Otniel-Bogdan Mercea

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EDUCATION

Max Planck Institute for Intelligent Systems (MPI-IS) and University of Tübingen — Tübingen, Germany
*PhD in Computer Science (**Thesis under review.**)* — *May 2021 - Aug. 2024*

- **PhD program**: International Max Planck research school for Intelligent Systems (IMPRS-IS).
- **Supervisors**: Prof. Zeynep Akata and Prof. Andreas Geiger.
- **Examination committee**: Prof. Zeynep Akata, Prof. Andreas Geiger, Prof. Justus Thies, Prof. Hilde Kuehne
- **PhD Topics**: multi-modal and zero/few-shot learning, and efficient adaptation of large-scale models.
- **Activities**: Maintain the EML website, supervise MSc theses, teach, organize reading groups, and interview ELLIS candidates.

The University of Edinburgh — Edinburgh, Scotland
Master of Science in Artificial Intelligence; Distinction (Overall 76%) — *Sept. 2019 - Aug. 2020*

- **Thesis**: "What Neural Networks can not learn?". **Supervisor**: Prof. Amos Storkey. **Grade**: Distinction (77%).

Politehnica University of Timisoara — Timisoara, Romania
Bachelor of Engineering in Computers and Information Technology; Top 3% (Overall 9.70/10) — *Oct. 2015 - June 2019*

- **Thesis**: "HybridAlpha-Reinforcement Learning on Resource-Constrained Systems". **Supervisor**: Prof. Calin-Adrian Popa. **Grade**: 10/10. Thesis also accepted at RAAI 2019 conference.
- **Activities**: Hackathons, Competitive programming contests, Capture the flag (CTF) competitions (Cybersecurity).

EXPERIENCE

Google DeepMind — Zürich, Switzerland
Research Intern — *Sep. 2024 – Dec. 2024*

- Researching video segmentation with a focus on SAM 2, supervised by Stefano Pellegrini, Jasper Uijlings, and Cordelia Schmid.
- Outcome: successfully enhanced SAM 2 with amodal perception, offering benefits for tracking and segmentation tasks.

Helmholtz Munich and Technical University of Munich — Munich, Germany
Guest PhD student — *Jan. 2024/June 2024 – Aug. 2024*

- Conducted research on multi-modal large language models and audio-visual learning under Prof. Zeynep Akata and assisted with teaching a graduate seminar.
- Outcome: a CVPR 2024 workshop paper, a preprint under submission, and a postdoctoral offer.

Google Research — Grenoble, France
Research Intern (4 months) + Student Researcher (4 months) — *July 2023 – Mar. 2024*

- Led research on efficient adaptation of large-scale models under the guidance of Anurag Arnab, Alexey Gritsenko, and Cordelia Schmid.
- Collaborated with Aleksandra Nowak, Utku Evci, Yann Dauphin from Google DeepMind, driving key innovations in model adaptation.
- Outcome: a patent filling, a CVPR 2024 Highlight paper, a preprint, and a return internship offer at Google DeepMind.

Everseen — Timisoara, Romania
Machine Learning Researcher — *Nov. 2020 – Apr. 2021*

- Researched ways of improving tracking systems in real-time multi-camera scenarios.
- Outcome: developed the company's first prototype for real-time multi-camera tracking system, leading to two US patent filings.

Presslabs — Timisoara, Romania
Junior Software Engineer — *July 2018 – Sept. 2018*

- Successfully contributed to the development of the open-source MySQL operator (1039 ☆) for Kubernetes.
- Outcome: implemented new functionalities, fixed bugs, and conducted testing.

3Pillar Global — Timisoara, Romania
Junior Software Engineer — *June 2017- Sept. 2017*

- Successfully refactored and optimized critical components of the software and identified and resolved bugs to improve overall performance. Worked in the Decision Lens team.
- Outcome: a significantly more readable and easier to maintain codebase.

DSPLabs research group at Politehnica Univerity of Timisoara — Timisoara, Romania
Undergraduate Research Assistant — *Feb. 2017 - June 2018*

- Selected to develop an interface for the FENP real-time scheduling algorithm collaborating with Cristina and Valentin Stangaciu.
- Outcome: assessed Litmus-RT's suitability for our project, with my work featured in a tutorial on the Litmus-RT page.

PATENTS

- **US 20230200569-A1**: "System and method for adjusting a position of an order taking device". Ana Cristina Todoran, **O.-B. Mercea**, Razvan-Dorel Cioarga.
- **US 20230206466-A1**: "System and method for tracking and identifying moving objects". Ana Cristina Todoran, **O.-B. Mercea**.

PUBLICATIONS

- **Preprint 2024 (Under review)**: "Towards Optimal Adapter Placement for Efficient Transfer Learning". Aleksandra I. Nowak, **O.-B. Mercea**, Anurag Arnab, Jonas Pfeiffer, Yann Dauphin, Utku Evci. ⌨
- **CVPRw 2024 (L3D-IVU)**: "Audio-Visual Generalized Zero-Shot Learning using Pre-Trained Large Multi-Modal Models". David Kurzendörfer*, **O.-B. Mercea***, A. Sophia Koepke, Zeynep Akata. (⦵ 13 ☆)/⌨. This was a MSc thesis co-supervised by me.
- **CVPR 2024 (Highlight - Top 3.60%)**: "Time-, Memory- and Parameter-Efficient Visual Adaptation". **O.-B. Mercea**, Alexey Gritsenko, Cordelia Schmid, Anurag Arnab. ⌨.
- **BMVC 2023 (Oral)**: "Video-adverb retrieval with compositional adverb-action embeddings". Thomas Hummel, **O.-B. Mercea**, A. Sophia Koepke, Zeynep Akata. (⦵ 6 ☆)/⌨.
- **DAGM GCPR 2023**: "Text-to-feature diffusion for audio-visual few-shot learning". **O.-B. Mercea**, Thomas Hummel, A. Sophia Koepke, Zeynep Akata. (⦵ 8 ☆)/⌨.
- **CoRL 2022**: "Learning an Explainable Planner for Autonomous Driving". Katrin Renz, Kashyap Chitta, **O.-B. Mercea**, A. Sophia Koepke, Zeynep Akata, Andreas Geiger. (⦵ 228 ☆)/⌨.
- **ECCV 2022**: "Temporal and cross-modal attention for audio-visual zero-shot learning". **O.-B. Mercea***, Thomas Hummel*, A. Sophia Koepke, Zeynep Akata. (⦵ 24 ☆)/⌨.
- **CVPR 2022**: "Audio-visual Generalised Zero-shot Learning with Cross-modal Attention and Language". **O.-B. Mercea**, Lukas Riesch, A. Sophia Koepke, Zeynep Akata. (⦵ 35 ☆)/⌨.

TECHNOLOGIES USED

- **Fluent in:** Python.
- **Competent in:** Java, C/C++, Shell Scripting, Linux, Android.
- **Some experience in:** Go, Assembly, C#, Kubernetes, TypeScript, JavaScript, HTML, CSS.
- **Libraries used:** React, Redux, NumPy, Pandas, Matplotlib, JAX, PyTorch, TensorFlow, Keras.

TALKS

- **Video & Image Sense Lab,** The University of Amsterdam, May 2022. "Audio-visual Generalised Zero-shot Learning with Cross-modal Attention and Language".
- **IMPRS-IS symposium,** Tübingen Feb. 2021. "From explainability and interpretability to 3D computer vision and efficient learning: increasing the performance of autonomous agents" *(acceptance rate 14%)*.

SELECTED ACHIEVEMENTS AND AWARDS

- **1st Prize** in the Kaggle competition "EEML 2019 - Electricity prediction".
- **Best Smart Mobility Project** awarded at UniHack 2019.
- **Honour Student** awarded in 2018 by the Romanian Academy, Timisoara City Council, and Association "Orizonturi Universitare" for outstanding achievements. Only one student from the faculty (BSc and MSc) receives this distinction annually.
- **Grand Prize** awarded at HackTM Sibiu 2018 edition. HackTm is the biggest software and hardware hackathon in South Eastern Europe.
- **Second place** awarded at the national competition "Java competition for universities 2018" organized by Oracle Academy.
- **Honors Diploma** awarded in 2015 by Sebis Town Hall for exceptional achievements in Informatics/Mathematics competitions and for enhancing the prestige of the high school and town.
- **International Contest of Mathematics and Informatics Caius Iacob.**
  - **Competitive programming section** : **Second place** in 2014 and **Mention** in 2015.
  - **Mathematics section** : **Second Place** in 2015.
- **Informatics Olympiad county phase**: **Mention** in 2014 and **Second place** in 2015.

SELECTED SCHOLARSHIPS

- **OxML Scholarship** offered for Oxford Machine Learning Summer School 2024 (all tracks). Declined due to inability to attend all tracks.
- **Google RS Conference Scholarship** awarded to cover all my conference-related travel expenses for CVPR 2024.
- **IMPRS-IS Scholarship** awarded in 2021 as one of the top 57 successful candidates out of 968 applications *(5.8% acceptance rate)* for a fully-funded PhD program at the International Max Planck Research School for Intelligent Systems.
- **Performance Scholarships** awarded every term during my undergraduate for excellent academic performance.
- **Special Scholarship** awarded in 2018, recognizing exceptional results in national contests.

SUPERVISION

- **MSc thesis**: "Adapting to Misunderstandings of Communicating MLLMs on the Fly". **Student**: Yavuz Durmazkeser.
- **MSc thesis**: "Audio-Visual Generalized Zero-Shot Learning using Large Pre-Trained Models". **Student**: David Kurzendörfer. Accepted at CVPRw 2024 (L3D-IVU).

Teaching

- **Teaching Assistant** for the seminar "Advanced Topics in Vision-Language Models" (MSc level) at Technical University of Munich in 2024.
- **Teaching Assistant** for the course "Introduction to Machine Learning (INF 3151)" (BSc level) at University of Tübingen in 2023.

Reviewing

- CVPR 2022-2024, ECCV 2022-2024, ICCV 2023, NeurIPS 2023, TPAMI 2023, ICLR 2024, Best Romanian AI Thesis Awards 2024.

Highly selective Courses and Summer Schools

- **Oxford Machine Learning Summer School (OxML)**: Selected in 2024 to attend MLx Fundamentals and MLx Representation Learning & Gen. AI, organized by Oxford University's Deep Medicine Program, CIFAR, and AI for Global Goals.
- **Eastern European Machine Learning Summer School (EEML)**: Selected as one of only 12 undergraduate students to attend EEML 2019, mainly organized by Google DeepMind, with a competitive *admission rate of just 21%*.
- **Bitdefender**: Attend a highly competitive Cybersecurity course with an *acceptance rate of 10%*. Learned to debug desktop/mobile applications and malware using Assembly. Received an employment offer (I declined it).
- **Microsoft**: Successfully completed a highly selective software development course with an *acceptance rate of 6.6%*. Learned to develop applications in C# using Bing Maps.