Matevz Matjasec

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Research Interests and Expertise

I am an AI researcher at Max Planck Institute for Intelligent Systems, investigating the interplay between optimizer and architecture in Deep Learning, and new networks for long-range reasoning. My overarching goal is to find and understand the origin of intelligence and to develop a mathematical framework behind it. My research interests lie in continual learning, generalisation on OOD tasks, sample efficient ML learning and the role of optimisation dynamics. I am very much interested in causality and meta-learning or 'learning to learn' with a focus on illuminating in-context learning in transformer models. My prior work is mostly based within the Natural Language Processing field; my MPhil project was investigating shortcut learning of language models on NLI, and I have worked as a student researcher at the Institute Jozef Stefan on Humane AI Net project developing a multilingual news dataset for evaluating online news stream clustering algorithms. Beyond that I was involved in several smaller projects among others investigating LLMs as knowledge bases, lottery ticket hypothesis and mode connectivity and pruning methods for transformer models.

Education

MPhil Advanced Computer Science | University of Cambridge | 2022 - 2023

- Research-oriented programme with a strong emphasis on machine learning and natural language processing
- Completed a year-long research project on Natural Language Processing, specifically focusing on shortcut learning in pretrained models through the lens of optimization
- Relevant modules: module on Deep Learning, module on ML Systems and Federated Learning under Nick Lane's supervision, Advanced Topics in AI, NLP module
- Audited a module on Computational Neuroscience and a module on GNNs

BSc Physics | King's College London | 2019 – 2022

- Graduated with First Class Honours Degree
- Completed a research project in machine learning
- Among the top 5% in a cohort of over 180 students in the first year
- Represented King's College London at the International Theoretical Physics Olympiad, a 24-hour open-book academic contest with open-ended questions on theoretical physics

- Relevant modules: Classical Physics (95%), Mathematics and Computation for Physics (87%), Introduction to AI (91%), Introduction to Numerical Modelling (74%)

Research Experience

MPhil project | University of Cambridge | September 2022 – July 2023

- Supervisor: Dr Andreas Vlachos
- My research project investigated shortcut learning in natural language models through the lens of training dynamics and loss landscapes

Research Assistant | Institute Jozef Stefan (IJS) | December 2021 – April 2022

- Working on an EU Commission-funded Humane AI Net Project (Grant No. 952026).
- Aim of the project was to develop a multilingual news dataset for evaluating online news stream clustering algorithms.
- I worked on initial dataset analysis and have developed preliminary language modelling methods for clustering news into distinct 'events' (clustered based on content similarity, entities mentioned, temporal proximity...)

3rd year research project | King's College London | January 2022 – June 2022

- Supervisor: Dr Patrick Mesquida
- As part of a module titled Third Year Project, I aimed to classify proteins to their corresponding protein families using a language model based on BERT, called ProtBERT, trained on sequences of amino acids and later fine-tuned on a labelled dataset of proteins.
- Presented this work at an undergraduate student conference at King's College London in April 2022

Professional Experience

AI Researcher at Max Planck Institute for Intelligent Systems| 2025 - Present

- Supervisor: Dr Antonio Orvieto
- Investigating the interplay between optimizer and architecture in Deep Learning and new networks for long-range reasoning

ML and AI Advisor | Alpdev | October 2025 – Present

- Advising team on software development for full-stack projects, advanced analytics, AI, and ML.

OBED.ai | 2023

- Funded the company
- An NLP-based 'active' agent aimed at fully automating call centres, starting with language translation, invoking specific CRM and finally providing natural language audio response.

Voltaire | 2019

- Funded the company
- An educational platform for Slovenian secondary school students serving as a preparation for the final secondary school examination Matura (equivalent level to IB/A levels) and to a lesser extent higher education students.
- Developed an MVP and reached initial talks with investors.
- The project was set aside to focus on my Physics studies at KCL.

Publications

- Awarded patent (2022) for weight-adjusted running bibs - a pendulum-inspired weight distribution increasing running speed for athletic contests
- Patent application (2021) for traffic light system - a city-wide graph neural network, online learning-based algorithm optimising traffic flow and decreasing fuel emissions
- Patent application (2021) for satellite power transmission system - a ground-based electricity production, earth-satellite transmission, satellite-earth transmission concept, opening the door to the electrification of transport and remote power production vastly cutting emissions.

Notable Awards

Ad Futura Scholarship for Study Abroad | 2022

- Awarded to exceptional international students by the Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia

Rotary Club Ljubljana Scholarship | 2022

- Awarded to gifted international students
- Two scholarships awarded annually, one for most outstanding natural science students and one for art students

Ljubljana Scholarship for International Undergraduate Students | 2021

- Awarded for notable achievements in the fields of science, culture, and sport

Extracurricular Experience

Princeton Physics of Life Summer School | June 2020 – August 2020

- intensive seminar-based programme for UG Physics students covering topics on Neuroscience, Machine Learning, single-molecule biophysics, collective intelligence and chaotic systems

Lions Club Ljubljana | 2018 - 2019

- Volunteer in the youth section of Lions Club Ljubljana, organising events and raising funds for humanitarian aid

Additional Information

Language skills: **Slovenian:** Native **English:** Fluent **German:** Basic

Coding: Python (mainly PyTorch and Numpy), R, LaTeX

Soft skills: Coursework assignments and projects made me comfortable with communicating to diverse audiences and presenting work in oral or written format. Working at IJS taught me how to efficiently work and communicate in a team. Start-up ventures forced me to become extremely self-disciplined and self-initiative.

Personal interests: Walking in nature, skiing, sailing, hiking, jazz, opera, history, philosophy, politics.