics Society (TRS) at IIT Kharagpur, India (July 2007 to April 2008).

Ten Most Important Publications of the Applicant

Published Peer-reviewed Journal Articles

1. **An Online Scalable Approach to Unified Multirobot Cooperative Localization and Object Tracking.** *Aamir Ahmad, Guilherme Lawless and Pedro Lima*, IEEE Transactions on Robotics (T-RO), vol.PP, no.99, pp.1-16, **2017**.
(Available Online: <https://doi.org/10.1109/TR0.2017.2715342>)
2. **Moving-horizon nonlinear least squares-based multirobot cooperative perception.** *Aamir Ahmad, Heinrich H. Bülthoff*, Robotics and Autonomous Systems (RAS) Journal, Vol 83, pp. 275 - 286. September **2016**.
(Available Online: <http://dx.doi.org/10.1016/j.robot.2016.06.002>)
3. **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*, Robotics and Autonomous Systems (RAS) Journal, Vol 63 Issue 1, pp. 68–79. **2015**.
(Available Online: <http://dx.doi.org/10.1016/j.robot.2014.08.018>)
4. **3D to 2D Bijection for Spherical Objects Under Equidistant Fisheye Projection,** *Aamir Ahmad, João Xavier, José Santos-Victor, Pedro Lima*, Elsevier Journal of Computer Vision and Image Understanding (CVIU), Vol. 125 pp. 72–183. **2014**.
(Available Online: <http://dx.doi.org/10.1016/j.cviu.2014.04.004>)
5. **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, pp. 1084-1093, **2013**.
(Available Online: <http://dx.doi.org/10.1016/j.robot.2012.12.008>)

Published Peer-reviewed Book Chapters

6. **Towards Optimal Robot Navigation in Domestic Spaces,** *Rodrigo Ventura, Aamir Ahmad*, RoboCup 2014: Robot World Cup XVIII, Volume 8992 of the series Lecture Notes in Computer Science pp 318-331. **2015**.
(Available Online: http://link.springer.com/chapter/10.1007%2F978-3-319-18615-3_26)
7. **Cooperative Localization Based on Visually Shared Objects,** *Pedro Lima, P. Santos, R. Oliveira, Aamir Ahmad and J. Santos*, 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. **2011**.
(Available Online: http://link.springer.com/chapter/10.1007/978-3-642-20217-9_30)

Published Peer-reviewed Conference Papers

8. **Moving-horizon Nonlinear Least Squares-based Multirobot Cooperative Perception,** *Aamir Ahmad, Heinrich H. Bülthoff*, 7th European Conference on Mobile Robots (ECMR 2015), Lincoln, United Kingdom, **2015**.
→ Voted by the reviewers and the conference participants as one of the 10 best papers presented.
9. **Cooperative Robot Localization and Target Tracking based on Least Squares 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, **2013**.
10. **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, **2013**.

Other Publications of the Applicant

Google Scholar Citations Link: <https://goo.gl/UtyD5i>

Published Peer-reviewed Conference Papers

1. **Dynamic baseline stereo vision-based cooperative target tracking**, *Aamir Ahmad, Eugen Ruff, Heinrich H. Bülthoff*, 19th International Conference on Information Fusion (FUSION 2016), Heidelberg, Germany, **2016**.
2. **Onboard robust person detection and tracking for domestic service robots**, *David Sanz, Aamir Ahmad, Pedro Lima*, ROBOT'2015 - Second Iberian Robotics Conference, Lisbon, Portugal, **2015**.
3. **Towards Optimal Robot Navigation in Domestic Spaces**, *Aamir Ahmad and Rodrigo Ventura*, Proc. of the 2014 RoboCup Symposium, João Pessoa, Brazil, **2014**.
4. **Unknown-Color Spherical Object Detection and Tracking**, *A. Troppan, E. Guerreiro, F. Ciliberti, G. Santos, Aamir Ahmad and Pedro Lima*, in Proceedings of Robotica 2013 - 13th International Conference on Autonomous Robot Systems and Competitions, Lisbon, Portugal, **2013**.
5. **Multi-Robot Cooperative Object Tracking Based on Particle Filters**, *Aamir Ahmad and Pedro Lima*, Proc. of European Conference on Mobile Robots (ECMR 2011), Örebro, Sweden, 2011.
→ Voted by the reviewers and the conference participants as one of the 10 best papers presented, **2011**.
6. **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**.
7. **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**.
8. **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 Workshop Papers

9. **Dataset Suite for Benchmarking Perception**, *Aamir Ahmad and Pedro Lima*, RoboticsIEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015) Workshop: Open forum on evaluation of results, replication of experiments and benchmarking in robotics research, October 2015, Hamburg, Germany, **2015**.
10. **A Setup for Multi-UAV Hardware-In-The-Loop Simulations**, *Marcin Odelga, Paolo Stegagno, Heinrich Bülthoff and Aamir Ahmad*, Workshop on Research, Education and Development of Unmanned Aerial Systems (RED-UAS 2015), November 2015, Cancun, Mexico, **2015**.

Technical Reports

For the full list of technical reports, please see

<http://www.kyb.tuebingen.mpg.de/nc/employee/details/aahmad.html#3>