Vassilis Vassiliades

Associate/Visiting Research Fellow
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Education

- **Ph.D. in Computer Science** *Jan 2009 - Oct 2015*
  Department of Computer Science, University of Cyprus (UCY), Nicosia, Cyprus
  Thesis title: "Studies in Reinforcement Learning and Adaptive Neural Networks"
  Members of the Examination Committee: Dr. Chris Christodoulou (supervisor, University of Cyprus), Prof. Christos N. Schizas (University of Cyprus), Prof. Emeritus Chris Charalambous (University of Cyprus), Prof. Dr. Florentin Wörgötter (Georg-August-Universität Göttingen, Germany), Dr. Guido Bugmann (Plymouth University, UK)
- **M.Sc. in Intelligent Systems Engineering** (with distinction) *Sep 2007 - Fall 2008*
  Department of Computer Science, University of Birmingham, Birmingham, UK
  Thesis title: "Neural Network Ensembles with Negative Correlation Learning"
  Supervisor: Dr. John Bullinaria
- **B.Sc. in Computer Science** *Sep 2003 - Jun 2007*
  Department of Computer Science, University of Cyprus (UCY), Nicosia, Cyprus
  Thesis title: "Multiagent Reinforcement Learning as Applied to General-Sum Games"
  Supervisor: Dr. Chris Christodoulou
- **Online Courses Completed**:
  Neural Networks for Machine Learning (Coursera, Fall 2012, taught by Prof. Geoffrey Hinton),
  Machine Learning class - advanced track (Stanford, Fall 2011, taught by Prof. Andrew Ng)
- **Schools**:
  Winter School on Intrinsic Motivations: From Brains to Robots (FIAS, Frankfurt, December 2012),
  Cyprus Summer School on Intelligent Systems (UCY, Cyprus, July 2007)

Research Interests

Reinforcement Learning, Neural Networks, Machine Learning, Deep Learning, Neuroevolution, Evolutionary Computation, Artificial Intelligence, Robotics, Computational Neuroscience

Publications

- **Refereed archival journal papers**:
  1. Agathocleous, M., Christodoulou, C., Promponas, V., Kountouris, P., and **Vassiliades, V.** (2018). A hybrid learning scheme for efficiently training bidirectional recurrent neural networks for protein secondary structure prediction. *Submitted*.
  2. Kondo, D., **Vassiliades, V.**, Tode, H., and Asami, T. (2018). The Named Data Networking Flow Filter: Towards Improved Security over Information Leakage Attacks. *Submitted*.
  3. Kondo, D., Silverston, T., **Vassiliades, V.**, Tode, H., and Asami, T. (2018). Name Filter: A Countermeasure against Information Leakage Attacks in Named Data Networking. *IEEE Access*. https://doi.org/10.1109/ACCESS.2018.2877792.
  4. Chatzilygeroudis, K., **Vassiliades, V.**, Stulp, F., Calinon, S., and Mouret, J.-B. (2018). A survey on policy search algorithms for learning robot controllers in a handful of trials. *Under Review*. A preprint can be found in: https://arxiv.org/abs/1807.02303.
  5. Chatzilygeroudis, K., **Vassiliades, V.** and Mouret, J.-B. (2018). Reset-free Trial-and-Error Learning for Robot Damage Recovery. *Robotics and Autonomous Systems*, 100: 236-250. (One of the top journals in robotics, h5-index 43)
  6. **Vassiliades, V.**, Chatzilygeroudis, K. and Mouret, J.-B. (2018). Using Centroidal Voronoi Tessellations to Scale Up the Multidimensional Archive of Phenotypic Elites Algorithm. *IEEE Transactions on Evolutionary Computation*, 22: 623-630. (One of the top journals on evolutionary computation, Impact factor 10.629)
  7. **Vassiliades, V.** and Christodoulou, C. (2016). Behavioral Plasticity Through the Modulation of Switch Neurons. *Neural Networks*, 74: 35-51.

8. **Vassiliades, V.** and Christodoulou, C. (2013). Toward Nonlinear Local Reinforcement Learning Rules Through Neuroevolution. *Neural Computation*, 25(11): 3020-3043.
9. Kountouris, P., Agathocleous, M., Promponas, V., Christodoulou, G., Hadjicostas, S., **Vassiliades, V.** and Christodoulou, C. (2012). A comparative study on filtering protein secondary structure prediction. *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 9(3): 731-739.
10. **Vassiliades, V.**, Cleanthous, A. and Christodoulou, C. (2011). Multiagent Reinforcement Learning: Spiking and Nonspiking Agents in the Iterated Prisoner's Dilemma. *IEEE Transactions on Neural Networks*, 22(4): 639-653.

- **Refereed papers in compiled volumes and full conference proceedings**:

11. **Vassiliades, V.** and Mouret, J.-B. (2018). Discovering the Elite Hypervolume by Leveraging Interspecies Correlation. In Proceedings of the Genetic and Evolutionary Computation Conference (GECCO), pp. 149–156. ACM. (Top conference on evolutionary computation, Acceptance rate 36%)
12. Chatzilygeroudis, K., Rama, R., Kaushik, R., Goepp, D., **Vassiliades, V.** and Mouret, J.-B. (2017). Black-Box Data-efficient Policy Search for Robotics. In Proceedings of the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), pp. 51–58. IEEE. (Second biggest robotics conference, Acceptance rate 44%)
13. **Vassiliades, V.**, Chatzilygeroudis, K. and Mouret, J.-B. (2017). Comparing multimodal optimization and illumination. In Proceedings of the Genetic and Evolutionary Computation Conference Companion, pp. 97–98. ACM.
14. **Vassiliades, V.**, Chatzilygeroudis, K. and Mouret, J.-B. (2017). A comparison of illumination algorithms in unbounded spaces. In Proceedings of the Genetic and Evolutionary Computation Conference Companion, pp. 1578-1581. ACM.
15. Papaspyros, V., Chatzilygeroudis, K., **Vassiliades, V.** and Mouret, J.-B. (2016). Safety-Aware Robot Damage Recovery Using Constrained Bayesian Optimization and Simulated Priors. In NIPS 2016 Workshop on Bayesian Optimization, https://arxiv.org/abs/1611.09419.
16. Agathocleous, M., Christodoulou, C., Promponas, V.J., Kountouris, P. and **Vassiliades, V.** (2016). Training Bidirectional Recurrent Neural Network Architectures with the Scaled Conjugate Gradient Algorithm. *Artificial Neural Networks - ICANN 2016, Lecture Notes in Computer Science*, ed. by A.E.P. Villa, P. Masulli and A.J.P. Rivero, Springer, 9886: 123-131.
17. Lambrou, I., **Vassiliades, V.** and Christodoulou, C. (2012). An Extension of a Hierarchical Reinforcement Learning Algorithm for Multiagent Settings. *Recent Advances in Reinforcement Learning, EWRL 2011, Lecture Notes in Artificial Intelligence*, ed. by S. Sanner and M. Hutter, Springer, 7188: 261-272.
18. **Vassiliades, V.** and Christodoulou, C. (2010). Multiagent Reinforcement Learning in the Iterated Prisoner's Dilemma: Fast Cooperation through Evolved Payoffs. *Proceedings of the International Joint Conference on Neural Networks (IJCNN'10)*, Barcelona, Spain, 2828-2835.
19. Agathocleous, M., Christodoulou, G., Promponas, V., Christodoulou, C., **Vassiliades, V.** and Antoniou, A. (2010). Protein Secondary Structure Prediction with Bidirectional Recurrent Neural Nets: can weight updating for each residue enhance performance? *AIAI 2010*, ed. by H. Papadopoulos, A. S. Andreou and M. Bramer, IFIP International Federation for Information Processing AICT, 339: 128-137.
20. **Vassiliades, V.**, Cleanthous, A. and Christodoulou, C. (2009). Multiagent Reinforcement Learning with Spiking and Non Spiking Agents in the Iterated Prisoner's Dilemma. *Artificial Neural Networks - ICANN 2009, Lecture Notes in Computer Science*, ed. by C. Alippi, M. Polycarpou, C. Panayiotou, G. Ellinas, Springer, 5768: 737-746.

- **Refereed abstracts**:

21. **Vassiliades, V.**, Christodoulou, C., Cleanthous, A. and Lambrou, I. (2012). Explorations in Reinforcement Learning. *Research Work of Postgraduate Students, Faculty of Pure and Applied Sciences, University of Cyprus*, Nicosia, Cyprus, November 2012, Abstract for Poster P-28.
22. Agathocleous, M., Hadjicostas, S., Kountouris, P., Promponas, V., **Vassiliades, V.** and Christodoulou, C. (2011). Improving protein secondary structure prediction using evolutionary strategies and RBF networks. *Proceedings of the 6th Conference of the Hellenic Society for Computational Biology & Bioinformatics HSCBB11*, Patra, Greece, October 2011, p.34.
23. Agathocleous, M., Kountouris, P., Promponas, V., Christodoulou, G., **Vassiliades, V.** and Christodoulou, C. (2011). Training bidirectional recurrent neural networks with Conjugate gradient-type algorithms for protein secondary structure prediction. *19th International Conference on*

Intelligent Systems for Molecular Biology and 10th European Conference on Computational Biology (ISMB/ECCB), Vienna, Austria, July 2011, Abstract for Poster W67.

24. Kountouris, P., Agathocleous, M., Promponas, V., Christodoulou, G., Hadjicostas, S., **Vassiliades, V.** and Christodoulou, C. (2011). A comparative study on filtering protein secondary structure prediction. *19th Annual International Conference on Intelligent Systems for Molecular Biology and 10th European Conference on Computational Biology (ISMB/ECCB)*, Vienna, Austria, July 2011, Abstract for Poster W39.
25. Kountouris, P., Agathocleous, M., Promponas, V., Christodoulou, G., Hadjicostas, S., **Vassiliades, V.** and Christodoulou, C. (2011). A comparative study on filtering protein secondary structure prediction. *Proceedings of the 4th Cyprus Workshop on Signal Processing and Informatics*, Nicosia, Cyprus, July 2011, p.13.
26. Agathocleous, M., Christodoulou, G., Promponas, V., Christodoulou, C., **Vassiliades, V.** and Antoniou, A. (2010). Per residue weight updating procedure for Protein Secondary Structure Prediction with Bidirectional Recurrent Neural Networks. *Proceedings of the 3rd Cyprus Workshop on Signal Processing and Informatics*, Nicosia, Cyprus, July 2010, p. 23.
27. **Vassiliades, V.** and Christodoulou, C. (2010). Evolving internal rewards for effective multiagent learning in game theoretical situations. *Proceedings of the 3rd Cyprus Workshop on Signal Processing and Informatics*, Nicosia, Cyprus, July 2010, p. 22.
28. **Vassiliades, V.**, Cleanthous, A. and Christodoulou, C. (2009). Multiagent Reinforcement Learning: Spiking and Non spiking Neural Network Agents. *Proceedings of the 2nd Cyprus Workshop on Signal Processing and Informatics*, Nicosia, Cyprus, July 2009, p. 16.

Work Experience

- **Research Engineer**, Inria, Nancy - Grand Est *Dec 2017 - May 2018*
  Member of team LARSEN, working on the **ERC**-funded ResiBots project. The goal of the project is to provide the algorithmic foundations for low-cost robots that can autonomously recover from unforeseen damages in a few minutes. I also organized a journal club on subjects that involve evolution, development, learning and planning for robotics.
- **Post-doctoral Researcher**, Inria, Nancy - Grand Est *Dec 2015 - Nov 2017*
  Member of team LARSEN, working on the ERC-funded ResiBots project.
- **Associate/Visiting Research Fellow**, University of Cyprus *Dec 2015 - present*
- **Member of the Computational Intelligence and Neuroscience (CIN) Group**, Department of Computer Science, UCY *Jan 2009 - Oct 2015*
  Research and development of C++ libraries on reinforcement learning, neural networks, evolutionary computation and computational intelligence.
- **Special Scientist**, Department of Computer Science, UCY *Apr 2010 - Mar 2012*
  Full-time research on reinforcement learning, neuroevolution, multiagent learning, and neural networks. This project was funded by an internal research programme grant of UCY for which I co-wrote the proposal (see section "Research Grants"). I also participated on a research project related to neural networks for bioinformatics; this project was funded by the Research Promotion Foundation of Cyprus (Title: "Developing of Novel & Efficient Second-Order Learning & Optimisation Techniques for Protein Structure Prediction", Value: €84,823, Duration: 2008-2011).
- **Special Scientist**, Department of Computer Science, UCY *Oct 2008 - May 2009*
  Part-time research on multiagent reinforcement learning in general-sum games. This project was funded by an internal research grant of UCY (Title: "Can self-control through precommitment behaviour be explained by evolutionary game theory within a computational connectionist model?", Value: £20,000 CYP (€34,172), Duration: 2007-2009).
- **Programmer**, Department of Computer Science, UCY *Summer 2005*
  Development of project DITIS (http://www.ditis.ucy.ac.cy/) for desktop systems. I was working within a team to implement the GUI and the database.

Teaching Experience

- **Teaching Assistant**, Department of Computer Science, UCY
  - CS002 - Introduction to Computer Science *Spring 2014*
    Course that taught basic concepts of computer science for non-computer scientists. I was responsible for the lab sessions that focused on teaching about Microsoft Windows, the Internet, how to navigate in the web, send emails and use the Microsoft Office suite (Word, Excel, Powerpoint).

– **CS442 - Computational Learning Systems** *Fall 2009*
Course that focused on *neural networks*: multilayer perceptrons, backpropagation, Kohonen self-organizing maps, radial basis function networks, Hopfield networks, Boltzmann machines and *reinforcement learning*. Held office hours, attended classes, corrected papers and independently lectured 28 students.

Honors and Awards

- My PhD thesis went through the finals (top 15) of the 2017 ERCIM Cor Baayen Award Competition.
- University of Cyprus scholarship for PhD students (2013-2014).
- EPSRC scholarship for the MSc Intelligent Systems Engineering programme at the University of Birmingham (2007-2008).

Research Grants

- Title: "Can Evolutionary Spiking and Non-spiking Neural Networks yield more robust solutions for Multiagent Learning problems?". I co-wrote (main contributor) the research proposal and was the named and main researcher on the project. UCY internal research programme grant (ranked 1st out of 17 in the Department of Computer Science). Value: €88,000. Duration of the project: Apr 2010 - Mar 2012.

Academic Travel Grants

- Received a travel grant (that covered both travel and accommodation costs) by the organizers of the FIAS Winter School on Intrinsic Motivations - From Brains to Robots, Frankfurt, December 2012.

Professional Activities

- **Mentor**: Team "BrightSight" for Microsoft's Imagine Cup competition (2012). Our team developed a "Braille Messenger" application for blind people, won the local competition and represented Cyprus in the finals in Sydney, Australia (July 2012).
- **Assisting in final year project supervision**: (1) BSc thesis on modeling the evolution of self-control (2014-2015), (2) BSc thesis on modeling the relationship between self-control and consciousness (2014-2015), (3) MSc thesis on using higher order learning algorithms for training bi-directional recurrent neural networks on the problem of protein secondary structure prediction (2014-2015), (4) BSc thesis on hierarchical reinforcement learning (2014-2015), (5) BSc thesis on multiagent reinforcement learning (2012-2013) for modelling the Greek-Turkish arms race, (6) BSc thesis on hierarchical reinforcement learning (2010-2011) which resulted in a publication, (7) BSc thesis on multiagent reinforcement learning (2009-2010) for modelling the Cyprus problem.
- **Reviewer (journals)**: PLOS One (2018), Computer Vision and Image Understanding (2017), IEEE Transactions on Neural Networks and Learning Systems (2013), International Journal of Computer Mathematics (2011), Physics Letters A (2011), IEEE Transactions on Neural Networks (2010), WSEAS Transactions on Systems and Control (2010).
- **Reviewer (conferences/workshops)**: International Conference on Robotics and Automation (ICRA 2018), NIPS Workshop on Bayesian Optimization (BayesOpt 2017), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017), 25th International Conference on Artificial Neural Networks (ICANN2016), 9th International Conference on Artificial Intelligence Applications and Innovations (AIAI2013).
- **Program Committee Member**: 9th International Conference on Artificial Intelligence Applications and Innovations (AIAI2013), 1st Workshop on Computational Intelligence for Critical Infrastructure Systems (part of AIAI 2013).
- **Volunteering**: Neural Coding Workshop 2010, Limassol, Cyprus.

Conferences/Workshops Attended and Papers Presented

- Annual Genetic and Evolutionary Computation Conference (GECCO 2018), Kyoto, Japan, July 2018, Oral presentation.
- Annual Genetic and Evolutionary Computation Conference (GECCO 2017), Berlin, Germany, July 2017, Oral and Poster presentation.
- Attended the 2nd Neuroscience Across Disciplines Workshop (NAD13), Nicosia, Cyprus, January 2013.
- Attended the 1st Neuroscience Across Disciplines Workshop (NAD12), Nicosia, Cyprus, January 2012.
- 9th European Workshop on Reinforcement Learning (EWRL9), Athens, Greece, September 2011, Oral presentation.
- Attended the 13th Annual Genetic and Evolutionary Computation Conference (GECCO 2011), Dublin, Ireland, July 2011.

- Attended the 9th International Neural Coding Workshop (NC2010), Limassol, Cyprus, October-November 2010.
- World Congress on Computational Intelligence (WCCI), Barcelona, Spain, July 2010, Oral presentation at the International Joint Conference on Neural Networks (IJCNN).
- 3rd Cyprus Workshop on Signal Processing and Informatics, Nicosia, Cyprus, July 2010, Oral presentation.
- 19th International Conference on Artificial Neural Networks (ICANN 2009), Limassol, Cyprus, September 2009, Oral presentation.
- 2nd Cyprus Workshop on Signal Processing and Informatics, Nicosia, Cyprus, July 2009, Oral presentation.

Technical Skills

C++, Python, MATLAB, Java, LaTeX, C#, Visual Basic .NET, HTML/CSS, PHP, R, Prolog, SQL

Languages

Greek (native), English (excellent knowledge), French (basic knowledge)