Filippos Christianos

curriculum vitae

📱 *+44 (0) 7517 133477*
✉ *filippos.christianos@gmail.com*
🌐 *www.fchristianos.com*
in *fchristianos*
○ *semitable*

━━━━━ Education

2019–2023 **PhD in Reinforcement Learning**, *University of Edinburgh*, UK

○ My thesis titled "Advances in Multi-Agent Reinforcement Learning: Experience Sharing, Parameter Sharing, Equilibrium Selection" was submitted in January 2023. Advisor: Dr. Stefano Albrecht.

○ Published my research as a first author in machine learning conferences such as **NeurIPS** and **ICML**.

2018–2019 **Master of Science in Robotics and Autonomous Systems**, *University of Edinburgh & Heriot-Watt University*, UK, with distinction

○ Studied courses such as Machine Learning and Pattern Recognition, Reinforcement Learning, and Robotics.

○ Thesis on "Exploration in Deep Multi-Agent Reinforcement Learning". Advisors: Dr. Stefano Albrecht and Dr. Frank Broz.

2009–2017 **Electronic and Computer Engineering**, *Technical University of Crete*, Greece
5-year diploma degree with Bachelors and integrated MSc

○ Studied core courses on Computer Science, Electronics, and Telecommunications.

○ Followed elective courses focused on Artificial Intelligence, Game Theory, and Multi-Agent Systems.

○ Thesis on "Employing Hypergraphs for Efficient Coalition Formation with Application to the V2G Problem". Was awarded full marks and led to peer reviewed publication. Advisor: Dr. Georgios Chalkiadakis.

━━━━━ Work Experience

2022–2023 **Co-Author**, Multi-Agent Reinforcement Learning: An Introduction (book) (anticipated 2023 publication)

○ Funded project to write a comprehensive textbook on multi-agent reinforcement learning. Collaborated with two other authors to conceptualise and write the content for the book, which is under contract with MIT Press for publication.

2022 (Summer) **Research Scientist Intern**, *NVIDIA*

○ Worked with the Autonomous Vehicles (AVs) research group. The project involved reasoning with occlusions. We developed a method for generating plausible vehicle trajectories in occluded spaces with a variational autoencoder and including them in a downstream planning pipeline.

○ This work resulted in "Planning with Occluded Traffic Agents using Bi-Level Variational Occlusion Models" which was accepted in ICRA 2023 (Christianos et al. 2023).

2020–Present	**Teaching Assistant**, *University of Edinburgh*

In post-graduate course: Reinforcement Learning.

- Assisted in developing and teaching a popular course on reinforcement learning for advanced undergraduate students and Masters-level students at Edinburgh University. I delivered the lectures on Deep Reinforcement Learning I & II, designed the coursework assignment, and assisted in tutorials and exams.
- The course has had enrolment numbers between 150-200 in all years and has consistently received very high marks in student feedback surveys. Some selected quotes from students: "The course was extremely well organised; in particular the coursework and the tutorials. I found the coursework to be one of the best organised and rewarding courseworks I have undertaken at University."; "This was probably the best course I have taken during my MSc degree at Edinburgh.".

2017–2018	**Research Assistant**, *ENECIA*

Remote work for a start-up.

- Developed tools for smart cities, including power-consumption prediction models, and policies for electric vehicle charging. Part of my work has been peer-reviewed and published in Panagopoulos et al (2022).
- Responsible for system administration tasks for cloud infrastructure (AWS), including management of computing resources and databases.

2015–2017	**Game Developer**, *Self-employed*

Led the development of a sci-fi strategy video game. My work included C++ coding with which I programmed procedural creation of 3D meshes, simulations of planet tectonics and climate, and the game's artificial intelligence. Also led the development of two profitable projects that were released in the Unreal Engine Marketplace.

Areas of Expertise

My PhD research was in the area of Multi-Agent Deep Reinforcement Learning. In particular, I study how multiple agents can benefit from homogeneity and efficiently explore in environments with sparse rewards. My main research interests are:

- Machine Learning
- Reinforcement Learning
- Multi-Agent Systems
- Deep Learning
- Unsupervised Learning

I am interested in both single and multi-agent applications of reinforcement learning; the application of deep networks and deep learning in reinforcement learning; and the use of unsupervised learning (e.g. variational auto-encoders) for opponent modelling, or learning state representations.

I have worked with several programming languages including (but not limited to):

- Python
- MATLAB
- C++
- JavaScript

In my work I have extensively used the following technologies and frameworks:

- ○ PyTorch
- ○ SciPy
- ○ OpenAI's Gym
- ○ pandas
- ○ Linux
- ○ NumPy
- ○ Amazon Web Services (AWS)
- ○ MongoDB
- ○ Git

I have also been performing Linux system administration tasks (e.g. Bash scripting, security, Slurm cluster management, webhosting support, and more).

Conference and Journal Publications

[1] **Filippos Christianos**, Peter Karkus, Boris Ivanovic, Stefano V. Albrecht, and Marco Pavone. "Planning with Occluded Traffic Agents using Bi-Level Variational Occlusion Models". In: *IEEE International Conference on Robotics and Automation (***ICRA***)*. 2023.

[2] Lukas Schäfer, **Filippos Christianos**, Josiah Hanna, and Stefano V. Albrecht. "Decoupling Exploration and Exploitation in Reinforcement Learning". In: *International Conference on Autonomous Agents and Multi-Agent Systems (***AAMAS***)*. 2022.

[3] **Filippos Christianos**, Georgios Papoudakis, Arrasy Rahman, and Stefano V. Albrecht. "Scaling Multi-Agent Reinforcement Learning with Selective Parameter Sharing". In: *Proceedings of the 38th International Conference on Machine Learning (***ICML***)*. 2021.

[4] Georgios Papoudakis*, **Filippos Christianos***, Lukas Schäfer, and Stefano V. Albrecht. "Benchmarking Multi-Agent Deep Reinforcement Learning Algorithms in Cooperative Tasks". In: *In Proceedings of the Neural Information Processing Systems Track on Datasets and Benchmarks (***NeurIPS***)*. 2021.

[5] Georgios Papoudakis, **Filippos Christianos**, and Stefano V. Albrecht. "Agent Modelling under Partial Observability for Deep Reinforcement Learning". In: *Advances in Neural Information Processing Systems (***NeurIPS***)*. 2021.

[6] Arrasy Rahman, Niklas Höpner, **Filippos Christianos**, and Stefano V. Albrecht. "Towards Open Ad Hoc Teamwork Using Graph-based Policy Learning". In: *Proceedings of the 38th International Conference on Machine Learning (***ICML***)*. 2021.

[7] **Filippos Christianos**, Lukas Schäfer, and Stefano V. Albrecht. "Shared Experience Actor-Critic for Multi-Agent Reinforcement Learning". In: *Advances in Neural Information Processing Systems (***NeurIPS***)*. 2020.

[8] Athanasios A. Panagopoulos, **Filippos Christianos**, Michail Katsigiannis, Konstantinos Mykoniatis, Marco Pritoni, Orestis P. Panagopoulos, Therese Peffer, Georgios Chalkiadakis, David E. Culler, Nicholas R. Jennings, and Timothy Lipman. "A Low-Complexity Non-Intrusive Approach to Predict the Energy Demand of Buildings over Short-Term Horizons". In: *Advances in Building Energy Research (***ABER***)* (2020).

[9] **Filippos Christianos** and Georgios Chalkiadakis. "Efficient Multi-Criteria Coalition Formation Using Hypergraphs (with Application to the V2G Problem)". In: *Multi-Agent Systems and Agreement Technologies (***EUMAS***)*. 2017.

Workshop Papers and Extended Abstracts

[1] **Filippos Christianos** and Georgios Chalkiadakis. "Employing Hypergraphs for Efficient Coalition Formation with Application to the V2G Problem". In: *Proceedings of the Twenty-Second European Conference on Artificial Intelligence (**ECAI***)*. 2016.

Preprints or Under Review

[1] Georgios Papoudakis, **Filippos Christianos**, Arrasy Rahman, and Stefano V. Albrecht. *Dealing with Non-Stationarity in Multi-Agent Deep Reinforcement Learning*. 2019.

Additional Activities

Reviewing

2022	NeurIPS, AAMAS, ICLR (highlighted reviewer)
2021	MRS, IROS, TPAMI, ICLR, AAMAS
2020	TPAMI, ICML(deleg.), NeurIPS(deleg.)

Presenting

2023	Gave seminar on MARL at Motion2AI.
2022	Presented in Berkeley's Multi-Agent Learning Seminar group.
2018–Present	Regular Presenter, Reinforcement Learning Reading Group, University of Edinburgh.
2020	EdIntelligence, Invited to present at Mini NeurIPS event.
2019–2020	Student Presenter, CDT-RAS annual conference.
2013	Presented open/free software technologies in local outreach program, Crete, Greece.
2012,2013	Conducted seminar sessions on Linux, EL/LAK association.

Volunteering, Awards, and Other

2022	Thesis abstract accepted at AAMAS2022 doctoral consortium.
2021	Co-supervised MSc dissertation project on "Multi-Agent Deep Reinforcement Learning: Revisiting MADDPG", University of Edinburgh.
2021	Honorable mention (2nd best paper) AAMAS Workshop in Adaptive and Learning Agents for Graph-based Policy Learning.
2020–Present	System administration tasks (Linux, Slurm) for research group server.
2019	DriveML Huawei Autonomous Vehicles Challenge, awarded 4th Place, London.
2018	Awarded fully funded scholarship for MSc and PhD studies (EPSRC CDT-RAS.)
2018	Awarded Ridley Fellowship from Newcastle University (*declined*).
2014	Volunteer, European Agent Systems Summer School, Greece.
2014	Won competition of the Artificial Intelligence class in Technical University of Crete (best agent in a variation of the checkers game).
2009-2013	Advocate and Organiser of EL/LAK association (Free/Open Source Software).
2008	Finalist in the Pan-Hellenic computer science competition.