

# Mohamed Abdelfattah

Lausanne, Switzerland

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## Education

### École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

#### Ph.D. in Computer Vision

Aug 2026 (Expected)

- Supervised by [Alexandre Alahi](#) at VITA Lab
- Building SOTA **transformer**-based frameworks in *self-supervised learning*, *representation learning*, and *action understanding*
- First-author of top-tier conference publications at **CVPR** and **ECCV**; co-author at **EMNLP**.

### The American University in Cairo (AUC)

Cairo, Egypt

#### B.S. in Computer Engineering

Jun 2022

- Graduated with Highest Honors (Rank: 5/80, GPA: 3.91/4.0), recognized on the Dean's List of Honors
- Double Minor in Mathematics and Business Administration
- Thesis Title:** Fine-Grained Text-to-Image Generation using Generative Adversarial Networks (GANs).
- IELTS 8.5/9.0, GRE: Math 170/170, Verbal 161/170, Writing 5.5/6.

## Publications

### S-JEPA: A Joint Embedding Predictive Architecture for Self-Supervised Skeletal Action Recognition

[Mohamed Abdelfattah](#), [Alexandre Alahi](#)

*European Conference on Computer Vision **ECCV**, 2024*

### MaskCLR: Attention-Guided Contrastive Learning for Robust Action Representation Learning

[Mohamed Abdelfattah](#), [Mariam Hassan](#), [Alexandre Alahi](#)

*Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition **CVPR**, 2024*

### Toward contactless human thermal monitoring: A framework for Machine Learning-based human thermo-physiology modeling augmented with computer vision

[Mohamad Rida](#), [Mohamed Abdelfattah](#), [Alexandre Alahi](#), [Dolaana Khovalyg](#)

*Building and Environment 110850. Elsevier, 2023*

### Zerowaste dataset: Towards deformable object segmentation in cluttered scenes

[Dina Bashkirova](#), [Mohamed Abdelfattah](#), [Ziliang Zhu](#), [James Akl](#), [Fadi Alladkani](#), [Ping Hu](#), [Vitaly Ablavsky](#), [Berk Calli](#), [Sarah Adel Bargal](#), [Kate Saenko](#)

*Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition **CVPR**, 2022*

### ArtELingo: A Million Emotion Annotations of WikiArt with Emphasis on Diversity over Language and Culture

[Youssef Mohamed](#), [Mohamed Abdelfattah](#), [Shyma Alhuwaider](#), [Feifan Li](#), [Xiangliang Zhang](#), [Kenneth Church](#), [Mohamed Elhoseiny](#)

*Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing **EMNLP**, 2022*

## Research Experience

### SpreeAI

Nevada, USA

#### Computer Vision Research Scientist

Jul 2022 – Feb 2023

- Developed a **conditional diffusion model** that enhanced high-quality user face reconstruction, resulting in a **20% improvement** in performance compared to previous methods.
- Innovated a U-Net architecture for **head swapping** that effectively preserved **pose, skin tone, and illumination**, improving realism in AI-powered photorealistic try-on.

### King Abdullah University of Science and Technology (KAUST)

Thuwal, Saudi Arabia

#### Deep Learning Intern (Prof. Mohamed Elhoseiny, Vision-CAIR Group)

Mar 2022 – Jan 2023

- Led the collection of the first and largest **vision-language dataset** with affective captions and explanations in four languages.
- Co-developed training techniques and recipes for leveraging diversity of language and culture towards superior performance in image captioning and emotion prediction tasks. Co-authored and published a high-impact [paper](#) at **EMNLP 2022**

### Boston University

Boston, USA

#### Visiting Research Student (Prof. Sarah Bargal, IVC Group)

Jun 2021 – Dec 2021

- Designed and implemented **data augmentation pipelines** tailored to preserve object characteristics and dataset diversity.
- Delivered insights into the challenges of balancing datasets and optimizing segmentation performance in deformable industrial waste objects.
- Co-authored and published a pioneering [paper](#) at **CVPR 2022**.

### SWVL

Cairo, Egypt

#### Data Engineering Intern

Sep 2020 – Jan 2021

- Utilized Amazon Web Services (AWS) to store, analyze, and model data of **5.2 million** customers.
- Engineered an innovative data visualization tool utilizing Apache Spark, Kepler, and Mapbox, enhancing team collaboration and insights.

## Featured Projects

### MaskCLR: Robust Transformers for Action Recognition

Lausanne, Switzerland

CVPR 2024

EPFL

- Proposed a novel **masking strategy** that selectively drops the most important joints in the human skeleton sequence, helping transformers learn from previously-unexplored, information-rich joints for skeleton-based action classification.
- Developed a multi-level **contrastive learning** framework to enforce the representations of standard and occluded skeletons to be class-discriminative, forming better decision boundaries and boosting the overall model accuracy and robustness.
- Achieved SOTA results on NTU60, NTU120, and Kinetics400 datasets, outperforming prior models on perturbed and incomplete skeletons.

### S-JEPA: A New Pretext Task for Self-Supervised Action Recognition

Lausanne, Switzerland

ECCV 2024

EPFL

- Proposed a new **pretext task** based on predicting the latent representations of missing joints, focusing on high-level contextual information.
- Introduced a centering operation to stabilize training and enhance the quality of learned representations.
- Outperformed SOTA methods on NTU60, NTU120, and PKU-MMD datasets using a vanilla transformer architecture.

### ArtELingo: Multi-Modal Understanding Through Language Diversity

Thuwal, Saudi Arabia

EMNLP 2022

KAUST

- Spearheaded the collection of an extensive **1.5 million dataset** (ArtELingo), comprising **84,000 artworks** with affective human captions in English, Arabic, Chinese, and Spanish, supporting cultural and linguistic diversity in AI.
- Co-developed novel algorithms for **multi-modal understanding**, boosting performance on image captioning and emotion prediction tasks by leveraging cross-language and cross-culture diversity.

### ZeroWaste: Detection and Segmentation of Challenging Objects

Boston, USA

CVPR 2022

Boston University

- Developed an augmented version of an industrial waste deletion dataset - ZeroWasteAug - to address **class imbalance** by augmenting cropped objects from underrepresented classes, resulting in a class-balanced dataset.
- Conducted extensive experiments on **weakly supervised semantic segmentation** of highly deformable objects using state-of-the-art (SOTA) models (e.g., PuzzleCAM, Mask R-CNN) to establish robust baselines for future research.
- Evaluated model performance and validated the generalization capability of segmentation approaches across deformable object categories.

## Skills

<b>Coding</b>	Python, PyTorch, TensorFlow, CUDA, Git, Docker, OpenCV, NumPy, SciPy, Scikit-learn
<b>Deep Learning</b>	Self-Supervised Learning, Representation Learning, Transfer Learning, Graph Neural Networks
<b>Computer Vision</b>	Semantic Segmentation, Object Detection, Feature Extraction, 3D Human Pose Estimation
<b>Languages</b>	English (Fluent), Arabic (Native)

## Achievements

2022	<b>PA Cup</b> , for top academic and extracurricular achievements in the class of 2022	AUC
2022	<b>High Academic Achievement Award</b> , for graduating among the top 5 students in the class of 2022	AUC
2021	<b>Research Grant</b> , awarded 4,000 USD for impactful research contributions in computer vision	AUC
2019	<b>Best Design Award</b> , for designing the most efficient mine-detection rover at a national robotics competition	Minesweepers
2019	<b>ROV Excellence Award</b> , for ranking in the top 10 teams in the middle east in the MATE ROV Competition	MATE ROV
2018	<b>First Place</b> , for solving the most competitive programming problems in the CSCE Programming Contest.	AUC
2018	<b>Highest Achiever and Reader of the Year</b> , for authoring the rhetorically strongest essays in 2018.	AUC
2017	<b>AGFE Full Scholarship</b> , awarded a 160,000 USD scholarship for outstanding potential in STEM fields	AUC

## Teaching Experience

### École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

#### Lead Teaching Assistant, Deep Learning for Autonomous Vehicles

Feb 2023 – Present

- Champion an ambitious project enabling **+150 EPFL master's students** to collaboratively design and implement a **Tesla Autopilot** prototype from the ground up.
- Lead a team of Ph.D. TAs** in transforming course structure, mentoring high-achieving student teams in a competitive landscape.
- Facilitate engaging weekly **coding workshops** focused on deepening students' understanding of **PyTorch**.
- Oversee course deliverables and timelines, tracking student progress through challenging **Kaggle** competitions.

### The American University in Cairo (AUC)

Cairo, Egypt

#### Deep Learning Teaching Assistant

Sep 2020 – Dec 2021

- Mentored and guided students in designing and implementing the foundational building blocks of **deep neural networks** using numpy, fostering hands-on skills essential for future researchers.
- Helped students gain the intuition behind complex machine and deep learning concepts.