



# Daan Bloembergen

## Curriculum Vitæ

### Personal information

Full name	Daniël (Daan) Bloembergen
Nationality	Dutch
Date of birth	upon request
Address	upon request
E-mail	upon request
Website	<a href="http://www.flowermountains.nl">www.flowermountains.nl</a>
Phone	upon request

### Education

- Nov 2010–  
May 2015) **Ph.D. in Computer Science / Artificial Intelligence**, *Maastricht University*.  
Research project focusing on the link between evolutionary game theory (EGT) and multi-agent learning, in particular the use of EGT to model the learning dynamics of a multi-agent system. The project was funded by the Netherlands Organisation for Scientific Research (NWO).  
**Supervisors:** Prof. dr. Karl Tuyls, Prof. dr. Gerhard Weiss  
**Title of the dissertation:** Multi-Agent Learning Dynamics  
**Successfully defended on:** 21 May 2015
- 2008–2010 **M.Sc. Artificial Intelligence**, *Maastricht University*.  
Predicate Cum Laude (weighted percentage 86.3%)
- 2007–2008 **M.A. European Studies on Society, Science, and Technology**, *Maastricht University*,  
*unfinished, 38 ECTS earned*.  
Including a 4 month specialisation in *Research and Technology Policy* at the University of Oslo, Norway
- 2004–2007 **B.Sc. Knowledge Engineering**, *Maastricht University*.

### Work experience

- Oct 2017–  
present **Researcher**, *Centrum Wiskunde & Informatica*, Intelligent and Autonomous Systems.  
Working on multi-agent systems, in particular multi-agent learning and interaction for smart-grid solutions.
- Mar 2015–  
Sep 2017 **Postdoctoral Research Associate**, *University of Liverpool*, Dept. of Computer Science.  
Postdoc on multi-agent learning under supervision of Prof. dr. Karl Tuyls. Research focussing on the dynamics of multi-agent learning, in particular the link between evolutionary game theory and reinforcement learning. Assisting Prof. Tuyls in the daily supervision of three Ph.D. students on the following topics: 1) game theoretic modelling of space debris removal; 2) modelling mood in multi-agent interactions; 3) multi-agent deep reinforcement learning.

- Mar 2014– **Honorary Research Assistant**, *University of Liverpool*, Dept. of Computer Science.  
Mar 2014 Visiting PhD student at the Agent ART group, under supervision of Prof. dr. Karl Tuyls.
- Nov 2010– **Ph.D. student**, *Maastricht University*, Dept. of Knowledge Engineering.  
Mar 2015 See above.
- Sept 2010– **Student assistant**, *Maastricht University*, UM Webbeheer (website management).  
Oct 2010 Assistant, responsible for testing (new) functionality of the university website.
- 2009–2010 **Student assistant**, *Maastricht University*, Central Editing Office, Marketing & Communications Department.  
Assistant web editor, responsible for editing and maintaining the content of the university website.
- 2005–2010 **Student promotion team**, *Maastricht University*.  
Promoting Maastricht University in general and Knowledge Engineering in particular at high schools, fairs, and open days.

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## Activities

### Academic

**Lecturer**, *Multi-Agent Reinforcement Learning and Dynamics of Learning*, European Agent Systems Summer School (EASSS), Gdansk, August 2017.

**Lecturer and co-organiser**, *Tutorial on Reinforcement Learning in Single and Multi-Agent Settings*, AAMAS 2016, Singapore.

**Lecturer**, *Tutorial on Multi-agent Reinforcement Learning*, Adaptive and Learning Agents workshop at AAMAS 2014, Paris, France.

**Lecturer**, *Multi-agent Reinforcement Learning tutorial*, ECML 2013, Prague, Czech Republic.

**Lecturer**, *Multi-agent Reinforcement Learning tutorial*, AAMAS 2013, St. Paul, USA.

**Co-chair**, *8th Adaptive Learning Agents Workshop (ALA)*, AAMAS 2016, Singapore.

**Co-chair**, *7th Adaptive Learning Agents Workshop (ALA)*, AAMAS 2015, Istanbul, Turkey.

**Local organisation member**, *9th European Workshop on Multi-agent Systems (EUMAS 2011)*, Maastricht, The Netherlands.

**PC member**, *AAAI 2016, AAMAS 2017/16, IJCAI 2017/16/15, TAROS 2015, ALA 2014/13*.

**Reviewer**, *Games – Open Access Game Theory Journal; Journal of Autonomous Agents and Multi-Agent Systems*.

### Teaching

**Module co-ordinator and lecturer**, *COMP532: Machine Learning and BioInspired Optimisation*, Covered topics: reinforcement learning, multi-agent learning, swarm intelligence, deep learning, artificial immune systems, DNA computing.

Postgraduate module, Department of Computer Science, University of Liverpool, 2016/17

**Teaching Assistant**, *Computer Science*, introduction to JAVA programming.

B.Sc. Knowledge Engineering, Maastricht University. 2013/14, 2012/13, 2011/12

**Teaching Assistant**, *Theoretical Computer Science*, introduction to automata, formal languages, computability, and complexity.

B.Sc. Knowledge Engineering, Maastricht University. 2013/12, 2011/12

## Other

- Sept 2013–  
Aug 2014 **Chair**, *PhD Academy Maastricht*, organises social, educative and fun activities for all PhD candidates of Maastricht University.
- Jan 2012–  
Aug 2013 **Social events coordinator**, *PhD Academy Maastricht*.
- 2008–2009 **Chair**, *Study Association Incognito*, organises social and academic activities for all bachelor and master students at the Department of Knowledge Engineering, Maastricht University.
- 2006–2007 **Activities Committee member**, *Study Association Incognito*.

## Awards

- 2014 **FoCAS best paper award**, at the Adaptive and Learning Agents workshop (ALA) at AAMAS 2014 for the paper titled "Trading in markets with noisy information: An evolutionary analysis".  
<http://focas.eu/best-paper-award-ala-2014>
- 2011 **KION Thesis award 2008-2010**, Award for the best master's thesis in Artificial Intelligence in the Netherlands.  
<http://www.kion.nu>

## Languages

Dutch	<b>Fluent</b>	<i>Mother tongue</i>
English	<b>Fluent</b>	<i>Main language of instruction throughout higher education</i>
German	<b>Moderate</b>	<i>Good understanding of spoken and written German, moderate writing and speaking skills</i>

## Programming experience

Software	MATLAB, Mathematica, ROS (Robot Operating System)
Programming languages	Java, C++, Python, L <sup>A</sup> T <sub>E</sub> X, PHP

## Publications

Daan Bloembergen, Tim Brys, and Logan Yliniemi. Preface to the special issue: adaptive and learning agents. *The Knowledge Engineering Review*, 32, 2017.

Joe Collenette, Katie Atkinson, Daan Bloembergen, and Karl Tuyls. Environmental effects on simulated emotional and moody agents. *The Knowledge Engineering Review*, 32, 2017.

Joe Collenette, Katie Atkinson, Daan Bloembergen, and Karl Tuyls. The effect of mobility and emotion on interactions in multi-agent systems. In David Pearce and H. Sofia Pinto, editors, *Proceedings of the 8th European Starting AI Researcher Symposium (STAIRS)*, pages 39–50. IOS Press, 2016.

Joe Collenette, Katie Atkinson, Daan Bloembergen, and Karl Tuyls. Mobility effects on the evolution of co-operation in emotional robotic agents. In *AAMAS 2016 workshop on Adaptive and Learning Agents (ALA)*, 2016.

Joe Collenette, Katie Atkinson, Daan Bloembergen, and Karl Tuyls. Modelling mood in cooperative emotional agents. In *13th International Symposium on Distributed Autonomous Robotic Systems*, 2016.

Richard Klima, Daan Bloembergen, Rahul Savani, Karl Tuyls, Daniel Hennes, and Dario Izzo. Space debris removal: A game theoretic analysis. In Gal Kaminka et al., editors, *Proc. of the 22nd Europ. Conf. on Artificial Intelligence (ECAI)*, pages 1658–1659. IOS Press, 2016.

Richard Klima, Daan Bloembergen, Rahul Savani, Karl Tuyls, Daniel Hennes, and Dario Izzo. Space debris removal: A game theoretic analysis. *Games*, 7(3):20, 2016.

Karl Tuyls, Sjriek Alers, Elisa Cucco, Daniel Claes, and Daan Bloembergen. A telepresence-robot approach for efficient coordination of swarms. In *Proceedings of the Artificial Life Conference 2016*, pages 666–673. MIT Press, 2016.

Daan Bloembergen. *Multi-agent learning dynamics*. PhD thesis, Maastricht University, 2015.

Daan Bloembergen, Ipek Caliskanelli, and Karl Tuyls. Learning in networked interactions: A replicator dynamics approach. In Christopher J. Headleand, William J. Teahan, and Llyr Ap Cenydd, editors, *Artificial Life and Intelligent Agents*, volume 519 of *Communications in Computer and Information Science*, pages 44–58. Springer International Publishing, 2015.

Daan Bloembergen, Daniel Hennes, Peter McBurney, and Karl Tuyls. Trading in markets with noisy information: An evolutionary analysis. *Connection Science*, 27:253–268, 2015.

Daan Bloembergen, Daniel Hennes, Simon Parsons, and Karl Tuyls. Survival of the chartist: An evolutionary agent-based analysis of stock market trading. In *Proc. of the 14th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1699–1700, 2015.

Daan Bloembergen, Karl Tuyls, Daniel Hennes, and Michael Kaisers. Evolutionary dynamics of multi-agent learning: A survey. *Journal of Artificial Intelligence Research*, 53:659–697, 2015.

Daan Bloembergen, Daniel Hennes, Peter McBurney, and Karl Tuyls. Trading in markets with noisy information: An evolutionary analysis. In *AAMAS 2014 Workshop on Adaptive and Learning Agents (ALA)*, 2014.

Daan Bloembergen, Bijan Ranjbar-Sahraei, Haitham Bou Ammar, Karl Tuyls, and Gerhard Weiss. Influencing social networks: An optimal control study. In *Proc. of the 21st Europ. Conf. on Artificial Intelligence (ECAI)*, pages 105–110, 2014.

Bijan Ranjbar-Sahraei, Daan Bloembergen, Haitham Bou Ammar, Karl Tuyls, and Gerhard Weiss. Effects of evolution on the emergence of scale free networks. In *Proc. of the 14th Int. Conf. on the Synthesis and Simulation of Living Systems (ALIFE)*, pages 376–383. MIT Press, 2014.

Bijan Ranjbar-Sahraei, Haitham Bou Ammar, Daan Bloembergen, Karl Tuyls, and Gerhard Weiss. Evolution of cooperation in arbitrary complex networks. In Lomuscio, Scerri, Bazzan, and Huhns, editors, *Proc. of 13th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 677–684. International Foundation for AAMAS, 2014.

Bijan Ranjbar-Sahraei, Haitham Bou Ammar, Daan Bloembergen, Karl Tuyls, and Gerhard Weiss. Theory of cooperation in complex social networks. In *Proc. of the 25th AAAI Conf. on Artificial Intelligence (AAAI)*, pages 1471–1477, 2014.

Sjriek Alers, Daan Bloembergen, Daniel Claes, Joscha Fossel, Daniel Hennes, and Karl Tuyls. Telepresence robots as a research platform for AI. In *Proc. of the AAAI Spring Symp. on Designing Intelligent Robots: Reintegrating AI II*, pages 2–3, mar 2013.

Sjriek Alers, Daan Bloembergen, Max Bögler, Daniel Hennes, and Karl Tuyls. MITRO: an augmented mobile telepresence robot with assisted control (demonstration). In Conitzer, Winikoff, Padgham, and Van der Hoek, editors, *Proc. of 11th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1475–1476. International Foundation for AAMAS, 2012.

Daniel Hennes, Daan Bloembergen, Michael Kaisers, Karl Tuyls, and Simon Parsons. Evolutionary advantage of foresight in markets. In *Proc. of the Genetic and Evolutionary Computation Conference (GECCO)*, pages 943–950. ACM, 2012.

Michael Kaisers, Daan Bloembergen, and Karl Tuyls. A common gradient in multi-agent reinforcement learning. In Conitzer, Winikoff, Padgham, and Van der Hoek, editors, *Proc. of 11th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1393–1394. International Foundation for AAMAS, 2012.

Sjriek Alers, Daan Bloembergen, Daniel Hennes, Steven De Jong, Michael Kaisers, Nyree Lemmens, Karl Tuyls, and Gerhard Weiss. Bee-inspired foraging in an embodied swarm (demonstration). In Tumer, Yolum, Sonenberg, and Stone, editors, *Proc. of 10th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1311–1312. International Foundation for AAMAS, 2011.

Sjriek Alers, Daan Bloembergen, Daniel Hennes, and Karl Tuyls. Augmented mobile telepresence with assisted control (demonstration). In *Proc. of 23rd Benelux Conf. on Artificial Intelligence (BNAIC)*, pages 451–452, 2011.

Daan Bloembergen, Steven De Jong, and Karl Tuyls. Lenient learning in a multiplayer stag hunt. In *Proc. of 23rd Benelux Conf. on Artificial Intelligence (BNAIC)*, pages 44–50, 2011.

Daan Bloembergen, Michael Kaisers, and Karl Tuyls. Empirical and theoretical support for lenient learning. In Tumer, Yolum, Sonenberg, and Stone, editors, *Proc. of 10th Int. Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1105–1106. International Foundation for AAMAS, 2011.

Daan Bloembergen. Analyzing reinforcement learning algorithms using evolutionary game theory. Master's thesis, Maastricht University, The Netherlands, 2010.

Daan Bloembergen, Michael Kaisers, and Karl Tuyls. A comparative study of multi-agent reinforcement learning dynamics. In *Proc. of 22nd Benelux Conf. on Artificial Intelligence (BNAIC)*, pages 11–18, 2010.

Daan Bloembergen, Michael Kaisers, and Karl Tuyls. Lenient frequency adjusted Q-learning. In *Proc. of 22nd Benelux Conf. on Artificial Intelligence (BNAIC)*, pages 19–26, 2010.