Anastasia PSAROU

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Education

PhD in Multi-Agent Systems, Jagiellonian University, GMUM November 2023 - present
Title: Optimizing Urban Route Choice for Autonomous Vehicles Using Multi-Agent Reinforcement Learning.
Part of the COeXISTENCE group - ERC grant, supervised by professor Rafal Kucharski.

Electrical and Computer Engineering, University of Thessaly September 2018 - December 2023
5-year Diploma (Integrated MSc)
Master thesis: Fingerspelling Recognition in the Greek Sign Language Using Human Skeleton and Pose Features

AGH University of Science and Technology, Krakow February 2022 - June 2022
Exchange (Erasmus+) studies

Work Experience

Research Assistant November 2023 - present
Jagiellonian University, Faculty of Mathematics and Computer Science

PhD student researching the routing decisions of autonomous vehicles using multi-agent reinforcement learning.

Visiting Researcher September 2025 - February 2026
ETH University, Institute for Transport Planning and Systems, SVT Group

Working on congestion pricing and fairness in multi-agent traffic systems using multi-agent reinforcement learning, supervised by Dr. Anastasios Kouvelas and Dr. Michalis Makridis. This visit was supported by the "Excellence Initiative - Research University" of Jagiellonian University.

Software Engineering Internship July 2022 - September 2022
GSI Helmholtz Centre for Heavy Ion Research, Darmstast, Germany

In this internship I worked towards optimizing scientific python pipelines for electromagnetic calculations achieving 70% and run machine learning models on the GPUs installed in GSI HPC infrastructure.

Publications

Journal Papers

1. Akman, A. O.*, **Psarou, A.***, Gorczyca, Ł., Varga, Z. G., Jamróz, G., & Kucharski, R. (2025). RouteRL: Multi-agent reinforcement learning framework for urban route choice with autonomous vehicles. SoftwareX, 31, 102279. https://doi.org/10.1016/j.softx.2025.102279

2. Jamróz, G., Akman, A. O., **Psarou, A.**, Varga, Z. G., & Kucharski, R. (2025). Social implications of coexistence of CAVs and human drivers in the context of route choice. Scientific Reports, 15(1), 6768. https://doi.org/10.1038/s41598-025-90783-w

Conference Papers

1. **Psarou, A.**, Gorczyca, Ł., Gaweł, D., & Kucharski, R. (2025). Autonomous vehicles need social awareness to find optima in multi-agent reinforcement learning routing games. arXiv preprint arXiv:2510.11410. https://arxiv.org/abs/2510.11410, **under submission to AAMAS 2026**

2. **Psarou, A.**, Akman, A. O., Gorczyca, Ł., Hoffmann, M., Jamróz, G., & Kucharski, R. (2025). Collaboration between the city and machine learning community is crucial to efficient autonomous vehicles routing. arXiv preprint arXiv:2502.13188. https://arxiv.org/abs/2502.13188, **under submission to AAMAS 2026**

3. Kucharski, R., **Psarou, A.**, & Descormier, N. (2025). Equilibria in routing games with connected autonomous vehicles will not be strong, as exclusive clubs may form. arXiv preprint arXiv:2510.12862. https://arxiv.org/abs/2510.12862, **under submission to AAMAS 2026**

4. Akman, A. O., **Psarou, A.**, Hoffmann, M., Gorczyca, Ł., Kowalski, Ł., Gora, P., Jamróz, G., & Kucharski, R. (2025). URB – Urban routing benchmark for RL-equipped connected autonomous vehicles. arXiv preprint arXiv:2505.17734. https://arxiv.org/abs/2505.17734, **accepted to NeurIPS 2025**

5. Akman, A. O., **Psarou, A.**, Varga, Z. G., Jamróz, G., & Kucharski, R. (2025). Impact of collective behaviors of autonomous vehicles on urban traffic dynamics: A multi-agent reinforcement learning approach. arXiv preprint arXiv:2509.22216. https://arxiv.org/abs/2509.22216, **presented in EWRL 2024**

Teaching - Supervision

Microscopic Modeling and Simulation of Traffic Operations, ETH Winter semester 2025-2026
Assisted in conducting this lecture during my stay at ETH Zurich.

Complex Social Systems course, Jagiellonian University Summer semester 2023-2024, 2024-2025
Designed, and taught lab sessions on flow models, geospatial and transit data frameworks (OSMnx, GTFS, OTP), complex systems, and reinforcement learning.

AI intern program July 2025 - September 2025
Supervised Dominik Gawel on hyperparameter optimization and reinforcement learning algorithm development for autonomous vehicle routing, contributing to a conference-level publication at AAMAS.

Project supervision
Cooperative reinforcement learning, Filip Soszyński, Ignacy Kolton, Kacper Marzol (github repository).

Urban gentrification simulation, Paweł Małecki, Marcin Starzak (github repository).

Academic co-authorship network properties over the years, Łukasz Orski, Łukasz Gorczyca.

Unveiling the High-End Lifestyles: Data Driven Insights and Behavioral Profiling, Katharina Kampa.

Conferences - Summer schools

NeurIPS December 2025
Poster presentation: "URB – Urban routing benchmark for RL-equipped connected autonomous vehicles".

CIFAR DLRL Summer School August 2025
Learned about advances in deep and reinforcement learning while engaging with top researchers in the field.

hEART Conference June 2025
Poster presentation: "Social implications of coexistence of CAVs and human drivers in the context of route choice".

SUMO User Conference May 2025
Poster presentation: "RouteRL: Multi-agent reinforcement learning framework for urban route choice with autonomous vehicles".

ML in PL November 2024
Tutorial presentation: "Multi-Agent Reinforcement Learning Tutorial for Optimal Urban Route Choice Using TorchRL".

European Workshop on Reinforcement Learning (EWRL) October 2024
Poster presentation: "Impact of Collective Behaviors of Autonomous Vehicles on Urban Traffic Dynamics: A Multi-Agent Reinforcement Learning Approach".

ICLR May 2024

Promotion team of the Student Branch of IEEE in Volos, Greece 2018 - 2019

Funding

Research & Support module, Jagiellonian University June 2025
Received funding with an excellent score (38/40 points) to support my research visit at ETH Zurich.

Skills

Programming Languages: Python (Pandas, Torch, TorchRL, Tensorflow, Numpy, Matplotlib, NetworkX), C/C++, Java, HTML, CSS, JavaScript, Matlab, CUDA, SQL, LaTeX, MIPS, Verilog, OpenMp, OpenMPI.
Subjects: Multi-agent Reinforcement Learning, Game Theory, Agent-based modeling Machine Learning, High Performance Computing, Computer Vision, Parallel Computing, Operating Systems, Concurrent Programming, Object Oriented Programming, Database Systems, Data Science.
Developer Tools: Git, Anaconda, Jupyter Notebook, VS Code, Google Colab, NetBeans.
Extra: SLURM, Docker, Microsoft Office, Linux Command Line.
Music: Piano. I have a degree in piano enabling me to teach professionally.

Languages

Greek(mother tongue) **English**(almost bilingual) **French**(intermediate to advanced) **Polish**(beginner)