

Laura Arditti

PHD STUDENT · POLITECNICO DI TORINO

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Education

Moxoff Academy

MOXOFF: MATHEMATICS FOR INNOVATION

Milan, Italy

Oct. 6, 2020 - Nov. 23, 2020

- <https://www.moxoff.com/academy/>
- Participation to the academy with a full scholarship obtained on a competitive basis.
- The Moxoff Academy is a technical-scientific specialization program on applied mathematics and data science that allows to acquire knowledge to tackle innovation projects in the industrial field.

PhD in Pure and Applied Mathematics

POLITECNICO DI TORINO

Torino, Italy

Oct. 2018 - Present

- Doctoral scholarship fully founded by the Excellence Project of the Department of Mathematical Sciences (DISMA) in Politecnico di Torino, which has been designated as a department of excellence based on a competitive selection process carried out by the Italian Ministry of Education, University and Research (MIUR).
- Advisor: Prof. Giacomo Como
- Research Project: Structural properties of network games and resilient control of network systems.

Master in Mathematical Engineering

POLITECNICO DI TORINO

Torino, Italy

Sept. 2016 - Sept. 2018

- Final grade: 110/110 cum laude
- Thesis: Analysis on Weighted Homogeneous Trees
- Advisor: Prof. Maria Vallarino

Bachelor in Physical Engineering

POLITECNICO DI TORINO

Torino, Italy

Sept. 2013 - Sept. 2016

- Final grade: 110/110 cum laude

High School Degree (Maturità Scientifica - Programma Brocca)

LICEO SCIENTIFICO FRANCESCO CECIONI

Livorno, Italy

2008 - 2013

- Final grade: 100/100 cum laude

Research Interests

- My research efforts are concentrated on game theory and its relationship with graphical models, such as Markov random fields. These are important tools in statistical sciences, and more recently in machine learning, and their newly established connections with network games could produce new insight and move forward the study of both fields, with many possible applications to social and economic networks. In parallel to this, I am working within the MIUR Excellence Project 2018 - 2022. In particular, I am focusing on the development of mathematical models and tools for the analysis of systemic risk and the resilient control synthesis of network systems. The main application domains are social networks, infrastructure networks (such as transport and energy) and economic and financial networks.
- *Keywords:* network games, graphical models, game dynamics, dynamics over networks, control theory, network resilience.

Publications

- Arditti L., Como G., Fagnani F. *Separable games*.
In preparation.
Preprint available at arXiv:2003.13128 (<https://arxiv.org/abs/2003.13128>)
- Arditti L., Como G., Fagnani F. *Graphical Games and Decomposition*.
Presented at the 21st IFAC World Congress (Berlin, Germany, 12-17 July 2020).
Accepted for publication in IFAC-PapersOnLine.
Available at arXiv:2003.13123 (<https://arxiv.org/abs/2003.13123>)
- Vanelli M., Arditti L., Como G., Fagnani F. *On games with coordinating and anti-coordinating agents*.
Presented at the 21st IFAC World Congress (Berlin, Germany, 12-17 July 2020).
Accepted for publication in IFAC-PapersOnLine.
Available at arXiv:1912.02000 (<https://arxiv.org/abs/1912.02000>)
- Arditti L., Tabacco A., Vallarino M. (2020) *BMO Spaces on Weighted Homogeneous Trees*.
In: The Journal of Geometric Analysis.
DOI: <https://doi.org/10.1007/s12220-020-00435-w>
Also available at arXiv:2006.02693 (<https://arxiv.org/abs/2006.02693>)
- Arditti L., Tabacco A., Vallarino M. (2020) *Hardy Spaces on Weighted Homogeneous Trees*.
In: Boggiatto P. et al. (eds) *Advances in Microlocal and Time-Frequency Analysis. Applied and Numerical Harmonic Analysis*. Birkhäuser, Cham
DOI: https://doi.org/10.1007/978-3-030-36138-9_2
Also available at arXiv:1902.09273 (<https://arxiv.org/abs/1902.09273>)

Scientific Activity

From Shortest Paths to Reinforcement Learning: A MATLAB-Based Tutorial on Dynamic Programming

Springer International Publishing

EURO ADVANCED TUTORIALS ON OPERATIONAL RESEARCH

December 21, 2020

- <https://www.springer.com/gp/book/9783030618667>
- Poorf reader of the manuscript.

The 9th International Conference on Complex Networks and their Applications

Madrid, Spain

COMPLEX NETWORKS 2020

December 1-3, 2020

- <https://complexnetworks.org/>
- Member of the Technical Program Committee (<https://complexnetworks.org/committees/>).

21st IFAC World Congress

Berlin, Germany

INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL

July 11-17, 2020

- <https://www.ifac2020.org/>
- Presenter and author of two contributions, appearing in the invited session "Distributed Control and Optimization On Complex Networks".

Seminar at LIDS - MIT

MIT, Cambridge

LABORATORY FOR INFORMATION & DECISION SYSTEMS

May 20, 2020

- Speaker for the seminar held via Zoom on "Separable Games".
- <https://lids.mit.edu/news-and-events/events/zoom-separable-games>

Poster Session for the Visit of the Advisory Board of the DISMA Excellence Project

Politecnico di Torino

DEPARTMENT OF MATHEMATICAL SCIENCES

February 18, 2020

- Separability and Stability of Games
- https://areeweb.polito.it/disma-excellence/allegati/2020/giornata_AB.pdf

DISMA Excellence Seminar

Politecnico di Torino

DEPARTMENT OF MATHEMATICAL SCIENCES

December 3, 2019

- Graphicality and decomposition of games
- https://areeweb.polito.it/disma-excellence/allegati/2019/Visiting/seminario_Arditti.pdf

DISMA PhD Poster Session

Politecnico di Torino

DEPARTMENT OF MATHEMATICAL SCIENCES

November 22, 2019

- Graphicality and decomposition of games
- [http://www.disma.polito.it/en/news/\(idnews\)/14046](http://www.disma.polito.it/en/news/(idnews)/14046)

Network Dynamics in the Social, Economic, and Financial Sciences

Torino, Italy

DEPARTMENT OF MATHEMATICAL SCIENCES, POLITECNICO DI TORINO

November 4-8, 2019

- <https://areeweb.polito.it/disma-excellence/NDR/Dynamics.html>
- Participation as member of the organising group of the workshop.
- Speaker presenting "On graphicality and decomposition of games" (slides available at https://areeweb.polito.it/disma-excellence/NDR/allegati/slide/Short_presentations_2/Arditti.pdf).

Resilient Control of Infrastructure Networks

DEPARTMENT OF MATHEMATICAL SCIENCES, POLITECNICO DI TORINO

Torino, Italy

September 24-27, 2019

- <https://areeweb.polito.it/disma-excellence/NDR/Resilient.html>
- Participation as member of the organising group of the workshop.
- Speaker in the short presentation session.

National Meeting on Harmonic Analysis

Bergamo, Italy

May 27-29, 2019

- <https://sites.google.com/view/aabergamo2019/home>
- Speaker presenting “Hardy spaces on weighted homogeneous trees”

Schools, Conferences and Workshops

Graphs and Randomness in Turin

MATHEMATICS DEPARTMENT, UNIVERSITÀ DI TORINO

Torino, Italy

January 20-21, 2020

- <https://sites.google.com/view/graphs-and-randomness-in-turin>
- Participation to the workshop.

The Oxford Summer School in Economic Networks

MATHEMATICAL INSTITUTE, UNIVERSITY OF OXFORD

Oxford, United Kingdom

June 24-28, 2019

- <https://www.inet.ox.ac.uk/events/the-oxford-summer-school-in-economic-networks-1/>
- Participant to the summer school with partial funding through a scholarship obtained on a competitive basis.

New Trends in Harmonic Analysis

DEPARTMENT OF MATHEMATICAL SCIENCES, POLITECNICO DI TORINO

Torino, Italy

May 24-25, 2018

- http://calvino.polito.it/~anfunz/workshop2018_2/ntha.htm
- Participation to the workshop.

Weekly Seminars

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

Torino, Italy

Oct 2018 - Present

- <https://areeweb.polito.it/disma-excellence/pastEvents.html>
- Weekly attendance and participation as a speaker on December 3, 2019 presenting “Graphicality and decomposition of games”.

Young Researchers Workshop in Harmonic Analysis

DEPARTMENT OF MATHEMATICAL SCIENCES, POLITECNICO DI TORINO

Torino, Italy

April 13, 2018

- http://calvino.polito.it/~anfunz/workshop2018_1/yrwha.htm
- Participation to the workshop.

MATLAB Master Class: “Programming with MATLAB”

POLITECNICO DI TORINO

Torino, Italy

October 22, 2014

- Participation to the workshop.

Algebraic Geometry and Related Topics XII

Torino, Italy

June 4-7, 2014

- <http://ricerca.mat.uniroma3.it/users/lopez/GGAACXII/GGA2014.html>
- Participation to the workshop.

PhD Courses

Targeting in social networks

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

Torino, Italy

October 16-17, 2019

- <https://areeweb.polito.it/disma-excellence/NDR/Courses.html>
- PhD course held by Prof. Agnieszka Rusinowska, from Centre d’Economie de la Sorbonne.

Modelling and distributed control of the power grid

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

Torino, Italy

November 11-12, 2019

- <https://areeweb.polito.it/disma-excellence/NDR/Courses.html>
- PhD course held by Prof. Sandro Zampieri, from the University of Padova.

Network systems in science and technology

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

Torino, Italy

September 16-20, 2019

- <https://areeweb.polito.it/disma-excellence/NDR/Courses.html>
- PhD course held by Prof. Francesco Bullo, from the University of California Santa Barbara.

Stochastic optimization and optimal learning

Torino, Italy

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

July, 2019

- https://didattica.polito.it/pls/portal30/gap.pkg_guide.viewGap?p_cod_ins=01TBCRT&p_a_acc=2019&p_header=S&p_lang=IT
- PhD course held by Prof. Paolo Brandimarte, from Politecnico di Torino.

Integrable discretization

Torino, Italy

POLITECNICO DI TORINO, DISMA DEPARTMENT OF EXCELLENCE

Feb 11 - Mar 01 2019

- <https://areeweb.polito.it/disma-excellence/DDG/phdCourse.html>
- PhD course held by Prof. Udo Hertrich-Jeromin, from Vienna University of Technology.
- Passed with merit

Data Science for Networks (Excellence Training)

Torino, Italy

POLITECNICO DI TORINO, SMARTDATA CENTER

Jan 15 - Feb 05 2019

- <https://smartdata.polito.it/phd-course-data-science-for-networks/>
- PhD course held by Prof. Fabricio Murai Ferreira and Prof. Flavio Figueiredo.

Work Experience

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TEACHING ASSISTANT FOR THE COURSE "NETWORK DYNAMICS AND LEARNING"

Sept. 2020- Feb.2021

- Course Level: graduate level course within the master program in Data Science And Engineering.
- Included modules: graph theory, Markov probabilistic models, game theory, distributed optimization, inference algorithms, opinion dynamics, epidemics models, learning in games.
- Teachers: Prof. Fabio Fagnani.
- Employment kind: term-contract employment
- **Activities and responsibilities:**
- 20 hours of teaching (1,5 hours of classroom time per week)
- Preparation of Python notebooks, exercise sheets and discussion during weekly lab sessions
- Assisting students in dedicated consulting hours
- Correction of project works done by students
- Assistance during written and oral examinations

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Torino, Italy

TEACHING ASSISTANT FOR THE COURSE "DYNAMICS OVER NETWORKS"

Sept. 2020- Feb.2021

- Course Level: graduate level course within the master program in Mathematical Engineering and Physics of Complex Systems.
- Included modules: graph theory, game theory, deterministic and stochastic dynamical systems over networks.
- Teachers: Prof. Fabio Fagnani.
- Employment kind: term-contract employment
- **Activities and responsibilities:**
- 10 hours of teaching (1,5 hours of classroom time per week)
- Preparation of exercise sheets and discussion during weekly exercise sessions
- Assisting students in dedicated consulting hours
- Correction of project works done by students
- Assistance during written and oral examinations

Politecnico di Torino

Torino, Italy

TEACHING ASSISTANT FOR THE COURSE "MATHEMATICAL METHODS"

Jan. 2020 - Sept. 2020

- Course Level: undergraduate level course within the bachelor program in Electronic and Communications Engineering, Physics Engineering, Computer Engineering.
- Included modules: complex analysis and theory of distributions.
- Teachers: Prof. Giacomo Como.
- Employment kind: term-contract employment
- **Activities and responsibilities:**
- 20 hours of teaching (1,5 hours of classroom time per week)
- Preparation of exercise sheets and discussion during weekly exercise sessions
- Assisting students in dedicated consulting hours
- Assistance during written and oral examinations

- Course Level: graduate level course within the master program in Mathematical Engineering and Physics of Complex Systems.
- Included modules: graph theory, game theory, deterministic and stochastic dynamical systems over networks.
- Teachers: Prof. Giacomo Como.
- Employment kind: term-contract employment

Activities and responsibilities:

- 20 hours of teaching (1,5 hours of classroom time per week)
- Preparation of exercise sheets and discussion during weekly exercise sessions
- Assisting students in dedicated consulting hours
- Correction of project works done by students
- Assistance during written and oral examinations

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- Included modules: complex analysis and distribution theory, probability theory
- Teachers: Prof. Andrea Tosin, Prof. Paola Siri
- Employment kind: Part time collaboration

Activities and responsibilities:

- 20 hours of tutoring (1,5 hours of classroom time per week)
- Assist students in dedicated consulting hours
- Correct exercises done by the students
- Give assistance during written examinations

Competences and Abilities

Technical skills

- Programming Languages:
 - Java ★★☆☆,
 - Python ★★☆☆,
 - SQL ★★☆☆,
 - Cypher Query Language ★☆☆,
 - HTML ★☆☆,
 - CSS ★☆☆,
 - Javascript ★☆☆,
 - LaTeX ★★☆☆
 - Matlab ★☆☆
- Applications/programs: Visual Studio, Github, Jupyter Notebooks, IntelliJ IDEA
- Databases: Oracle Database, Neo4j

Languages

- Italian: mother tongue
- English: IELTS 6.5 – competent user
- French: DELF A2