

# Elisabetta Fedele

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## Education

- Sep. 2021 – present **Master in Computer Science, ETH Zürich**
- Major in **Machine Intelligence** and Minor in **Theoretical Computer Science**.
  - **Courses:** Algorithmic Game Theory, Algorithms Lab, Randomized Algorithms and Probabilistic Methods, Graph Theory, Computational Intelligence Lab, Generative Visual Models, Advanced Machine Learning, Machine Perception, Computer Graphics, Computer Vision, NLP.
- Sep. 2018 – Jun. 2021 **Bachelor in Computer Systems Engineering, Politecnico di Milano**
- Final grade: 110/110 *cum laude*.
  - **Selected courses:** Probability and Statistics, Mathematical Analysis I and II, Linear Algebra, Algorithms and Principles of Theoretical Computer Science, Software Engineering.

## Research Experience

- Nov. 2023 – May. 2024 **Master Thesis, ETH**
- Advised by Prof. Marc Pollefeys and Dr. Francis Engelmann.
  - Working on generative models for 3D scenes.
- Jul. 2023 – Sep. 2023 **Research Intern, EPFL**
- Advised by Prof. Alessandro Chiesa and part of Compsec Lab.
  - I worked on asymptotically improving the time-space complexity of the sumcheck algorithm.
  - We found a new family of algorithms that, by interpolating between the best time-efficient and the best space-efficient algorithms, greatly improves the asymptotic and practical performance of the protocol.
  - Our findings is now being integrated into the Arkworks library.
- Mar. 2023 – Jun. 2023 **Semester Project Student, Google Zürich**
- Co-advised by Dr. Francis Engelmann, Dr. Federico Tombari, and Prof. Marc Pollefeys.
  - We leveraged the capabilities of CLIP to expand the task of 3D instance segmentation to an Open-Vocabulary setting.
  - Resulted in a publication at **NeurIPS 2023**.

## Publications and Preprints

- 🔗 Ayca Takmaz\*, **Elisabetta Fedele\***, Robert W. Sumner, Marc Pollefeys, Federico Tombari, Francis Engelmann. OpenMask3D: Open-Vocabulary 3D Instance Segmentation. *Advances in Neural Information Processing Systems (NeurIPS) 2023*. Also presented in Google Zürich, Google booth at ICCV 2023, AI+X Summit Zürich.
- 🔗 Dimitri Von Rütte\*, **Elisabetta Fedele\***, Jonathan Thomm\*, Lukas Wolf\*. FABRIC: Personalizing Diffusion Models with Iterative Feedback. *Under review*.

## Teaching Experience

- Feb. 2023 – Aug. 2023 **Machine Perception, ETH Zürich**
- Authored lecture notes for the course.
- Sep. 2020 – Jan. 2021 **Fundamentals of Computer Science, Politecnico di Milano**
- Tutored an undergraduate class of 250 students during the coding laboratory.

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\* authors contributed equally

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## Workshop Organization

Oct. 2023 **OpenSUN3D, ICCV 2023**

I was among the organizers of the 1st Workshop on Open-Vocabulary 3D Scene Understanding, held in conjunction with the *International Conference on Computer Vision (ICCV) 2023* in Paris, France.

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## Academic Projects

Sep. 2022 - **Ray tracing renderer, ETH Zürich**

Dec. 2022 ○ I implemented a ray tracing renderer in C++ for the course of *Computer Graphics*.

May 2022 - **Sentiment Analysis of Tweets, ETH Zürich**

Jul. 2022 ○ Group project for the course of *Computational Intelligence Lab*.

○ We compared performance of BERTweet, LSTM on Word2Vec embeddings and FastText and we finetuned BERTweet to achieve an accuracy of 92.04%.

○ Code available here.

Apr. 2022 - **3D Human Pose and Shape Estimation from RGB Images, ETH Zürich**

Jun. 2022 ○ Group project for the course of *Machine Perception*.

○ We implemented a modified version of PARE in PyTorch, with a HR-NetV32 backbone, achieving an error of 57.5 PA-MPJPE.

○ Report available here.

Sep. 2021 - **Advanced Machine Learning Projects, ETH Zürich**

Jan. 2022 ○ Group projects in the health domain for the course of *Advanced Machine Learning*.

○ Specific topics: *Prediction of a person's age using features extracted from brain image data (MRI), ECG signals classification, Segmentation of the mitral valve in echocardiography videos*.

Mar. 2021 - **Software Engineering class project, Politecnico di Milano**

Jun. 2021 ○ We developed a multithreaded software version of a multiplayer board game.

○ Code available here.

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## Honors & Awards

2023 **NeurIPS 2023 Scholar Award, NeurIPS**

2023 **Summer@EPFL Fellowship, EPFL**

2022-2023 **Scholarship for Sardinian students, Regione Sardegna**

2020-2021 **Merit-Based Scholarship, Politecnico di Milano**

2019 **Scholarship for Sports Merits, Politecnico di Milano**

2019 **Best Freshmen Prize, Politecnico di Milano**

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## Languages and Skills

**Languages:** Italian (native), English (fluent), French (basic), German (basic).

**Computer Skills:** Python, Java, C, C++, MATLAB, Git,  $\LaTeX$ , PyTorch, TensorFlow, Open3D.

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## Extracurricular activities

2022 - present **Sailing Instructor Diploma - Level I, Italian Sailing Federation**

2006–2019 **Professional Optimist and 420 sailor, Cagliari/Mandello del Lario**

○ Member of the **Italian Sailing Team** from 2012 to 2019.

○ Competed in 6 **World Championships** and in 4 **European Championships**.

○ Awarded **Best Italian Female Sailor** by *Tutto Vela* for the year 2014.