Francesco Bonacina

Master Student in Pyhisics of Complex Systems

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Date of birth 02/02/1994 | Nationality Italy

EDUCATION AND TRAINING

Sept 2017 – Present — Master's Degree in Physics of Complex Systems — **110 / 110 cum laude e menzione**

University of Turin (UniTo)

- Master's thesis: *'Models for bipartite complex networks: case study of a host-pathogen network'* under the supervision of Michele Tizzoni.

Sept 2014 – Oct 2017 — Bachelor's Degree in Physics — **110 / 110**

University of Turin (UniTo)

- Bachelor's thesis: '*Analysis of time measurements stability of electromagnetic calorimeter of CMS at LHC*'. Supervisors: Stefano Argirò, Federico Ferri.

Sept 2013 – June 2014 — First Year of the Degree 'International Sciences of Development and Cooperation'

University of Turin (UniTo)

2008 – 2013 — Scientific Baccalaureate — **98 / 100**

Liceo scientifico Edoardo Amaldi, Alzano Lombardo (Bergamo)

PROFESSIONAL EXPERIENCE

Sept 2020 – Present — Internship in Complex Systems and Epidemiology

ISI Foundation, Turin (Italy). Supervisors: Michele Tizzoni and Daniela Paolotti

- Study of a host-pathogen interaction database using tools from complex networks.

Application of models for bipartite networks. First, application of entropy-based projection algorithms and community reconstruction techniques with the purpose of detecting the hosts which share more pathogens with humans. Second, use of Bayesian inference methods to predict the non-observed edges (i.e. the non-observed infections), crucial clue of future outbreaks.

- Development of a Python module submitted to the NetworkX library.

Development of a Python module to deal with community hierarchical clustering in networks. Purpose: to draw dendrograms starting from the community recostruction process performed by the Girvan-Newman algorithm. GitHub: https://github.com/FrancescoBonacina/dendrogram_girvan-newman.

May 2017 – July 2017 — Internship in Particle Physics

CMS Research group at Irfu - CEA Saclay, Gif - sur - Yvette (France). Supervisor: Federico Ferri.

-Analysis of data from the Compact Muon Solenoid (CMS) experiment located at CERN.

Analysis of temporal resolution of the time measurments coming from the electromagnetic calorimeter (ECAL) of CMS. Time-series analyses and data visualization with C++ (Root) to compare two types of time measurments: from the laser monitoring system and from $Z \rightarrow e^{+}e^{-}$ events.

FELLOWSHIPS

May 2017 – July 2017

- Fellowship from the Erasmus Traineeship + program, to cover my stay in Paris during my Bachelor's internship.

PROFESSIONAL SKILLS

Mother tongue

Italian

Foreign languages

English - B2

French - B1

Computational skills

- Proficient in Linux, Windows and Mac;
- Advanced level in object programming with Python and C++;
- Basic level programming with Bash, Java and STAN;
- LaTex and Office packages.

ADDITIONAL INFORMATION

Other professional experiences

- (Sept 2013 – Present) Acrobatics teacher, Association 'Progetto S.l.i.p', Torino (Italy);

- (2013 – Present) Artist of contemporary circus, Contemporary circus company 'Pirouettes Ensemble', Bergamo (Italy);

- (Sept 2013 – Jul 2014) Preparatory course to the professional training school for the contemporary circus artist, 'Cirko Vertigo' circus school, Grugliasco (Italy);

- (Jen 2019 – Jen 2020) Tutor in scientific labs for children, 'Laboratorio della curiosità', Turin (Italy).

Association activities

- (2016 – Present) Member of a Solidarity Buying Group;

- (2017 – Present) Participation in several theatre projects in collaboration with the association 'Isabelle il Capriolo', Bergamo (Italy);

- (2012 – 2013) Educator in Scout association;