

# Curriculum Vitae

## Bruno Lacerda

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### RESEARCH INTERESTS

Planning under uncertainty, probabilistic model checking, multi-robot systems, service robotics, temporal logics, discrete event systems.

### RESEARCH POSITIONS

September 2017 - Present      *Postdoctoral Research Assistant in Robotics*  
University of Oxford, Oxford, United Kingdom

April 2013 - September 2017      *Research Fellow in Intelligent Robotics*  
University of Birmingham, Birmingham, United Kingdom

Contribution to Projects:

- Spatio-Temporal Representations and Activities for Cognitive Control in Long-Term Scenarios (STRANDS). *EU-FP7*.
- Novel Dynamic Vehicle Scheduling and Path Planning Algorithms for Mobile Robotic and AGV Warehouse Order Picking. *TSB Smart Award*.
- Learning the structure and dynamics of human environments to support intelligent mobile robot behaviour. *EPSRC First Grant*.

Teaching:

- 2015/2016, 2016/2017, Semester 2: Two lectures on multi-robot coordination for the Robot Programming module.
- 2014/2015, Semester 1: Part of the lecturer team for the Intelligent Robotics module.
- 2013/2014, Semester 1: Part of the demonstrator team for the Foundations of Computer Science module.

September 2008 - December 2008      *Research Grantee*  
Örebro University, Örebro, Sweden

Contribution to Projects:

- Ecology of Physically Embedded Intelligent Systems.

March 2008 - August 2008      *Research Grantee*  
Instituto Superior Técnico, Lisbon, Portugal

Development of translation tool between two xml representations of Petri nets.  
Development of research agenda and proposal for PhD application.

### EDUCATION

2009 - 2013      *Doutoramento (PhD) in Electrical and Computer Engineering (Pass with merit)*  
Instituto Superior Técnico, Lisbon, Portugal  
Thesis: "*Supervision of Discrete Event Systems Based on Temporal Logic Specifications*".  
Advisor: Prof. Pedro U. Lima.  
Research visits:

- 09/2011 - 12/2011: University of California at Los Angeles, Los Angeles, CA, USA, hosted by Prof. Paulo Tabuada.

- 03/2010 - 06/2010: Universidad Carlos III de Madrid, Madrid, Spain, hosted by Prof. Miguel A. Salichs.

2002 - 2007 *Mestrado (MSc) in Mathematics and Applications*  
 Instituto Superior Técnico, Lisbon, Portugal  
 Thesis: “*Linear-Time Temporal Logic Control of Discrete Event Systems*”.  
 Advisors: Prof. Pedro U. Lima, Prof. Francisco M. Dionísio.

2002 - 2007 *Licenciatura (BSc) in Applied Mathematics and Computation*  
 Instituto Superior Técnico, Lisbon, Portugal

#### AWARDED FUNDING

May 2016 - July 2016 Research Visit to Delft University of Technology  
 LES & EPS PERCAT Career Development Competition (University of Birmingham) - £400  
 (maximum awardable amount)  
 Ramsay Research Travel Fund (School of Computer Science, University of Birmingham) -  
 £1500

September 2011 - Research Visit to University of California at Los Angeles  
 December 2011 Funding for PhD Student Visits Abroad (Fundação para a Ciência e Tecnologia) - €3065  
 March 2010 - June 2010 Research Visit to University Carlos III de Madrid  
 Funding for PhD Student Visits Abroad (Fundação para a Ciência e Tecnologia) - €1735

#### INVITED TALKS

February 2017 Workshop on Formal Methods in AI, University of Naples "Federico II", Naples, Italy  
 March 2017 Computer Science Department Seminar Series, University of Liverpool, UK  
 June 2017 Robolog Workshop, IRISA, Rennes, France  
 September 2017 Full-day Tutorial at 4th "Lucia" PhD School on AI and Robotics, Lisbon, Portugal

#### SERVICE TO THE COMMUNITY

Program Committee International Joint Conference on Artificial Intelligence (IJCAI) - 2017  
 AAAI Conference on Artificial Intelligence (AAAI) - 2018  
 International Conference on Autonomous Agents and Multiagent Systems (AAMAS) -  
 2014, 2016, 2017, 2018  
 International Conference on Automated Planning and Scheduling (ICAPS) - 2016, 2017,  
 2018  
 European Conference of Artificial Intelligence (ECAI) - 2016  
 AAAI Spring Symposium on Integrating Representation, Reasoning, Learning, and  
 Execution for Goal Directed Autonomy - 2018  
 Introspective Methods for Reliable Autonomy Workshop @ IROS - 2017  
 Workshop on Autonomous Mobile Service Robots @ IJCAI - 2016  
 AI for Long-term Autonomy Workshop @ ICRA - 2016  
 Workshop on Autonomous Robots and Multirobot Systems @ AAMAS - 2016  
 Workshop on Artificial Intelligence and Robotics @ AAAI - 2014  
 AAAI Robotics Fellowships - 2015, 2016

Journal Reviewing IEEE Transactions on Automatic Control (TACON)

IEEE Robotics & Automation Magazine (RAM)  
 IEEE Transactions on Automation Science and Engineering (T-ASE)  
 IEEE Transactions on Systems, Man, and Cybernetics (SMC)  
 IEEE Transactions on Intelligent Systems (IS)

Conference Reviewing      International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)  
    International Symposium on Distributed Autonomous Robotic Systems (DARS)  
    IEEE International Conference on Robotics and Automation (ICRA)  
    IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)  
    American Control Conference (ACC)  
    IEEE International Conference on Automation Science and Engineering (CASE)

## INDUSTRY POSITIONS

September 2007 -      *Junior Consultant*  
 February 2008      Everis, Consulting, IT, Outsourcing & Professional Services, Lisbon, Portugal  
                                  Participation in the development of a Business Continuity Plan for an insurance carrier.

April 2006 -      *Part-time Collaborator*  
 September 2006      Mercer Human Resource Consulting, Lisbon, Portugal  
                                  Development of a human resource management software tool.

## PUBLICATIONS

Under Review      “Supervision of Petri Nets Based on Safe State/Event Linear Temporal Logic Specifications”. Bruno Lacerda and Pedro U. Lima. *Submitted to IEEE Transactions on Systems, Man and Cybernetics: Systems (SMC)*.  
                                  “Probabilistic planning with formal performance guarantees for mobile service robots”. Bruno Lacerda, Fatma Faruq, David Parker and Nick Hawes. *Submitted to International Journal of Robotics Research (IJRR)*.

Journal Papers      [1] “The STRANDS Project: Long-Term Autonomy in Everyday Environments”. Nick Hawes et al. *IEEE Robotics & Automation Magazine*, Vol. 24, No. 3, 2017.  
                                  [2] “On the Notion of Uncontrollable Marking in Supervisory Control of Petri Nets”. Bruno Lacerda and Pedro U. Lima. *IEEE Transactions on Automatic Control*, Vol. 59, No. 11, 2014.  
                                  [3] “Linear-Time Temporal Logic Control of Discrete Event Models of Cooperative Robots”. Bruno Lacerda and Pedro U. Lima. *Journal of Physical Agents*, Vol. 2, No. 1, 2008.

Conference Papers      [4] “Multi-Objective Policy Generation for Mobile Robots Under Probabilistic Time-Bounded Guarantees”. In *Proceedings of the 27th International Conference on Automated Planning and Scheduling (ICAPS)*, Pittsburgh, PA, USA, 2017.  
                                  [5] “Partial Order Temporal Plan Merging for Mobile Robot Tasks”. Lenka Mudrová, Bruno Lacerda and Nick Hawes. In *Proceedings of the 22nd European Conference on Artificial Intelligence (ECAI)*, The Hague, Netherlands, 2016.

- [6] “An Integrated Control Framework for Long-Term Autonomy in Mobile Service Robots”. Lenka Mudrová, Bruno Lacerda and Nick Hawes. In *Proceedings of the 7th European Conference on Mobile Robotics (ECMR)*, Lincoln, UK, 2015.
- [7] “Optimal Policy Generation for Partially Satisfiable Co-Safe LTL Specifications”. Bruno Lacerda, David Parker and Nick Hawes. In *Proceedings of the 24th International Joint Conference on Artificial Intelligence (IJCAI)*, Buenos Aires, Argentina, 2015.
- [8] “Now or later? Predicting and maximising success of navigation actions from long-term experience”. Jaime P. Fentanes, Bruno Lacerda, Tomas Krajník, Nick Hawes and Marc Hanheide. In *Proceedings of the 2015 IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, USA, 2015.
- [9] “Optimal and dynamic planning for Markov decision processes with co-safe LTL specifications”. Bruno Lacerda, David Parker and Nick Hawes. In *Proceedings of the 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, IL, USA, 2014.
- [10] “LTL-Based Decentralized Supervisory Control of Multi-Robot Tasks Modelled as Petri Nets”. Bruno Lacerda and Pedro U. Lima. In *Proceedings of the 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, CA, USA, 2011.
- [11] “Designing Petri Net Supervisors from LTL Specifications”. Bruno Lacerda and Pedro U. Lima. In *Proceedings of the 2011 Robotics: Science and Systems Conference (RSS)*, Los Angeles, CA, USA, 2011.
- [12] “Designing Petri Net Supervisors for Multi-Agent Systems from LTL Specifications (Extended Abstract)”. Bruno Lacerda and Pedro U. Lima. In *Proceedings of the 10th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Taipei, Taiwan, 2011.
- [13] “Petri Net Based Supervisory Control of a Social Robot with LTL Specifications”. Bruno Lacerda, Pedro U. Lima, Javi Gorostiza and Miguel A. Salichs. In *Proceedings of the 11th International Conference On Mobile Robots And Competitions*, Lisbon, Portugal, 2011.
- [14] “Petri Nets as an Analysis Tool for Data Flow in Wireless Sensor Networks”. Bruno Lacerda and Pedro U. Lima. In *Proceedings of the 1st Portuguese Conference on Wireless Sensor Networks (CNRS)*, Coimbra, Portugal, 2011.

#### Workshop Papers

- [15] “Nested Value Iteration for Partially Satisfiable Co-Safe LTL Specifications (Extended Abstract)”. Bruno Lacerda, David Parker and Nick Hawes. In *Proceedings of the AAAI Fall Symposium on Sequential Decision Making for Intelligent Agents (SDMIA)*, Arlington, Virginia, USA, 2015.
- [16] “Optimal Motion Planning for Markov Decision Processes with Co-Safe Linear Temporal Logic Specifications”. Bruno Lacerda, David Parker and Nick Hawes. In *Proceedings of the 31st Workshop of the UK Planning & Scheduling Special Interest Group (PlanSIG)*, Edinburgh, UK, 2014.
- [17] “LTL Plan Specification for Robotic Tasks Modelled as Finite State Automata”. Bruno Lacerda and Pedro U. Lima. In *Proceedings of the AAMAS '09 Workshop on Agent Design: Advancing from Practice to Theory (ADAPT)*, Budapest, Hungary, 2009.