

# Elior Benarous

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## EDUCATION

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### Harvard University

Cambridge | Apr 2024 – May 2025

*Graduate Research Fellow in Diffusion Models*

Computational Robotics Lab ([Prof. Heng Yang](#) & [Prof. Yilun Du](#))

### ETH Zürich (ETH)

Zürich | 2022 – 2024

*MSc Artificial Intelligence & Robotics*

Data Analytics Lab ([Prof. Thomas Hofmann](#))

- Relevant subjects: Deep Learning, Computer Vision, Probabilistic Artificial Intelligence

### University College London (UCL)

London | 2019 – 2022

*BEng Mechanical Engineering*

*First Class Honours, **Ranked 4<sup>th</sup>** in cohort*

- Relevant subjects: Machine Learning & Neural Computing, Mathematics, Robotics, Control Systems

## PUBLICATIONS

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*\* indicates equal contribution*

1. Image-Editing Specialists: A Multi-Objective Approach for Diffusion Models  
**E. Benarous**, Y. Du, H. Yang  
*Harvard University, 2024* [[Paper](#)]
2. Harnessing Synthetic Datasets: The Role of Shape Bias in Deep Neural Network Generalization  
**E. Benarous**, S. Anagnostidis, L. Biggio, T. Hofmann  
*Advances in Neural Information Processing Systems Workshop (NeurIPS), 2023* [[Paper](#)]
3. Multi-Modal Semantic & Geometric Perception for Off-road Navigation  
**E. Benarous**, D. Atha, M. Hutter  
*NASA Jet Propulsion Laboratory, 2023* [Talk + Internal research paper pending publication approval]
4. Enforcing Style Invariance in Patch Localization  
**E. Benarous\***, D. Brunner\*, J. Manz\*, F. Yang\*, T. Hofmann  
*ETH Zürich Data Analytics Lab, 2022* [[Paper](#)]

## RESEARCH EXPERIENCE

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### NASA Jet Propulsion Laboratory

Pasadena | Sep 2023 – Mar 2024

*Artificial Intelligence Research Intern*

- Conducted semantic perception research for the DARPA RACER project, aiming to improve high-speed autonomous driving in complex off-road environments for future Mars & Moon Rover Exploration missions
- Investigated multi-modal outlier detection to improve safe and robust navigation in unfamiliar environments
- Refined traversability forecasting in high-risk regions with sparse sensory information through joint reasoning about terrain's geometric and semantic attributes

**WasteFlow**

**Lausanne | May 2023 – Mar 2024**

*CTO & Co-Founder*

- Founded an AI-driven waste identification startup to improve recycling. Advised by [Prof. Mathieu Salzmann](#)
- Collaborated with the EPFL Computer Vision Lab to manage student research projects and align academic & industry goals
- Directed technical projects and supervised a team of 12 students & engineers to build a detection system using RGB-D data
- Designed a semi-automatic data labelling pipeline using Segment-Anything-Model, achieving a reduction in annotation time of 6x

**Greyparrot.AI (Series B Tech Startup)**

**London | July 2022 – Aug 2022**

*Computer Vision Research Intern*

- Developed a high-precision & high-robustness object speed tracking algorithm (error margin:  $\pm 0.01\%$  of images' resolution). Software now deployed in 50+ recycling facilities to enhance recycling rates and used as benchmark for future research
- Refined post-processing deduplication for YOLOv5's material detections by implementing classical feature detection, matching, and optical flow techniques. Released this feature in major facilities, including Veolia and Suez
- Evaluated internal ML infrastructure against Google Vertex AI AutoML and presented improvement suggestions to Google

**UCL Bachelor Thesis**

**London | Oct 2021 – May 2022**

*Lead Research Student*

- Built a multi-viewpoint and multi-modal computer vision framework to detect objects flowing on a conveyor and developed the dynamic pick-and-place control of a robotic arm to sort them. Awarded Highest Honours
- Integrated RGB and hyperspectral cameras for precise acquisition of shape, position and material properties

**UCL Football Match Forecasting Study**

**London | Oct 2021 – Jan 2022**

*Project Lead*

- Led a cross-functional team to create an ML model for predicting Premier League football match outcomes
- Crafted an end-to-end ML pipeline spanning data acquisition and curation, feature engineering, and model architecture optimization. Attained >60% accuracy and received Highest Honours for the technical report

**AWARDS**

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Winner of MIT x AI21Labs Hackathon on agentic LLMs	2024
ETH SEMP Scholar – \$7,000	2023 – 2024
Swiss National Science Foundation BRIDGE – \$150,000	2023 – 2024
Venture Kick Research Fund – \$170,000	2023 – 2024
EPFL Blaze & Ignition Grants – \$45,000	2023
UK Research & Innovation Fellowship Beneficiary	2021 – 2022

**SKILLS & INTERESTS**

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**Languages:** French & English (Native), German (B2), Chinese (HSK4)

**Software skills:** Python, MATLAB, ROS

**Volunteering activities:** Race Against Hunger, Food Bank, UCL Mentorship Program Manager

**Interests:** Travelling, Environmental & Biomedical technologies, Tennis