Otniel-Bogdan Mercea

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Education

- **Max Planck Institute for Intelligent Systems and University of Tübingen** — Tübingen, Germany
  *PhD in Computer Science (**Thesis to be defended.**)* — *May 2021 - Aug. 2024*
  - **Supervisors**: Prof. Zeynep Akata and Prof. Andreas Geiger. **PhD program**: IMPRS-IS.
  - **Examination committee**: Prof. Zeynep Akata, Prof. Andreas Geiger, Prof. Justus Thies, Prof. Hilde Kuehne.
  - **PhD Topics**: multi-modal learning, zero/few-shot learning, and efficient adaptation of large-scale models.
  - **Activities**: EML website admin, supervise MSc theses, teach, organize reading groups, and interview ELLIS candidates.
- **The University of Edinburgh** — Edinburgh, Scotland
  MSc in Artificial Intelligence; Distinction (Overall 76%) — *Sept. 2019 - Aug. 2020*
  - **Thesis**: "What Neural Networks can not learn?". **Supervisor**: Prof. Amos Storkey. **Mark**: Distinction (77%).
- **Politehnica University of Timisoara** — Timisoara, Romania
  BEng 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. **Mark**: 10/10.
  - **Activities**: Hackathons, Competitive programming contests, Capture the flag competitions (Cybersecurity).
  - **Undergraduate Research Assistant at DSPLabs**: developed an interface for the FENP real-time scheduling algorithm (supervised by Cristina and Valentin Stangaciu), part of my work being featured in a tutorial on the Litmus-RT page. Feb. 2017 - June 2018.

Relevant 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./June 2024 – Aug. 2024*
  - Researched multimodal large-language models and audio-visual learning under Prof. Zeynep Akata and assisted in teaching a MSc 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, supervised by Anurag Arnab, Alexey Gritsenko, and Cordelia Schmid.
  - Collaborated with Aleksandra Nowak, Utku Evci and Yann Dauphin on optimal adapter placement for transfer learning.
  - 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*
  - Contributed to the development of the open-source MySQL operator (1046 ☆) for Kubernetes.
  - Outcome: successfully implemented new functionalities, fixed bugs, and conducted testing.
- **3Pillar Global** — Timisoara, Romania
  Junior Software Engineer — *June 2017- Sept. 2017*
  - Refactored and optimized critical components of the software and identified and resolved bugs to improve overall performance.
  - Outcome: a significantly more readable and easier to maintain codebase.

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

- **Arxiv 2024**: "Towards Optimal Adapter Placement for Efficient Transfer Learning". Aleksandra I. Nowak, **O.-B. Mercea**, Anurag Arnab, Jonas Pfeiffer, Yann Dauphin, Utku Evci.
- **CVPR-W 2024**: "Audio-Visual Generalized Zero-Shot Learning using Pre-Trained Large Multi-Modal Models". David Kurzendörfer*, **O.-B. Mercea***, A. Sophia Koepke, Zeynep Akata. (14 ☆)/.

- **HIGHLIGHT @ CVPR 2024 (Top 3.60%)**: "Time-, Memory- and Parameter-Efficient Visual Adaptation". **O.-B. Mercea**, Alexey Gritsenko, Cordelia Schmid, Anurag Arnab. 🖼.
- **ORAL @ BMVC 2023**: "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. (251☆)/🖼.
- **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. (36 ☆)/🖼.

Technologies used

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

Talks

- **Perception spotlight presentations,** Google Research, Mar. 2024. "Time-, Memory- and Parameter-Efficient Visual Adaptation".
- **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 to the top 5.8% candidates (57 out of 968) for a fully-funded PhD program at IMPRS-IS.
- **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.

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

- **OxML**: Selected to attend OxML 2024, organized by Oxford University's Deep Medicine Program, CIFAR, and AI for Global Goals.
- **EEML**: One of only 12 undergraduate students to attend EEML 2019, mainly organized by Google DeepMind (*21% acceptance rate*).
- **Bitdefender**: Learned to debug applications/malware in Assembly in a competitive course (*10% acceptance rate*). Received a job offer.
- **Microsoft**: Learned to develop applications in C# using Bing Maps in a highly selective course (*6.6% acceptance rate)*.