Vassilis Vassiliades

Team Leader of the Learning Agents and Robots (LEAR) Multidisciplinary Research Group
Research Centre on Interactive Media, Smart Systems and Emerging Technologies (RISE), Nicosia, Cyprus
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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)

Research Interests

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

Publications

- **Refereed archival journal papers**:

  1. Kondo, D., **Vassiliades, V.**, Tode, H., and Asami, T. (2020). The Named Data Networking Flow
     Filter: Towards Improved Security over Information Leakage Attacks. *Computer Networks*, 173:
     107187.

  2. Chatzilygeroudis, K., **Vassiliades, V.**, Stulp, F., Calinon, S., and Mouret, J.-B. (2019). A survey on
     policy search algorithms for learning robot controllers in a handful of trials. *IEEE Transactions on
     Robotics*, 36(2): 328-347.

  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*, 6:
     65151-65170.

  4. 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.

  5. **Vassiliades, V.**, Chatzilygeroudis, K. and Mouret, J.-B. (2017). Using Centroidal Voronoi
     Tessellations to Scale Up the Multidimensional Archive of Phenotypic Elites Algorithm. *IEEE
     Transactions on Evolutionary Computation*, 22(4): 623-630.

  6. **Vassiliades, V.** and Christodoulou, C. (2016). Behavioral Plasticity Through the Modulation of
     Switch Neurons. *Neural Networks*, 74: 35-51.

  7. **Vassiliades, V.** and Christodoulou, C. (2013). Toward Nonlinear Local Reinforcement Learning Rules
     Through Neuroevolution. *Neural Computation*, 25(11): 3020-3043.

  8. 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.

  9. **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**:

  10. Ishikura, N., Kondo, D., Iordanov, I., **Vassiliades, V.** and Tode, H. (2020). Cache-Property-Aware Features for DNS Tunneling Detection. In 23rd Conference on Innovation in Clouds, Internet and Networks (ICIN 2020).

  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.

  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.

  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 Team Leader**, RISE   *Jun 2019 - present*
  I am leading the "Learning Agents and Robots" team at RISE that conducts basic and applied research on innovative methodologies and algorithms for creating intelligent software and robotic agents that can (1) interact with humans and learn from them, (2) act autonomously by learning to solve tasks and (3) become highly adaptive to dynamic environmental changes.

- **Associate/Visiting Research Fellow**, University of Cyprus   *Dec 2015 - present*
  Collaboration with my former PhD advisor (Chris Christodoulou) on machine learning projects and the supervision of students.

- **Research Associate**, RISE   *Feb 2019 - May 2019*
  I was part of the "Socially-Competent Robotic and Agent Technologies (SoCRATes) Multidisciplinary Research Group". My research focused on preference elicitation and neural-symbolic approaches for concept learning.

- **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.

- **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. I also participated on a research project related to neural networks for bioinformatics; this project was funded by the Research Promotion Foundation of Cyprus.

- **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").

- **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.

- **Software Developer**, 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 introduces students from the Education department to basic concepts in Computer Science. I was responsible for the laboratory sessions that focused on skills such as using the Microsoft Office suite (Word, Excel, Powerpoint), and the Internet (web browsing, emails).

- **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.

- **Instructor**, RISE Summer 2019 'STEM and Gaming' Scholars Program, RISE   July 2019
  - **Introduction to Artificial Intelligence**
    Course (1.5 hours) that made an introduction to artificial intelligence for high-school students.

- **Instructor**, "Gaming and Artificial Intelligence" RISE Summer Scholars Program, RISE   July 2020
  - **Defining Artificial Intelligence**
    Course (1.5 hours) that made an introduction to artificial intelligence for high-school students.

GRANTS

- **Basic Research Grants**
  - Title: "Can Evolutionary Spiking and Non-spiking Neural Networks yield more robust solutions for
    Multiagent Learning problems?".
    * UCY internal research programme grant (ranked 1st out of 17 in the Department of Computer
      Science).
    * I co-wrote (main contributor) the research proposal and was the named and main researcher on the
      project.
    * Value: €88,000.
    * Duration: Apr 2010 - Mar 2012 (24 months).

- **Industrial Research Grants**
  - I co-wrote the proposals for 2 machine learning projects for collaboration between RISE and the
    Cyprus Telecommunications Authority (CYTA).
    * Value: €112,000.
    * Duration: Oct 2019 - Sep 2020 (12 months).
  - Title: "Smart System for monitoring analysing and correcting body posture for cyclists" (Smart Cyclo)
    * Cyprus Research Innovation Foundation PRE-SEED Grant
    * Work Package leader
    * Value: €117,630.
    * Duration: Jun 2020 - Nov 2021 (18 months).

- **Travel Grants**
  - July 2012: Travel and accommodation costs for my team to Sydney, Australia fully covered by
    Microsoft to represent Cyprus in the international Imagine Cup competition.
  - December 2012: Travel and accommodation costs to Frankfurt, Germany fully covered to attend the
    Frankfurt Institute for Advanced Studies (FIAS) "Winter School on Intrinsic Motivations - From
    Brains to Robots".

HONORS AND AWARDS

- 500 USD Microsoft Azure credits for "NeurIPS 2019 : MineRL Competition".
- 200 USD Google Cloud Platform credits for "NeurIPS 2019 : Learning to Move - Walk Around challenge".
- 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).

SUPERVISION

- **MSc theses**:
  - **2014-2015 : Irene Petri** - Higher order learning algorithms for training bi-directional recurrent
    neural networks on the problem of protein secondary structure prediction
    * Supervision rate: 40% (with Chris Christodoulou and Michalis Agathocleous, UCY)

- **BSc theses**:
  - **2019-2020 : Stelios Tymvios** - Deep reinforcement learning for hard exploration problems: lessons learnt
    * Supervision rate: 90% (with Chris Christodoulou, UCY)
  - **2019-2020 : Chrysis Eftychiou** - Generalized neural architecture for artificial Tetris players
    * Supervision rate: 80% (with Chris Christodoulou, UCY)
  - **2014-2015 : Jeannette Chahwan** - Modeling the evolution of self-control through pre-commitment
    * Supervision rate: 50% (with Chris Christodoulou, UCY)
  - **2014-2015 : Anna Georgiou** - Modeling the relationship between self-control and consciousness
    * Supervision rate: 50% (with Chris Christodoulou, UCY)
  - **2014-2015 : Maria Kalli** - Hierarchical reinforcement learning
    * Supervision rate: 90% (with Chris Christodoulou, UCY)
  - **2012-2013 : Eleni Kokkinofta** - Modelling the Greek-Turkish arms race with multiagent reinforcement learning
    * Supervision rate: 50% (with Chris Christodoulou, UCY)
  - **2010-2011 : Giannis Lambrou** - Multiagent hierarchical reinforcement learning
    * Supervision rate: 90% (with Chris Christodoulou, UCY)
  - **2009-2010 : Ioannis Karaolis** - Modelling the Cyprus problem with multiagent reinforcement learning
    * Supervision rate: 50% (with Chris Christodoulou, UCY)
- **Internships**:
  - **June 2020 - August 2020 : Mohammad Mansour (BSc student from the American University of Beirut, Lebanon)** - Learning to navigate in 3D environments
    * Supervision rate: 100%
  - **June 2020 - July 2020 : Stelios Tymvios (BSc student from the University of Cyprus, Cyprus)** - Ensemble negative correlation reinforcement learning
    * Supervision rate: 100%
  - **June 2019 - August 2019 : Bassel Musharrafieh (BSc student from the American University of Beirut, Lebanon)** - Molecular property prediction using machine learning
    * Supervision rate: 100%
  - **June 2019 - August 2019 : Mohammad Mansour (BSc student from the American University of Beirut, Lebanon)** - Incremental Concept Learning Agent
    * Supervision rate: 75% (with Loizos Michael, RISE and Open University of Cyprus)
- **Competitions**:
  - **2012 : Microsoft Imagine Cup competition - Team 'BrightSight'**
    * Developed a messenger application on Android for blind people (using Braille).
    * Other team members: Vasilis Mitrousis and Aris Paphitis (MSc students at UCY).
    * Our team won the local competition and represented Cyprus in the international competition in Sydney, Australia (July 2012).

PROFESSIONAL ACTIVITIES

- **Reviewer (journals)**:
  - IEEE Transactions on Robotics (2020)
  - IEEE Robotics & Automation Letters (2019)
  - International Journal of Control, Automation and Systems (2019)
  - 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)**:
  - The Genetic and Evolutionary Computation Conference (GECCO 2019, 2020)
  - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017, 2020)
  - International Conference on Informatics for Environmental Protection (EnviroInfo 2020)
  - 2nd International Workshop on Intelligent Systems for the Internet of Things (ISIoT 2020)
  - International Conference on Robotics and Automation (ICRA 2018, 2019)
  - International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2019)
  - NIPS Workshop on Bayesian Optimization (BayesOpt 2017)
  - 25th International Conference on Artificial Neural Networks (ICANN 2016)
  - 9th International Conference on Artificial Intelligence Applications and Innovations (AIAI 2013)
- **Program Committee Member**:
  - International Conference on Informatics for Environmental Protection (EnviroInfo 2020)
  - 2nd International Workshop on Intelligent Systems for the Internet of Things (ISIoT 2020)
  - The Genetic and Evolutionary Computation Conference (GECCO 2019, 2020)
  - 9th International Conference on Artificial Intelligence Applications and Innovations (AIAI 2013)
  - 1st Workshop on Computational Intelligence for Critical Infrastructure Systems (part of AIAI 2013)
- **Membership (professional/research networks)**:
  - Confederation of Laboratories for Artificial Intelligence Research in Europe (CLAIRE)
  - ContinualAI community
  - Crowdhelix platform
  - ACM Special Interest Group on Genetic and Evolutionary Computation (SIGEVO)
- **Volunteering**: Neural Coding Workshop 2010, Limassol, Cyprus.

Participation at Conferences/Workshops/Schools/Competitions

- July 2020 - Presentation at "Gaming and Artificial Intelligence" RISE Summer Scholars Program, Nicosia, Cyprus.
- July 2019 - Presentation at RISE Summer 2019 'STEM and Gaming' Scholars Program, Nicosia, Cyprus.
- May 2019 - Attended the 2nd Reflect Festival, Limassol, Cyprus.
- July 2018 - Oral presentation at the Annual Genetic and Evolutionary Computation Conference (GECCO 2018), Kyoto, Japan.
- July 2017 - Oral and Poster presentations at the Annual Genetic and Evolutionary Computation Conference (GECCO 2017), Berlin, Germany.
- March 2013 - Attended the TEDxNicosia conference, Nicosia, Cyprus.
- January 2013 - Attended the 2nd Neuroscience Across Disciplines Workshop (NAD13), Nicosia, Cyprus.
- December 2012 - Attended the Winter School on "Intrinsic Motivations: From Brains to Robots", Frankfurt Institute for Advanced Studies (FIAS), Frankfurt, Germany.
- July 2012 - Presentation at Microsoft's Imagine Cup competition, Sydney, Australia.
- January 2012 - Attended the 1st Neuroscience Across Disciplines Workshop (NAD12), Nicosia, Cyprus.
- September 2011 - Oral presentation at the 9th European Workshop on Reinforcement Learning (EWRL9), Athens, Greece.
- July 2011 - Attended the 13th Annual Genetic and Evolutionary Computation Conference (GECCO 2011), Dublin, Ireland.
- October-November 2010 - Attended the 9th International Neural Coding Workshop (NC2010), Limassol, Cyprus.
- July 2010 - Oral presentation at the International Joint Conference on Neural Networks (IJCNN) part of the World Congress on Computational Intelligence (WCCI), Barcelona, Spain.
- July 2010 - Oral presentation at the 3rd Cyprus Workshop on Signal Processing and Informatics, Nicosia, Cyprus.
- September 2009 - Oral presentation at the 19th International Conference on Artificial Neural Networks (ICANN 2009), Limassol, Cyprus.
- July 2009 - Oral presentation at the 2nd Cyprus Workshop on Signal Processing and Informatics, Nicosia, Cyprus.
- July 2007 - Attended the "Cyprus Summer School on Intelligent Systems", UCY, Nicosia, Cyprus.

Technical Skills

C++11, Python, MATLAB, Java, LaTeX, C#, Visual Basic .NET, HTML/CSS, PHP, R, Prolog, SQL

Languages

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