Alberto Marchesi

Curriculum Vitae et Studiorum

Personal Information

Date of Birth	September 22, 1992
Place of Birth	Piacenza, Italy
Citinzenship	Italian
Email	albymark9@gmail.com

Work Information

University	Politecnico di Milano
Department	Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB)
Address	Via Golgi 39, 20133, Milano (MI), Italy
Email	alberto.marchesi@polimi.it
Webpage	home.deib.polimi.it/amarchesi
Phone	+39 02 2399 9685

Education

2016 — **PhD in Computer Science and Engineering**, *Politecnico di Milano*, Milano,
Advisor: Prof. Nicola Gatti.

2014 – 2016 — **MSc in Computer Science and Engineering**, *Politecnico di Milano*, Milano,
Thesis: Methods for finding Leader-Follower equilibria with multiple followers
Advisor: Prof. Nicola Gatti.
Mark *110 cum laude/110*

2011 – 2014 — **BSc in Computer Science and Engineering**, *Politecnico di Milano*, Milano.
Mark *110 cum laude/110*

2011 — **Diploma di Perito Industriale in Informatica**, *Istituto Tecnico Indistriale Statale G. Marconi*, Piacenza (PC).
Mark *100 cum laude/100*

Teaching Activities

2018 — **Economics and Computation**, *Teaching assistant*, Exercise sessions using innovative teaching methodologies.

2018 — **Informatica A**, *Teaching assistant*, Exercise sessions.

Research Interests

My current research focuses on *Artificial Intelligent*, especially *Algorithmic Game Theory*, *Machine Learning*, and *Computational Complexity*.

Algorithmic Game Theory My main research interests are: analysis of the computational complexity of equilibirum finding problems, in particuar leader-follower and Nash equilibria, development of exact and approximate algorithms for computing equilbiria.

Computational Complexity I am interested in deepening our undestanding of the intrinsc difficulty of efficiently solving problems, discovering connections between well-known problems form different fields of compuer science, both from an exact and an approximate point of view.

Machine Learning I am interested in the subfield of multi-agent learning, which studies how rational agents can learn their stratgies while competing among each other.

PhD Research Project

Title *Leader-Follower games*

Advisors Prof. Nicola Gatti

Description In recent years, leader-follower games have received a growing interest from the Artificial Intelligence community. These games model strategic interactions involving two groups of agents, the leaders and the followers, where the former commit to playing some strategies, and the latter, after observing the commitment, decide how to play. This model perfectly fits many real-world scenarios, such as the securitty domain. We investigate the, yet unexplored, leader-follower games, with single leader and multiple followers.

Master thesis

Title *Methods for finding Leader-Follower equilibria with multiple followers*

Supervisors Nicola Gatti

Description Recently, the problem of securing particularly crowded places or politically, economically, and culturally relevant targets is becoming paramount. In fact, the risk that these places are attacked by either organized terrorist groups or dangerous and unpredictable people is steadily increasing. Protecting such sensible targets ensuring the maximum security level requires huge financial investments. Unfortunately, in most cases the interested entities cannot afford these costs entirely, so that the resources available for security are not sufficient to guarantee a complete protection. This raises a new problem, the one of efficiently allocating available resources to ensure the highest possible level of protection. However, this is a difficult problem to solve, because it requires the analysis of many variables and possibilities, thus it is not suited to be solved manually. This led to the birth of a new branch of Artificial Intelligence, whose aim is to develop IT systems able to autonomously compute optimal defence strategies, reducing human intervention to a minimum.

This new area of research finds its foundations in Game Theory, introducing new game models, usually known as *Security Games*, and developing algorithms to solve them. In this field, a particular solution concept has been established, called *Leader-Follower* equilibrium, in which the leader takes the role of defender, while the follower plays as attacker, under the assumption that the latter can observe the defender's strategy beforehand. The Leader-Follower equilibrium in its simplest form, which considers only one leader and one follower, has already been largely studied. The purpose of this thesis is to extend such study, considering the case with *multiple followers* who play a Nash equilibrium.

Publications

Papers on Proceedings of International Conferences

Castiglioni M., Marchesi A., Gatti N.
Be a Leader or Become a Follower:The Strategy to Commit to with Multiple Leaders
To appear in the 28th International Joint Conference on Artificial Intelligence, IJCAI 2019, Macao, China

Marchesi A., Castiglioni M., Gatti N.
Leadership in Congestion Games: Multiple User Classes and Non-Singleton Actions
To appear in the 28th International Joint Conference on Artificial Intelligence, IJCAI 2019, Macao, China

Marchesi A., Farina G., Kroer C., Gatti N., Sandholm T.
Quasi-Perfect Stackelberg Equilibrium
The 33rd AAAI Conference on Artificial Intelligence, AAAI 2019, Honolulu, USA

Marchesi A., Coniglio S., Gatti N.
Leadership in Singleton Congestion Games
The 27th International Joint Conference on Artificial Intelligence, IJCAI 2018: 447-453, Stockholm, Sweden

Farina G., Marchesi A., Kroer C., Gatti N., Sandholm T.
Trembling-Hand Perfection in Extensive-Form Games with Commitment
The 27th International Joint Conference on Artificial Intelligence, IJCAI 2018: 233-239, Stockholm, Sweden

De Nittis G., Marchesi A., Gatti N.
Computing the Strategy to Commit to in Polymatrix Games
The 32nd AAAI Conference on Artificial Intelligence, AAAI 2018: 989-996, New Orleans, USA

Coniglio S., Gatti N., Marchesi A.
Pessimistic Leader-Follower Equilibria with Multiple Followers
The 26th International Joint Conference on Artificial Intelligence, IJCAI 2017: 171-177, Melbourne, Australia

Celli A., Marchesi A., Gatti N.
On the Complexity of Nash Equilibrium Reoptimization
The 33rd Conference on Uncertainty in Artificial Intelligence, UAI 2017: 292-301, Sydney, Australia

Basilico N., Coniglio S., Gatti N., Marchesi A.
Bilevel programming approaches to the computation of optimistic and pessimistic single-leader-multi-follower equilibria
The 16th International Symposium on Experimental Algorithms, SEA 2017: 31:1-31:14 London, UK, June 21-23, 2017

International Journals

Basilico N., Coniglio S., Gatti N., Marchesi A.
Bilevel programming methods for computing single-leader-multi-follower equilibria in normal-form and polymatrix games
EURO Journal on Computational Optimization, 2019

Papers in International Workshops

Marchesi A., Farina G., Kroer C., Gatti N., Sandholm T.
Quasi-Perfect Stackelberg Equilibrium
AAAI-19 Workshop on Reinforcement Learning in Games, Honolulu, USA

Celli A., Marchesi A.
Nash Equilibrium Reoptimization is Hard
The 3rd IJCAI Algorithmic Game Theory Workshop, Melbourne, Australia

National Journals

Celli A., Marchesi A.
Learning Dynamics in Limited-Control Repeated Games
Intelligenza Artificiale, 2018

Awards

National Doctoral Scholarship
Three-years doctoral scholarship sponsored by the Ministry of Education, Universities and Research.

Borsa di Studio FCA e CNH Industrial 2017
Scolarships for the best graduated students (Laurea Magistrale) who are sons/daughters of emplyees of FCA and CNH Industrial.

Borsa di Studio FCA e CNH Industrial 2015
Scolarships for the best graduated students (Laurea Triennale) who are sons/daughters of emplyees of FCA and CNH Industrial.

Talks and Seminars

Talks given at International Conferences

February 2018 — **Computing the Strategy to Commit to in Polymatrix Games**
The 32nd AAAI Conference on Artificial Intelligence, AAAI 2018: 989-996, New Orleans, USA

August 2017 — **Pessimistic Leader-Follower Equilibria with Multiple Followers**
The 26th International Joint Conference on Artificial Intelligence, IJCAI 2017, Melbourne, Australia

August 2017 **On the Complexity of Nash Equilibrium Reoptimization**
The 33rd Conference on Uncertainty in Artificial Intelligence, UAI 2017, Sydney, Australia

Talks given at Workshops

August 2017 **Nash Equilibrium Reoptimization is Hard**
The 3rd IJCAI Algorithmic Game Theory Workshop, Melbourne, Australia

Seminars

March 2017 **Leadership Games**
Permanent Itinerant Game Theory Seminars (P.I.G.S.), Politecnico di Milano, Italy

January 2018 **When Are Equilibria of Simple Auctions Near-Optimal?**
Permanent Itinerant Game Theory Seminars (P.I.G.S.), Politecnico di Milano, Italy

Editorial Activities

International Conferences

IJCAI 2017 International Joint Conference on Artificial Intelligence, Program Committee Subreviewer.

AAMAS 2017 International Conference on Antonomous Agents and Multiagent Sytems, Program Committee Subreviewer.

AAAI 2018 AAAI Conference on Artificial Intelligence, Program Committee.

IJCAI 2018 International Joint Conference on Artificial Intelligence, Program Committee Subreviewer.

AAAI 2019 AAAI Conference on Artificial Intelligence, Program Committee.

Students Supervision

Graduated Dec 2017 Giordano Colombi, with *Leadership Congestion Games*
M.Sc. in Mathematical Modeling for Engineering, Politecnico di Milano, Italy

Graduated Oct 2018 Matteo Castiglioni, with *Leadership Congestion Games*
M.Sc. in Computer Science and Engineering, Politecnico di Milano, Italy

Relevant Academic Courses

PhD Courses and PhD Summer Schools

Internet Economics, *Politecnico di Milano*

Modelli di Teoria dei Giochi per l'Ingegneria, *Politecnico di Milano*

Intelligent Multiagent Systems, *Politecnico di Milano*

Data-Based Approaches to Uncertain Optimization: Theory and Applications, *Politecnico di Milano*

Constrained Numerical Optimization with Control Applications - Theory and Algorithms, *Politecnico di Milano*

The 28th Jerusalem School in Economic Theory: Mechanism Design, *The Israel Institute for Advanced Studies (IIAS), Jerusalem*

Relevant MSc Courses

Economics and Computation, *Politecnico di Milano*
Autonomous Agents and Multiagent Systems, *Politecnico di Milano*
Artificial Intelligence, *Politecnico di Milano*
Machine Learning, *Politecnico di Milano*
Soft Computing, *Politecnico di Milano*
Model Identification and Data Analysis, *Politecnico di Milano*
Data Mining and Text Mining, *Politecnico di Milano*
Knowledge Engineering, *Politecnico di Milano*
Foundations of Operations Research, *Politecnico di Milano*
Game Theory, *Politecnico di Milano*

Qualifications

Sep 2013

TOEIC, *Mark 980/990*, Milano.
Certificate of English language

Languages

Italian	Native	*Mother Tongue*
English	Fluent	*Daily practice, all work performed in English*

Working Experience

May-Jul 2010

Web Application Programmer, *H&S - Qualità nel software*, Piacenza (PC), Italy.
Development of a web application in ASP.NET and C#, management of databases in SQL Server 2008 Professional.

Skills

General

Social	Good ability to adapt to multicultural environments, Good communication skills.
Organisational	Team spirit.
Technical	MS Office tools.

Programming

Languages	C, Java, Python (numpy, scipy), R, MATLAB, AMPL, SQL, HTML, C#, Scheme, Haskell, Prolog
Integrated Development Environments	Pycharm, Eclipse, NetBeans, MATLAB, R
Typesetting	Microsoft Office, Apple iWork, LaTeX
Operating Systems	Microsoft Windows, Apple MacOS, GNU/Linux

Personal Interests

Sport Tennis

Autorizzo al trattamento dati ai sensi del GDPR 2016/679 del 27 aprile 2016 (Regolamento Europeo relativo alla protezione delle persone fisiche per quanto riguarda il trattamento dei dati personali). Autorizzo la pubblicazione del Curriculum Vitae sul sito istituzionale del Politecnico di Milano (sez. Amministrazione Trasparente) in ottemperanza al D. Lgs n. 33 del 14 marzo 2013 (e s.m.i.).