

# Luca Anzalone

PHD STUDENT IN DATA SCIENCE AND COMPUTATION · UNIVERSITY OF BOLOGNA

Salerno, Italy

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## Experience

### DSC PhD Student

UNIVERSITY OF BOLOGNA - DEPARTMENT OF PHYSICS AND ASTRONOMY

Bologna, Italy

Nov. 2020 - present

- Collaborating with a group based at CERN on Unsupervised Anomaly Detection for new physics search.
- Co-supervised MSc thesis about VAEs for Anomaly Detection on FPGA, resulted in Oral contribution at [ISGC 2023](#).
- Developed and applied neural networks on a real-world high-energy physics analysis; the new method resulted in a journal paper at [MLST](#).
- Presented my work at international conferences, and several collaboration and internal meetings.
- Took courses on computer vision, neuroscience, big data processing, and machine learning.

### Teaching Assistant - Applied Machine Learning "Advanced"

BIOINFORMATICS MASTER'S DEGREE - UNIVERSITY OF BOLOGNA

Bologna, Italy

Apr. 2022 - Jun. 2022

- Gave an introductory lecture on model-free Deep Reinforcement Learning.
- Prepared and conducted hands-on about Variational Auto-Encoders, conditional generation with GANs, and model-free RL.
- Reviewed several ML and DL-based student project works.

### Apple Foundation Program

CO-LEAD PROGRAMMER AND COMMUNICATOR

Salerno, Italy

Jul. 2017 - Aug. 2017

- Four weeks training and teamwork project; learned about iOS, XCode, Swift, Objective-C, and UI/UX.
- Developed an iOS app powered by facial landmark localization to enable face gestures for drawing: aimed at art therapy for quadriplegics.
- First and only team in Salerno to present their project at the [Apple Academy](#) in Naples, in occasion of the visit of Apple CTO, Luca Maestri.

## Education

### Alma Mater Studiorum - University of Bologna

THIRD YEAR DOCTORAL STUDENT IN DATA SCIENCE AND COMPUTATION

Bologna, Italy

Nov. 2020 - present

- Working on Deep Learning for High-Energy Physics, Anomaly Detection, and Reinforcement Learning for hard sciences.
- Supervised by [Prof. Daniele Bonacorsi](#) and [Dr. Sergio Decherchi](#).

### Università degli Studi di Salerno

MASTER'S DEGREE IN COMPUTER SCIENCE (with honors) - DATA SCIENCE CURRICULUM

Salerno, Italy

Sep. 2018 - Sep. 2020

- Thesis: Deep Reinforcement Learning for Autonomous Urban Driving
- Supervised by [Prof. Michele Nappi](#) and [Dr. Silvio Barra](#).

### Università degli Studi di Salerno

BACHELOR DEGREE IN COMPUTER SCIENCE (with honors)

Salerno, Italy

Sep. 2015 - Sep. 2018

- Thesis: Android App for Face Landmark Localization
- Supervised by [Prof. Andrea F. Abate](#) and [Dr. Silvio Barra](#).

## Publications

### PEER-REVIEWED JOURNALS

#### Improving Parametric Neural Networks for High-Energy Physics

Machine Learning: Science and Technology

Luca Anzalone, Tommaso Diotallevi, Daniele Bonacorsi

2022

- An in-depth study of neural networks conditioned on a physics parameter for signal-background classification.  
[\[paper\]](#) [\[code\]](#)

#### An End-to-End Curriculum Learning Approach for Autonomous Driving Scenarios

IEEE Transactions on Intelligent Transportation Systems

Luca Anzalone, Paola Barra, Silvio Barra, Aniello Castiglione, Michele Nappi

2022

- Combined proximal policy optimization with a hand-designed curriculum to train a driving agent on simulated urban scenarios.  
[\[paper\]](#)

## PEER-REVIEWED CONFERENCE PROCEEDINGS

### Reinforce-lib: A Reinforcement Learning Library for Scientific Research

International Symposium on Grids & Clouds

Luca Anzalone, Daniele Bonacorsi

Oral - 2022

[paper] [code]

### Reinforced Curriculum Learning for Autonomous Driving in CARLA

IEEE International Conference on Image Processing

Luca Anzalone, Silvio Barra, Michele Nappi

Oral and Poster - 2021

[paper] [code] [poster]

### Transfer Learning for Facial Attribute Prediction and Clustering

International Conference on Smart City and Informatization

Luca Anzalone, Paola Barra, Silvio Barra, Fabio Narducci, Michele Nappi

2019

[paper] [code]

## Reviewer Activity

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### JOURNALS

2022 **European Physical Journal Plus, EPJP**

2022 **IEEE Transactions on Intelligent Transportation Systems, T-ITS**

## Certificates

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2021 **Fundamentals of Accelerated Computing with CUDA Python, NVIDIA Deep Learning Institute**

## Awards

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2020 **Top Students**, "Premio di Laurea" for Master's Degree

Salerno, Italy

2018 **Top Students**, "Premio di Laurea" for Bachelor Degree

Salerno, Italy

2014 **Top 30 Students**, High School English Language Scholarship (3 weeks)

Brighton, UK

## Projects and Writing

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### GITHUB

#### Reinforce-lib

Python Library

- A RL library intended to be modular and comprehensive, simple to apply but also easy to extend.
- Tools: Python, TensorFlow 2, tensorflow-probability, numpy, OpenAI Gym, TensorBoard.

2021 - ongoing

#### CARLA Environment

Contribution

- A Gym-compatible environment wrapper for the CARLA simulator, implemented in the Tensorforce RL library.
- Tools: Python, OpenAI Gym, CARLA API, Tensorforce.

2020

#### Android Face Landmarks

Android App

- An app capable of localizing facial landmarks, about the eyes, mouth, nose, and the full face as well; uses minified Dlib models.
- Tools: Android SDK, Kotlin, C++, Dlib, OpenCV.

2018

### BLOG POSTS

#### Object-based Reinforcement Learning | Medium

Towards Data Science

- A discussion about whether object-centric representations and graph neural networks could mitigate the main RL weaknesses.

Feb. 2020

#### CelebA Attribute Prediction and Clustering with Keras | Medium

Towards Data Science

- A more accessible exposition of my ISCI paper, about designing, training, and evaluating a facial attribute predictor on CelebA.

Sep. 2019

#### Training Alternative Dlib Shape Predictor Models using Python | Medium

Data-Driven Investor

- A step-by-step tutorial on how to customize, train, and tune shape predictor models for landmark localization.

Oct. 2018

## Skills

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### Programming

Python, Kotlin, Java, Lua

### ML/DL libs

TensorFlow 2, Keras, tensorflow-probability, scikit-learn, numpy, matplotlib, pandas, OpenCV, Dlib

### Miscellaneous

git, pdb, LaTeX, Jupyter, Docker, Unix

### Languages

Italian (native), English (academic)