


ANTONIO LONGA — Ph.D. Student

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My research interests focus on **Machine Learning** and **Networks**, particularly on **Temporal Networks**. I am also interested in human face-to-face interaction. During my PhD, I am studying human behaviour using state-of-the-art **Deep Learning** techniques.

Education

Ph.D. student in Computer Science

Bruno Kessler Foundation (FBK) and University of Trento

Working on state-of-the-art Geometric Deep Learning models, applied to temporal networks.

Nov. 2019 – Now

Trento, Italy

M.S. Computer Science

University of Trento

Dissertation: Graph embedding in 2D

Advisor: Andrea Passerini and Fabrizio Costa, 110/110 *cum laude*

Oct 2017 – Oct. 2019

Trento, Italy

Exchange student

Aalto University

Main Courses: Non Linear Optimization, Numerical Matrix Computation, Computational Methods in Stochastic and Mobile Cloud Computing.

Sep 2018 – Dec. 2019

Helsinki, Finland

B.S Computer Science

University of Milano-Bicocca

Dissertation: Analysis of Smali code for detection of obfuscation in Android applications

Advisor: Alberto Leporati and Claudio Ferretti, 103/110

Sep 2014 – Oct. 2017

Milan, Italy

Experience

Research intern

University of Cambridge

- Explanability on GNN architectures
- Under the supervision of Prof. Pietro Liò

Apr 2022 – Jun 2022

Cambridge, United Kingdom

Machine learning consultant

Pulsetech

- Increase the performance of Graph Neural Networks developed by the company.
- Teach state-of-the-art GNN to the research team.

Sep 2021 – Now

London, United Kingdom, (Remote)

Teaching assistant

University of Trento

- Machine learning
- More than 150 students
- Supervisor: Prof. Andrea Passerini

Sep 2021 – Now

Trento, Italy

Teaching assistant

University of Trento

- Computer Science at the department of Biomolecular Sciences and Technologies
- More than 60 students
- Supervisor: Prof. Andrea Passerini

Sep 2020 – Sep 2021

Trento, Italy

Research intern

University of Exeter

- Developed a deep neural network for graph embedding in a real low dimensional space.
- Achieving up to 99% of accuracy in 2 out of 5 dataset.

Mar 2019 – Sep 2019

Exeter, United Kingdom

Teaching assistant

Aalto University

- Algorithmic Methods of Data Mining at the department of Computer Science
- More than 150 students
- Selected as teaching assistant among more than 100 candidates.
- Supervisor: Prof. Aristides Gionis

Sep 2018 – Dec 2018

Helsinki, Finland

Publications

1. Explaining the Explainers in Graph Neural Networks: a Comparative Study
Under revision to ACM computing survey
Antonio Longa, Steve Azzolin, Gabriele Santin, Giulia Cencetti, Pietro Liò, Bruno Lepri, Andrea Passerini
2. Global Explainability of GNNs via Logic Combination of Learned Concepts
Preprint
Steve Azzolin, Antonio Longa, Pietro Barbiero, Pietro Liò, Andrea Passerini
3. Neighbourhood matching creates realistic surrogate temporal networks
Under revision to Science Advances (2022)
Antonio Longa, Giulia Cencetti, Sune Lehmann, Andrea Passerini and Bruno Lepri
4. An Efficient Procedure for Mining Egocentric Temporal Motifs
ECML PKDD Dami (2022)
Antonio Longa, Giulia Cencetti, Bruno Lepri and Andrea Passerini
5. Generating Synthetic Mobility Networks with Generative Adversarial Networks
Accepted to EPJ Data Science (2022)
Giovanni Mauro, Antonio Longa, Massimiliano Luca, Bruno Lepri and Luca Pappalardo
6. TEP-GNN: Accurate Execution Time Prediction of Functional Tests using Graph Neural Networks
Accepted to Profes (2022)
Hazem Peter Samoaa, Antonio Longa, Mazen Mohamad, Morteza Haghiri Chehreghani, and Philipp Leitner
7. Emotion Analysis using Multi-Layered Networks for Graphical Representation of Tweets
Accepted to IEEEAccess (2022)
Anna Nguyen, Antonio Longa, Massimiliano Luca, Joe Kaul, and Gabriel Lopez
8. Digital proximity tracing on empirical contact networks for pandemic control
Nature Communications (2021)
Giulia Cencetti, Gabriele Santin, Antonio Longa, Emanuele Pigani, Alain Barrat, Ciro Cattuto, Sune Lehmann, Marcel Salathe and Bruno Lepri

Talks

1. Explaining the explainers in GNNs: a comparative study
GAIN WORKSHOP: HOT TOPICS IN GRAPH NEURAL NETWORKS
2. An efficient procedure for mining egocentric temporal motifs
ECML PKDD 2022
3. Neighbourhood matching creates realistic surrogate temporal networks
CAMBRIDGE TALK 2022
4. ETN-Gen: Generating Temporal networks through Egocentric Temporal Neighbours
NETSCIX 2022
5. ETMM: Egocentric temporal motifs miner
COMPLEX NETWORKS 2021
6. Digital Proximity Tracing in the COVID-19 Pandemic on Empirical Contact Networks: Controlling re-emerging outbreaks
CCS2020 COMPLEX SYSTEMS FOR THE MOST VULNERABLE
7. How the ego perspective shapes the temporal motifs in human face to face interactions
NETSCI2020 SESSION 16A: TEMPORAL NETWORKS

Projects

- PyTorch Geometric tutorial** | *Python, PyTorch Geometric* **Feb 2021 - Now**
- Founder of a weekly meeting where I talk about novel GNN papers and I share open source code.
 - Since the project is born we have more than 20 researcher joining our live presentations, and more than 20k of views in 8 months.
- Graph embedding in 2D** | *Python, Keras* **Mar 2019 - Sep 2019**
- Developed a Graph Convolution Neural Network for the embedding of molecules in a smooth low dimension real space.
- University projects** | *Python, Hugin, Matlab, Julia* **Oct 2017 - Oct 2019**
- *Non Linear Optimization.*(Aalto) Implementation of several non linear optimizer.

- *Numerical Matrix Computation.*(Aalto) Optimization of well known algorithms for matrices decomposition.
- *Machine Learning.*(Trento) During the course I did three projects using Bayesian networks, SVM and Neural Network.
- *Simulation and Performance Evaluation.*(Trento) Implementing a simulator for the ALOHA protocol using queue systems.
- *Multimedia Data Security.*(Trento) Develop a state-of-the-art algorithm for image tampering detection, obtaining the 7th place in a challenge against Innsbruck University.

Skills

Programming (proficient): Python, Matlab

Programming (familiar): Julia, R, Node js, Java, Prolog, Ruby, MySQL, MongoDB, Neo4j

Developer Tools: VS Code, Eclipse, Anaconda

Technologies: PyTorch, PyTorch Geometric, Keras, Linux, GitHub

Awards

NetSci2020 sponsorship: Economic support for the online conference of NetSci2020

Ph.D. scholarship: Three year sponsorship, due to my fourth position among more than 120 participant

Research support UK: Seven paid months in United Kingdom

Erasmus plus: Five paid months at Aalto University, Finland

National register of excellences: Obtained an award from the Italian Institute for School and Research, due to the design of a sustainable building for students.