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 — **Nov. 2019 – Now**
Bruno Kessler Foundation (FBK) and University of Trento — *Trento, Italy*
Working on state-of-the-art Geometric Deep Learning models, applied to temporal networks.

M.S. Computer Science — **Oct 2017 – Oct. 2019**
University of Trento — *Trento, Italy*
Dissertation: Graph embedding in 2D
Advisor: Andrea Passerini and Fabrizio Costa, 110/110 *cum laude*

Exchange student — **Sep 2018 – Dec. 2019**
Aalto University — *Helsinki, Finland*
Main Courses: Non Linear Optimization, Numerical Matrix Computation, Computational Methods in Stochastic and Mobile Cloud Computing.

B.S Computer Science — **Sep 2014 – Oct. 2017**
University of Milano-Bicocca — *Milan, Italy*
Dissertation: Analysis of Smali code for detection of obfuscation in Android applications
Advisor: Alberto Leporati and Claudio Ferretti, 103/110

Experience

Machine learning consultant — **Sep 2021 – Now**
Pulsetech — *London, United Kingdom, (Remote)*
- Increase the performance of Graph Neural Networks developed by the company.
- Teach state-of-the-art GNN to the research team.

Teaching assistant — **Sep 2021 – Now**
University of Trento — *Trento, Italy*
- Machine learning
- More than 150 students
- Supervisor: Prof. Andrea Passerini

Teaching assistant — **Sep 2020 – Sep 2021**
University of Trento — *Trento, Italy*
- Computer Science at the department of Biomolecular Sciences and Technologies
- More than 60 students
- Supervisor: Prof. Andrea Passerini

Research intern — **Mar 2019 – Sep 2019**
University of Exeter — *Exeter, United Kingdom*
- 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.

Teaching assistant — **Sep 2018 – Dec 2018**
Aalto University — *Helsinki, Finland*
- 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

Publications

1. 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*

2. An Efficient Procedure for Mining Egocentric Temporal Motifs
   Accepted to ECML PKDD Dami (2022)
   Antonio Longa*, Giulia Cencetti, Bruno Lepri and Andrea Passerini*

3. A temporal egocentric perspective for the Configuration Model
   Under submission to Science Advances (2021)
   Antonio Longa*, Giulia Cencetti, Bruno Lepri and Andrea Passerini*

4. A GAN-based approach for generating mobility networks
   Working paper (2021)
   Giovanni Mauro, ***Antonio Longa****, Massimiliano Luca, Bruno Lepri and Luca Pappalardo*

5. Deep Spatio-Temporal Crime Hotspot Prediction and Ranking
   Working paper (2021)
   Massimiliano Luca, ***Antonio Longa****, Andrea Passerini and Bruno Lepri*

Talks

1. Digital Proximity Tracing in the COVID-19 Pandemic on Empirical Contact Networks: Controlling re-emerging outbreaks
   CCS2020 COMPLEX SYSTEMS FOR THE MOST VULNERABLE

2. 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.