

Zafeirios Fountas

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Education

Imperial College London

PHD IN COMPUTATIONAL NEUROSCIENCE

- Department of Computing
- Title: “Action selection in the rhythmic brain: The role of the basal ganglia and tremor”
- Supervisor: Prof. Murray Shanahan

London, UK

April 2011 - April 2016

Imperial College London

MSc IN COMPUTING SCIENCE

- Grade: Distinction
- Thesis: “Spiking Neural Networks for Human-like Avatar Control in a Simulated Environment”
- Supervisors: Dr. D. Gamez, Dr. A. Fidjeland

London, UK

Sept. 2010 - Sept. 2011

Aristotle University of Thessaloniki

BACHELOR DEGREE IN MATHEMATICS (FOUR YEAR-LONG UNDERGRADUATE COURSE)

- Grade: 7.72 out of 10
- Senior Thesis Project 1: “A comparison between the complexities of the games chess and go”
- Senior Thesis Project 2: “An approach to the solution of the board game Eternity II”
- Supervisor: Prof. Ioannis Antoniou

Thessaloniki, Greece

April 2003 - June 2010

City University London

STUDY ABROAD

- In the frame of the LLP/Erasmus Programme
- Department of Mathematical Science

London, UK

Sept. 2008 - Febr. 2009

Work and Research Experience

Imperial College London

RESEARCH ASSOCIATE

- Part of the six-partner EU (Horizon) project “TimeStorm”.
- Acting as Principal Investigator since March 2016.
- Research on human time perception, deep neural networks and episodic memory recall.
- Main designer and developer of the software suite Brain Studio.

London, UK

April 2016 - present

Emotech LTD

RESEARCH SCIENTIST, FOUNDING MEMBER

- Lead design and development of the artificial intelligence engine of the personal robot Olly.

London, UK

June 2015 - present

Department of Computing, Imperial College London

TEACHING ASSISTANT

- Courses: Computational neurodynamics (5 years), introduction to artificial intelligence (3 years), integrated programming laboratory (C++, Prolog, Assembly – 3 years).
- MSc thesis supervision (Mr. Pavlos Rontidis).
- Software engineering practice project supervision (16 students).

London, UK

2011 - 2017

Computational Neurodynamics Group, Imperial College London

VISITOR RESEARCHER

- Research on large-scale neural cognitive systems with human-like behaviour.

London, UK

2010 - 2011

Pandora Robotics

DEVELOPER, TEAM LEADER, CO-FOUNDER

- (2008-09) Lead of the robotic arm team. Design and construction of two mobile robotic platforms (one autonomous and one tele-operated) for the Rescue Robot League of the Robocup 2009 World Championship and Symposium. Graz, Austria. (Best European participation.)
- (2007-08) Lead of the artificial intelligence team. Design and construction of an autonomous mobile robotic platform for the Rescue Robot League of the Robocup 2008 World Championship and Symposium. Suzhou, China.
- (2006-07) Mechanical Design of a robotic arm.
- Main programming language: C++

Thessaloniki, Greece

2006 - 2010

Technical Skills

PROGRAMMING

- Fluent in C/C++, Python, Qt framework, Prolog, Mathematica, \LaTeX and SPSS.
- Good understanding of Matlab, (Visual) Basic, PostgreSQL, Java, OpenGL and Assembly(8086).
- Familiar with CUDA, gRPC, Android SDK, CLIPS, LISP and SolidWorks.

COMPUTATIONAL NEUROSCIENCE

- Fluent in various simulation tools including brian, NeuroML, NEURON, NeMo and Brain Studio.
- Main developer of the simulation suite Brain Studio and part of the maintenance team of NeMo simulator.

ARTIFICIAL INTELLIGENCE AND ROBOTICS

- Broad experience in Python-based machine learning libraries including tensorflow, scikit-learn, caffe, as well as the robotics libraries MRPT and Webots.

Awards - Scholarships

- 4 x CES 2017 Innovation Awards (smart home, drones and unmanned systems, home appliances, home audio-video accessories), for the personal robot Olly, as the lead Artificial Intelligence designer, Las Vegas, January 2017
- Google Europe Scholarship for Students with Disabilities (Dyslexia) 2014
- Shortlisted for the Best Graduate Teaching Assistant Award in Student Academic Choice Awards 2014 Imperial College London (6 shortlisted out of 600 nominees).
- Best 1st year PhD project, DoC Google Poster Competition 2013 - Imperial College London
- EPSRC Doctoral Training Account (DTA) Studentship for PhD in Computing at Imperial College London (2012-2015).
- Distinguished project status for MSc thesis – Imperial College London 2011
- Prize of Excellence and Innovation 2009. Best student participation in international competitions. Selected by the research committee of the Aristotle University of Thessaloniki, November 2010
- “Best paper (demo session) prize” (2009) for the presentation of the project “Search and Rescue Robotic Platform, development and implementation for the Robocup-RoboRescue 2008 contest”. Selected by the scientific board of the 3rd National Convention of Electrical and Computer Engineering Students, held in Thessaloniki 10-11 April 2009.
- “Best paper (demo session) prize” (2008) for the presentation of the project “Construction and demonstration of a robotic arm with four degrees of freedom”. Selected by the scientific board of the 2nd National Convention of Electrical and Computer Engineering Students, held in Athens 18-19 April 2008.
- State Scholarships Foundation’s scholarship holder in the frame of the LLP/Erasmus Programme.

International Competitions

IEEE CONFERENCE ON COMPUTATIONAL INTELLIGENCE AND GAMES, SEOUL, SOUTH KOREA.

08/2011

- Participation in 2K BotPrize 2011 (2nd place).

13TH ROBOCUP WORLD CHAMPIONSHIP AND SYMPOSIUM, GRAZ, AUSTRIA.

06/2009

- Participation in Rescue Robot League (9th place).

12TH ROBOCUP WORLD CHAMPIONSHIP AND SYMPOSIUM, SUZHOU, CHINA

07/2008

- Participation in Rescue Robot League (8th place).

Invited Talks and Outreach

ROYAL INSTITUTION CHRISTMAS LECTURES 2017.

16/12/2017

- Presentation and demonstration of Olly the robot during the lectures (broadcast on BBC Four).

INVITED SPEAKER: ROYAL COLLEGE OF ART.

22/11/2017

- Talk title: Imitating human behaviour with brain-inspired artificial intelligence.

SEMINAR ON BRAIN STUDIO, GRONINGEN, THE NETHERLANDS.

04/2016

- Groningen Cognitive Modelling Spring School, University of Groningen.

INTERVIEW IN THE UK MAGAZINE NEW SCIENTIST

09/2012

- Article: Mimicry beats consciousness in gaming’s Turing test, by Celeste Biever.

INTERVIEW IN THE UK MAGAZINE “EDGE”

09/2012

- Article: Unreal bots beat Turing test: AI players are officially more humans than gamers, by Keith Stuart.

INTERVIEW IN THE UK MAGAZINE NEW SCIENTIST

09/2012

- Article: AI cyber-fighter: does it feel human, punk?, by Celeste Biever.

31ST SGAI INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE, CAMBRIDGE, UNITED KINGDOM

12/2011

- Talk and demonstration as a part of special session on 'Alan Turing and the Turing Test for Machine Intelligence'.
- Title: "The Turing test: Chat bots and the Neurobot".

19TH INTERNATIONAL CONFERENCE ON AUTOMATED PLANNING AND SCHEDULING, THESSALONIKI, GREECE

09/2009

- Demonstration of the robotic platforms of PANDORA team.

Social Activities and Organizational Skills

CO-FOUNDER AND COMMITTEE MEMBER OF THE ECONOMICS SOCIETY OF IMPERIAL COLLEGE LONDON

2012-2016

PRESIDENT OF THE CHESS CLUB OF THE ARISTOTLE UNIVERSITY OF THESSALONIKI

2007-2010

STUDENT REPRESENTATIVE, ARISTOTLE UNIVERSITY OF THESSALONIKI

2004-2006

- Sector of Computer Sciences and Numerical Analysis, Department of Mathematics.

Other Interests

- Homemade robots, philosophy of mind, traveling, sailing, chess, Wu Shu Kwan, music.

Publications

JOURNALS

- Z. Fountas, M. Shanahan, "The Role of Cortical Oscillations in a Spiking Neural Network Model of the Basal Ganglia", PLoS ONE, 2017.
- D. Gamez, Z. Fountas, A.K. Fidjeland, "A Neurally Controlled Computer Game Avatar With Human-like Behavior", IEEE Transactions on Computational Intelligence and AI in Games, vol.5, no.1, pp.1,14, March 2013.

JOURNAL PRE-PRINTS

- Z. Fountas, M. Shanahan, "Assessing Selectivity in the Basal Ganglia: The 'Gearbox' Hypothesis." bioRxiv (2017): 172387. (*Under review in PLoS Computational Biology*)
- W. Roseboom, Z. Fountas, K. Nikiiforou, D. Bhowmik, M. Shanahan, A. Seth, "A functioning model of human time perception." bioRxiv (2017): 172387.

CONFERENCE PROCEEDINGS

- Z. Fountas, K. Nikiiforou, D. Bhowmik, M. Shanahan, W. Roseboom, A. Seth, "Clockless Biologically-Plausible Architecture for Temporal Perception Using Convolutional Neural Networks", Cognitive and Computational Neuroscience (CCN), New York, USA, 2017.
- J.C. Farah, C. Kaplanis, C. Snowden, L. Milic, Z. Fountas, P.A.M. Mediano, "Implementation of Attentional Bistability in a Computational Model of the Dragonfly Visual System", Cognitive and Computational Neuroscience (CCN), New York, USA, 2017.
- Z. Fountas, M. Shanahan, "GPU-based Fast Parameter Optimization for Phenomenological Spiking Neural Models", IEEE International Joint Conference on Neural Networks (IJCNN), Killarney, Ireland, 2015.
- Z. Fountas, M. Shanahan, "Phase Offset Between Slow Oscillatory Cortical Inputs Influences Competition in a Model of the Basal Ganglia", IEEE International Joint Conference on Neural Networks (IJCNN), Beijing, China, 2014.
- Z. Fountas, M. Shanahan, "A cognitive neural architecture as a robot controller." In Biomimetic and Biohybrid Systems, pp. 371-373. Springer Berlin Heidelberg, 2013.
- Z. Fountas, D. Gamez, A. K. Fidjeland, "A Neuronal Global Workspace for Human-like Control of a Computer Game Character", IEEE Conference on Computational Intelligence and Games (CIG'11), Seoul, South Korea, 2011.
- "Search and Rescue Robotic Platform, development and implementation for the Robocup-RoboRescue 2008 contest", Demo Session, 3rd National Convention of Electrical and Computer Engineering Students, Thessaloniki, 2009. (Greek)
- "RoboCupRescue 2008 - Robot League Team P.A.N.D.O.R.A. (Greece), Robotics Team", 1st National Convention of Robotics, Technical Chamber of Greece (TEE-TCG), Athens, 2009. (Greek)
- "Robotic arm 4 degrees of freedom, development and implementation for the tracking and movement of objects", Demo session, 2nd National Convention of Electrical and Computer Engineering Students, Athens, 2008. (Greek)

ABSTRACTS AND POSTERS

- Z. Fountas, M. Shanahan, "Assessing selectivity in the basal ganglia: the 'gearbox' hypothesis", Neuroscience 2014, San Diego, USA, 12-16 November 2016.
- Z. Fountas, P. Mediano, D. Bhowmik, "Brain Studio: A practical highperformance tool to design and simulate spiking neural networks", Neuroscience 2014, San Diego, USA, 12-16 November 2016.
- H. van Rijn, P. Mostert, P. Mediano, Z. Fountas, "The dopamine paradox in interval timing: how one neurotransmitter can both reset as well as modulate the clock", Neuroscience 2014, San Diego, USA, 12-16 November 2016.
- Z. Fountas, W. Roseboom, D. Bhowmik, K. Nikiforou and M. Shanahan, "Clockless biologically-plausible architecture for temporal perception using convolutional neural networks", Time in Tokyo: International Symposium on temporal perception and experience, Tokyo, Japan, 11-12 October 2016
- Z. Fountas, M. Shanahan, "Phase offset of entrained cortical inputs influences selectivity in a neural model of the basal ganglia", Neuroscience 2014, Washington, DC, USA, 15-19 November 2014.
- D. Gamez, Z. Fountas, M. Shanahan, A.K. Fidjeland, "A Cognitive System with a Neurally-Implemented Global Workspace", 5th International Conference on Cognitive Systems, Vienna, Austria, 22-23 February 2012.

THESES AND TECHNICAL REPORTS

- "Action selection in the rhythmic brain: The role of the basal ganglia and tremor", PhD Thesis, Imperial College London, 2016.
- "Spiking neural networks for human-like avatar control in a simulated environment", MSc Thesis, Imperial College London, 2011.
- "RoboCupRescue 2009 - Robot League Team P.A.N.D.O.R.A. (Greece)", 13th RoboCup World Championship and Symposium, Graz, Austria, June 14 - July 20, 2009.
- "RoboCupRescue 2008 - Robot League Team P.A.N.D.O.R.A. (Greece)", 12th RoboCup World Championship and Symposium, Suzhou, China, July 14-20, 2008.