AHMED YOUSSEF

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EXPERIENCE

Graduate Research Assistant, **University of Cincinnati** | Cincinnati, OH, USA   **Jan 2020 – Present**
- Pioneered ML-based particle collision simulations using Generative Models (VAE, Normalizing Flows), and Bayesian NN contributing to event generators adopted by 10k+ particle physics researcher worldwide
- Devised a novel text style transfer method utilizing LLMs such as OPT and GPT-3 for unsupervised inference, enabling more nuanced and context-aware textual transformations resulting in publication
- Crafted LLM-based solutions for efficient summarization and sentiment analysis
- Innovated a pivotal test statistic, enhancing data analysis and interpretation for collider experiments at LHC-CERN, impacting over 100k datasets and billions of events

Lab2Market Fellow, UC Center for Entrepreneurship | Cincinnati, OH, USA   **Jan 2023 – Present**
- Led market research and cross-functional team collaboration, accelerating product development and securing $7,500 in funding
- Formulated business strategies to tackle AI problems in industry settings
- Developed a cutting-edge identification system to increase quality control in manufactures and product optimization using computer vision

Independent AI Researcher   **Jul 2022 – Present**
- Collaborated on AI projects at EEML, hosted by Google DeepMind, that developed a compact model for creative output, achieving major results with small size models and fast inference
- Designed a GAN-based art generator using CLIP model and text prompts, resulting in a publication at the NeurIPS ML for Creativity and Design workshop

EDUCATION

University of Cincinnati   **Expected Grad : Aug 2024**
Ph.D. Candidate in Particle Physics (Focus in Machine Learning)

Ruhr University of Bochum   **Grad: Sep 2019**
Bachelor of Science in Physics

SELECTED PUBLICATIONS

NOTE: Authors in papers marked with (*) are listed alphabetically, as per field convention.

- ***"Towards data driven models of hadronization",* ML4PS workshop, **NeurIPS 2023**
- *"Hacking Generative Models with Differentiable Network Bending",* ML for Creativity and Design workshop, **NeurIPS 2023**
- *"Few-Shot Abstractive Summarization for Text Style Transfer",* **ICNLP 2023**
- *"Normalizing Flows for Fragmentation and Hadronization",* ML4PS workshop, **NeurIPS 2022**
- ***"Towards a data-driven model of hadronization using normalizing flows",* **ArXiv preprint 2311.09296,** *2023*
- ***"Earth Mover's Distance as a measure for CP-violation",* **Journal of High Energy Physics (JHEP), 10.1007/JHEP06(2023)098.***
- ***"Modeling Hadronization using Machine Learning",* **SciPost Phys. 14, 027 (2023).***
- ***"Electroweak Corrections to the Charm-Top-Quark Contribution to ε",* **Journal of High Energy Physics (JHEP), 10.1007/JHEP12(2022)014.***
- ***"Reweighting Monte Carlo Predictions and Automated Fragmentation Variations in Pythia 8",* submitted to **SciPost Physics, ArXiv preprint:2308.13459,** *2023***

SELECTED TALKS AND PRESENTATIONS

Conferences, Workshops

NeurIPS, Machine Learning for Creativity and Design Workshop , New Orleans, LA, USA   **Dec 2023**
- Title: *Hacking Generative Models with Differentiable Network bending*

NeurIPS, Machine Learning and the Physical Science Workshop , New Orleans, LA, USA   **Dec 2023**
- Title: Towards data-driven models of *Hadronization*

12ᵗʰ international Conference on the CKM Unitarity Triangle, Santiago de Compostela, Spain   **Sept 2023**
- Title: *Earth Mover's Distance as a measure for CP-violation*

International Conference in Natural Language Processing (ICNLP) 2023, Guangzhou, China   **Mar 2023**
- Title: *Few-Shot Abstractive Summarization for Text Style Transfer*

NeurIPS, Machine Learning and the Physical Science Workshop , New Orleans, LA, USA   **Dec 2022**
- Ttile: *Normalizing Flows for Fragmentation and Hadronization*

Invited Seminars

HEP seminar, TU Dortmund, Dortmund, Germany   **Aug 2023**
- Title: *Earth Mover's Distance as a measure for CP-violation*

Josef Stefan Institute (JSI)-FMF high-energy physics seminar, JSI, Ljubljana, Slovenia   **Aug 2023**
- Title: *MLHAD: A Machine Learning based Simulation for Hadronization*

Guest Lecturer in Particle Pheno, Univeristy Heidelberg, Heidelberg, Germany   **Jul 2023**
- Title: *MLHAD: A Machine Learning based Simulation for Hadronization*

Poster presentations

Mediterranean Machine Learning (M2L) Summer school, Thessaloniki, Greece   **Aug 2023**
- Title: *ML for Physics: Simulating Particle Collision*

IAIFI Workshop, Tufts University, Boston, MA, USA   **Aug 2022**
- Title: *Machine Learning for Hadronization*

SELECTED PROFESSIONAL DEVELOPMENT

- **M2L summer school organized by Google DeepMind**   **Aug/Sept 2023**
- **IAIFI summer school**   **Aug 2022**
- **EEML summer school organized by Google DeepMind**   **Jul 2022**
- **Generative Adversarial Networks Specialization by Deeplearning.AI**   **Feb – Apr 2021**
- **Deep Learning Specialization by DeepLearning.AI**   **Dec 2020 – Feb 2021**

COMMUNITY ENGAGEMENT

- **Student volunteer at NeurIPS 2022**   **Dec 2022**
- **Co-organized the PIKIMO 13 Conference**   **Nov 2022**
- **Organized and participated in IEEE events**   **2020 – now**

SKILLS

Programming & ML: Python, PyTorch, TensorFlow, SQL, C++
Data Engineering & Cloud: AWS, Docker, distributed training
Tools & Analysis: LaTeX, Git, Linux, Jupyter
Languages: English (Fluent), German (Native), Arabic (Native)

SELECTED HONORS AND AWARDS

Lab2Market Fellowship (2023)**, GSG Research Fellowship** (2023), **Graduate Research Award** (2020-2023)**, Variety of scholarships** (2021-2023)**, Promos Scholarship** (2018)**, German Scholarship** (2018)