Ignacy M. Stepka

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Education

Carnegie Mellon University — **August 2025 – present**
Ph.D. | Machine Learning Department — Pittsburgh, PA, USA

Poznan University of Technology — **October 2020 – March 2025**
Artificial Intelligence (B.Sc. Eng.) | GPA: 4.78 (2–5 scale) — Poznan, Poland

- University President's Scholarship for all eligible semesters; graduated with the highest grade and distinction (5+).

Skills

Python · PyTorch · C++ · Linux · SLURM · Hugging Face · scikit-learn · PyTorch Lightning · pandas · Weights & Biases · Docker · Git · SQL · RunPod · LaTeX · VS Code · Codex · Claude Code

Experience

Research Assistant / Ph.D. Student — **August 2025 – present**
Carnegie Mellon University | Robotics Institute — Pittsburgh, PA, USA
AutonLab | Advisor: Prof. Artur Dubrawski

- Researching dynamic tokenization with adaptive compression rates.
- Aligning language and time-series modalities to support forecasting and analysis.
- Improving the computational and memory efficiency of time-series foundation models.

Research Intern — **June 2023 – July 2025**
Carnegie Mellon University | Robotics Institute — Pittsburgh, PA, USA
AutonLab | Supervised by Prof. Artur Dubrawski

- 2x participant in the highly selective Robotics Institute Summer Scholar program (2023, 2024).
- Designed a model-inversion method to restore knowledge lost after agent dropout in decentralized federated learning.
- Developed a formal verification approach for Bayesian networks enabling rigorous model testing and validation.

Research Assistant — **November 2022 – August 2025**
Poznan University of Technology — Poznan, Poland
Machine Learning Laboratory | Supervised by Prof. Jerzy Stefanowski and Dr. Mateusz Lango

- Researched counterfactual explanations as part of the TAILOR EU network.
- Developed counterfactual methods robust to model shifts and a user-centric multi-criteria explanation ensemble.

Machine Learning Engineer — **August 2021 – March 2025**
Poznan Supercomputing and Networking Center | Polish Academy of Science — Poznan, Poland

- Individually contributed to deliverables in 3 distinct EU HORIZON funded projects:

Anomaly detection projects – ADMIRE, SHOP4CF (20 months)

- Investigated anomaly detection techniques for HPC centers in order to detect early faults and prevent server failures.
- Designed and implemented an MVP, which later served as a base for further development of the final solution.
- Prepared models for deployment and build the interface app for deployment in the factory of a large car manufacturer.

Explainable AI project – TAPAS (6 months)

- Analyzed the behavior of a black-box model in a multi-agent scenario setting, employing various XAI techniques.
- Found critical vulnerabilities in the decision-making process and made the team modify their approach.

Internship – position granted by winning Intel AI4Y program (3 months)

- Analyzed how different pre-processing techniques impact the performance of the UNet model in medical imaging.

Junior C# Developer — **February 2021 – July 2021**
ProCat — Poznan, Poland

- Built new modules for automated product catalog generation in a large product information management (PIM) system.

Selected Publications

- W. Potosnak, N. Zukowska, M. Wilinski, D. Howarth, **I. Stepka**, M. Goswami, A. Dubrawski – *"MICA: Multivariate Infini Compressive Attention for Time Series Forecasting"* – arXiv, 2026.
- **I. Stepka**, L. Sztukiewicz, M. Wilinski, J. Stefanowski – *"DetoxAI: A Python Toolkit for Debiasing Deep Learning Models in Computer Vision"* – ECML PKDD 2025.
- **I. Stepka**, M. Lango, J. Stefanowski – *"Counterfactual Explanations with Probabilistic Guarantees on their Robustness to Model Change"* – KDD 2025 Research Track.

Advising and mentoring

2025: McNair Shah (CMU) · Rafał Malcewicz (Aalto) · Jinmyeong Choi (Seoul National University)

2026: Piotr Kacprzak (AGH University of Krakow) · Grant Stec (United States Air Force)

Leadership and service

Reviewer: KDD 2026 (Datasets & Benchmarks) · ICLR 2026 · TSALM @ ICLR 2026 · FMSD @ ICML 2026 · NeurIPS 2026

Admissions Committee: Robotics Institute Summer Scholars Program (2026)

Seminar group leader, GHOST, Poznan University of Technology — January 2021 – June 2025
Led the eXplainable AI (2023) and Machine Unlearning (2024) study groups.

Data for Equity, Carnegie Mellon University — June 2024 – August 2024
Analyzed graduate admissions data and presented actionable findings to university officials.

RoboLaunch outreach initiative, Carnegie Mellon University — September 2023 – December 2023
Supported seminars connecting aspiring researchers with leading faculty.

Honors and awards

2nd place, National Competition for Best Engineering Thesis in Computer Science — June 2025
Awarded by the Polish Information Processing Society for my engineering thesis.

Ministry of Science and Higher Education Scholarship — March 2025
Awarded annually to 320 students in Poland, including 13 in computer science.

Ministry of Science and Higher Education Research Grant (EUR 15.5K) — December 2024
Awarded for the DetoxAI project to a team of three students.

CMU RI Google Scholarship — June 2024
Funded my summer research internship at Carnegie Mellon University.

Poznan University of Technology President Scholarship (5x) — 2021 – 2025
Semester scholarship for students in the top 10% by academic performance.

Intel AI4Youth Program Laureate — 2019
Won the national program with a computer-vision system enabling hands-free computer control through webcam-based gaze estimation.