

# NICOLA ZOMER

**M.Sc. student in Physics of Data (UniPD)**

Interested in LLMs, artificial life, bio-inspired learning and network science

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Personal Website

in Nicola Zomer

NicolaZomer

## EXPERIENCE

### Research Intern in Network Modeling

**Central European University**

Apr 2023 – Jun 2023

Master's internship under the supervision of Prof. Tiago P. Peixoto and Prof. Manlio de Domenico. We applied complex systems tools to understand and model the behaviour of platforms in the Fediverse, an ensemble of federated servers used for web publishing and file hosting.

## EDUCATION

### M.Sc. in Physics of Data

**University of Padua**

Oct 2021 – Present

GPA: 29.9/30

**Relevant courses:** Neural Networks and Deep Learning, Human Data Analytics, Statistical Mechanics of Complex Systems, Physical Models of Living Systems, Information Theory and Inference.

**Student researcher** @ComuneLab.

### B.Sc. in Aerospace Engineering

**University of Padua**

Oct 2018 – Sept 2021

Certification

**Final Grade:** 110/110 cum laude (GPA: 29.1/30)

**University team:** Alba CubeSat UniPD, Mission Analysis team.

## SELECTED PROJECTS

### Data structure-oriented learning strategies for 3D Objects classification

Implementation of two CNN models and an autoencoder to classify 3D objects, represented as Point Clouds or Voxels.

**Developed with PyTorch**

**Tested on ModelNet40**

### Effective processing pipeline and advanced NN architectures for Small footprint Keyword Spotting

Study of different pre-processing and feature extraction techniques, plus exploration of different NN models, such as ResNets and Conformers. Development of a real-time KS demo.

**Developed with TensorFlow**

**Tested on Google Speech Commands**

### Beyond backpropagation: a Bio-inspired Learning Rule

Efficient generalization of a biologically inspired learning rule to CNN. The algorithm satisfies requirements such as locality, competition, sparsity and selectivity, while being optimized and memory efficient.

**Developed with PyTorch**

**Tested on MNIST and CIFAR-10**

## SUMMER SCHOOLS

### Summer University 2023 on Effective High Performance Computing and Data Analytics CSCS and USI

GPU architectures, GPU programming with CUDA, Python HPC libraries (NumPy, CuPy, Numba, Dask). Final exam passed.

### ModML Summer School 2023

**Machine Learning Genoa Center (MaLGa)**

Intro to modern topics in ML, including: implicit regularization, sketching, RL, inverse problems, optimal transport, fairness.

### Oxford ML Summer School 2022

**AI for Global Goals**

Machine Learning for Health and for Finance, plus optional module on ML Fundamentals.

### Qiskit Global Summer School 2022

**IBM**

Two-week intensive course by IBM Quantum. Completed all graded lab work assignments with a final score of 100%.

## AWARDS



### Scholarship "Mille e una lode", University of Padua

Scholarship based on GPA for top 3% students of each degree course.  
A.Y. 2018/2019, 2019/2020, 2020/2021



### Mentee at LeadTheFuture (LTF)

Among the few Italian students selected to be mentees for LTF, a leading mentorship non-profit organization for students in STEM, with acceptance rate below 20%.

## LANGUAGES

**Italian:** Native Speaker

**English:** Full professional proficiency, Cambridge Certificate B2 (First)

**Spanish:** Limited working proficiency

## OTHER INTERESTS

In my spare time I enjoy hiking and practicing circus. I am an handbalancer, which basically means I spend hours on my hands looking at the floor! I also occasionally perform!