Mikayel Samvelyan

Curriculum Vitae

London, United Kingdom
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Research Interests

Deep Reinforcement Learning, Multi-Agent Learning, Open-Endedness
Adversarial Robustness, Large Language Models, Generalisation

Education

2020 – 2024 (expected) **University College London**, *United Kingdom*.
PhD in Computer Science
- Thesis: Robust Agents in Open-Ended Worlds
- Advised by Tim Rocktäschel and John Shawe-Taylor
- In partnership with Meta AI (FAIR)

2016 – 2017 **University of Oxford**, *United Kingdom*.
MSc in Computer Science
- Thesis: Factored Value Functions for Deep Multi-Agent Reinforcement Learning
- Advised by Shimon Whiteson

2014 – 2016 **Yerevan State University**, *Armenia*.
MSc in Informatics and Applied Mathematics

Fall 2013 **Delta State University**, *United States*.
Undergraduate Exchange in Computer Science

2010 – 2014 **Yerevan State University**, *Armenia*.
BSc in Informatics and Applied Mathematics

Research and Development Experience

09/20 – present **Meta AI (previously Facebook AI Research),** Research Assistant.
02/20 – 07/20 **USC Information Sciences Institute (via Toptal),** Research Engineer.
03/19 – 10/19 **Reddit (via Toptal),** Machine Learning Engineer.
05/18 – 08/20 **Toptal,** Machine Learning Engineer.
10/14 – 09/16 **Mentor Graphics (now Siemens)**, Research and Development Engineer.
10/12 – 07/13 **Exergy (now Instigate Robotics),** Software Engineer.
05/12 – 09/12 **Instigate Design,** Software Engineering Intern.

Awards and Distinctions

2022 – 2024 ELLIS PhD Program, European Laboratory for Learning and Intelligent Systems
2016 – 2017 Chevening Scholarship, Foreign Office, HM Government, UK
2016 – 2017 Luys Scholarship, Luys Foundation, Armenia
2016 – 2017 AGBU International Scholarship, USA
2014 – 2016 State Excellence Scholarship for Graduate Studies, Armenia (full scholarship)
2013 Global UGRAD Exchange Scholarship, US Department of State (full scholarship)
2013 3rd place in 1st Annual Robotics Competition AITP/DSU, USA
2012 Student of the Year Award, Department of Informatics and Applied Mathematics, YSU
2010 – 2014 State Excellence Scholarship for Undergraduate Studies, Armenia (full scholarship)

Open-Source Models

2024 **Meta Llama 3**, *https://ai.meta.com/blog/meta-llama-3*.
The most capable openly available LLM to date, [model card].

Selected Open-Source Libraries

2021 **MiniHack**, `github.com/facebookresearch/minihack`.
A sandbox framework for open-ended reinforcement learning research.

2019 **SMAC**, *StarCraft Multi-Agent Challenge*, `github.com/oxwhirl/smac`.
A standard benchmark for cooperative multi-agent reinforcement learning based on StarCraft II.

2019 **PyMARL**, `github.com/oxwhirl/pymarl`.
A popular framework for deep multi-agent reinforcement learning research.

Professional Service

Workshop Organization

2023 **Co-organizer**, *2nd Workshop on Agent Learning in Open-Endedness*, NeurIPS 2023.

2022 **Co-organizer**, *1st Workshop on Agent Learning in Open-Endedness*, ICLR 2022.

Competitions

2021 **Co-organizer**, *The NetHack Challenge*, NeurIPS 2021 Competition.

Application Evaluations

2021 – 2023 **ELLIS PhD Program**, *European Lab for Learning and Intelligent Systems*, Evaluator.

Reviewing

2021 – 2024 **ICLR**, International Conference on Learning Representations

2021 – 2024 **ICML**, International Conference on Machine Learning

2021 – 2023 **NeurIPS**, Neural Information Processing Systems

2024 **SET LLM**, Secure and Trustworthy LLMs workshop at ICLR 2024

2021 **NeurIPS: Datasets and Benchmarks Track**, Neural Information Processing Systems

2022 – 2023 **TMLR**, Transactions of Machine Learning Research

Teaching Experience

University College London, *Department of Computer Science*.
- Spring 2023: Statistical Natural Language Processing (COMP0087) (TA)
- Spring 2022: Reinforcement Learning (COMP0089) (TA)
- Spring 2022: Statistical Natural Language Processing (COMP0087) (TA)
- Spring 2021: Reinforcement Learning (COMP0089) (TA)
- Spring 2021: Statistical Natural Language Processing (COMP0087) (TA)

Russian-Armenian University, *Institute of Mathematics and Informatics*.
- Spring 2020: Data Structures (TA)
- Fall 2019: Machine Learning (Lecturer)
- Fall 2018: Machine Learning (Lecturer)
- Fall 2018: Operating Systems (TA)

American University of Armenia, *College of Science and Engineering*.
- Fall 2018: Artificial Intelligence (Guest Lecturer and TA)

SmartGateML: Yerevan Machine Learning Excellence Center.
- Spring 2018: Introduction to Machine Learning (Lecturer)
- Summer 2018: Applied Machine Learning (Lecturer)

NUACA, *Department of Computer Science*.
- Fall 2017: Intelligent Systems (Lecturer)
- Fall 2017: Software Tools for Artificial Intelligence (Lecturer)

Thesis Supervision

2024 **Co-Supervisor**, *University College London, UK*.
Olivia Martinoli Issler, BASc in Arts and Sciences: Sciences and Engineering

2023 **Co-Supervisor**, *University College London, UK*.
Garðar Ingvarsson, MSc in Computational Statistics and Machine Learning

2022 **Co-Supervisor**, *University College London, UK*.
Jonathan Cook, MSc in Computational Statistics and Machine Learning

2021 **Co-Supervisor**, *University College London, UK*.
Michael Matthews, MSc in Machine Learning

2021 **Co-Supervisor**, *University College London, UK*.
Hannah Teufel, MSc in Machine Learning

2021 **Co-Supervisor**, *University College London, UK*.
Robert McHardy, MSc in Machine Learning

Publications

Highlighted Papers

[1] **M. Samvelyan***, S. Raparthy*, A. Lupu*, E. Hambro, A. Markosyan, M. Bhatt, Y. Mao, M. Jiang, J. Parker-Holder, J. Foerster, T. Rocktäschel, R. Raileanu, "Rainbow Teaming: Open-Ended Generation of Diverse Adversarial Prompts", *Submitted to NeurIPS 2024*.

[2] **M. Samvelyan***, D. Paglieri*, M. Jiang, J. Parker-Holder, T. Rocktäschel, "Multi-Agent Diagnostics for Robustness via Illuminated Diversity", *AAMAS 2024* (Oral).

[3] **M. Samvelyan**, A. Khan, M. Dennis, M. Jiang, J. Parker-Holder, J. Foerster, R. Raileanu, T. Rocktäschel, "MAESTRO: Open-Ended Environment Design for Multi-Agent Reinforcement Learning", *ICLR 2023*.

[4] **M. Samvelyan**, R. Kirk, V. Kurin, J. Parker-Holder, M. Jiang, E. Hambro, F. Petroni, H. Küttler, E. Grefenstette, T. Rocktäschel, "MiniHack the Planet: A Sandbox for Open-Ended Reinforcement Learning Research", *NeurIPS 2021*.

[5] T. Rashid*, **M. Samvelyan***, C. Schroeder de Witt, G. Farquhar, J. Foerster, S. Whiteson, "Monotonic Value Function Factorisation for Deep Multi-Agent Reinforcement Learning", *Journal of Machine Learning Research (JMLR), 2020*.

[6] **M. Samvelyan***, T. Rashid*, C. Schroeder de Witt, G. Farquhar, N. Nardelli, T. Rudner, C.-M. Hung, P. Torr, J. Foerster, S. Whiteson, "The StarCraft Multi-Agent Challenge", *AAMAS 2019*.

[7] T. Rashid*, **M. Samvelyan***, C. Schroeder, G. Farquhar, J. Foerster, S. Whiteson, "QMIX: Monotonic Value Function Factorisation for Deep Multi-Agent Reinforcement Learning", *ICML 2018*.

Peer-Reviewed Conference Papers

[8] M. Matthews, M. Beukmans, B. Ellis, **M. Samvelyan**, M. Jackson, S. Coward, J. Foerster, "Craftax: A Lightning-Fast Benchmark for Open-Ended Reinforcement Learning", *ICML 2024* (Spotlight).

[9] A. Rutherford, B. Ellis, M. Gallici, J. Cook, A. Lupu, G. Ingvarsson, T. Willi, A. Khan, C. Schroeder, A. Souly, S. Bandyopadhyay, **M Samvelyan**, M. Jiang, R. Lange, S. Whiteson, B. Lacerda, N. Hawes, T. Rocktäschel, C. Lu, J. Foerster, "JaxMARL: Multi-Agent RL Environments in JAX", *AAMAS 2024*.

[10] B. Ellis, S. Moalla, **M. Samvelyan**, M. Sun, A. Mahajan, S. Whiteson, "SMACv2: An Improved Benchmark for Cooperative Multi-Agent Reinforcement Learning", *NeurIPS 2023*.

[11] C. Bamford, M. Jiang, **M. Samvelyan**, T. Rocktäschel, "GriddlyJS: A Web IDE for Reinforcement Learning", *NeurIPS 2022*.

[12] E. Hambro, S. Mohanty, D. Babaev, M. Byeon, D. Chakraborty, E. Grefenstette, M. Jiang, D. Jo, A. Kanervisto, J. Kim, S. Kim, R. Kirk, V. Kurin, H. KÃijttler, T. Kwon, D. Lee, V. Mella, N. Nardelli, I. Nazarov, N. Ovsov, J. Parker-Holder, R. Raileanu, K. Ramanauskas, T. Rocktäschel, D. Rothermel, **M. Samvelyan**, D. Sorokin, M. Sypetkowski, M. Sypetkowski, "Insights From the NeurIPS 2021 NetHack Challenge", *NeurIPS 2021*: Competitions and Demonstrations Track.

[13] M. Matthews, **M. Samvelyan**, J. Parker-Holder, E. Grefenstette, T. Rocktäschel, "Hierarchical Kickstarting for Skill Transfer in Reinforcement Learning", *CoLLAs 2022*.

[14] J. Parker-Holder, M. Jiang, M. Dennis, **M. Samvelyan**, J. Foerster, E. Grefenstette, T. Rocktäschel, "Evolving Curricula with Regret-Based Environment Design", *ICML 2022*.

[15] A. Mahajan, **M. Samvelyan**, L. Mao, V. Makoviychuk, A. Garg, J. Kossaifi, S. Whiteson, Y. Zhu, A. Anandkumar, "Tesseract: Tensorised Actors for Multi-Agent Reinforcement Learning", *ICML 2021*.

[16] A. Mahajan, T. Rashid, **M. Samvelyan**, S. Whiteson, "MAVEN: Multi-Agent Variational Exploration", *NeurIPS 2019*.

Workshop Papers and Pre-prints

[17] G. Ingvarsson, **M. Samvelyan**, B. Lim, M. Flageat, A. Cully, T. Rocktäschel, "Mix-ME: Quality-Diversity for Multi-Agent Learning", *ALOE @ NeurIPS 2023.*

[18] A. Mahajan, **M. Samvelyan**, T. Gupta, B. Ellis, M. Sun, T. Rocktäschel, S. Whiteson, "Generalization in Cooperative Multi-Agent Systems", *arXiv, 2022*.

[19] M. Matthews, **M. Samvelyan**, J. Parker-Holder, E. Grefenstette, T. Rocktäschel, "SkillHack: A Benchmark for Skill Transfer in Open-Ended Reinforcement Learning", *ALOE @ ICLR 2022.*

[20] J. Parker-Holder, M. Jiang, M. Dennis, **M. Samvelyan**, J. Foerster, E. Grefenstette, T. Rocktäschel, "That Escalated Quickly: Compounding Complexity by Editing Levels at the Frontier of Agent Capabilities", *Deep RL @ NeurIPS 2021*.

[21] A. Mahajan, **M. Samvelyan**, L. Mao, V. Makoviychuk, A. Garg, J. Kossaifi, S. Whiteson, Y. Zhu, A. Anandkumar, "Reinforcement Learning in Factored Action Spaces using Tensor Decompositions", *QTNML @ NeurIPS 2021*.

[22] S. Avetisyan, **M. Samvelyan**, M. Karapetyan, "Random Irregular Block-hierarchical Networks: Algorithms For Computation of Main Properties", *RAU Workshop*.

* equal contribution

Blogposts

2021 **MiniHack: A New Sandbox for Open-Ended Reinforcement Learning**.
Facebook AI Research Blog, [link].

2019 **Solving AI Challenges by Playing StarCraft**.
NVIDIA Developer Blog, [link].

2019 **SMAC: The StarCraft Multi-Agent Challenge**.
WhiRL Blog, University of Oxford, [link].

Languages

Native	Armenian
Fluent	English
Fluent	Russian
Elementary	German