

Andrea Spinelli

Curriculum vitae

(Last updated: September 28, 2024)

Personal information

Name and surname: Andrea Spinelli

Date of birth: December 6, 1992

Nationality: Italian

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Current position

- (January 1, 2024 - present) **Postdoctoral researcher** at University of Bergamo.
Research Project: *Optimization under uncertainty models and methods for electric vehicle routing problems* (“ULTRAOPTYMAL - Urban Logistics and sustainable TRANsportation: OPTimization under uncertainTY and MACHine Learning”, PRIN 20207C8T9M).
Scientific Director: Prof. Francesca Maggioni.
Academic discipline: MAT/09 (Operations Research).

Education

- (June 24, 2024) **PhD in Applied Economics and Management (AEM)** at University of Pavia and jointly at University of Bergamo.
Title of the thesis: *Optimization under uncertainty: applications to machine learning and waste management*.
Supervisor: Prof. Francesca Maggioni (University of Bergamo).
Academic discipline: MAT/09 (Operations Research).
- (March 1, 2017) **Master’s degree in Mathematics** at University of Milan.
Mark: 110/110.
Title of the thesis: *A mathematical model of the enterohepatic circulation of bile acids after partial hepatectomy*.
Supervisors: Prof. Paola Causin (University of Milan), Prof. Astrid Decoene and Prof. Jean-Baptiste Lagaert (Paris-Sud University).
- (October 9, 2014) **Bachelor’s degree in Mathematics** at University of Milan-Bicocca.
Mark: 110/110.
Title of the thesis: *Class A Bézier curves*.
Supervisor: Prof. Lucia Romani (University of Milan-Bicocca).
- (July 2011) **High school diploma** at Liceo Scientifico F. Lussana, Bergamo.
Mark: 100/100.

Training courses

- (September 15-15, 2024) **EURO Summer Institute 2024 (ESI2024): “Decision-making under uncertainty for commodities and financial markets”** - Ischia.
- (April 4-8, 2022) **Copenhagen School of Stochastic Programming**. University of Copenhagen (DK).
- (March 22-26, 2021) **Optimization Models for Machine Learning**. PhD Degree in Mathematics and Computer Science. University of Calabria (IT).
- (December 12, 2018) **Percorso formativo personalizzato (24 cfu) per l’accesso ai corsi triennali FIT**. University of Bergamo (IT).

Exams:

- Methodology of educational research (M-PED/04)
- General psychology 2 with laboratory (M-PSI/01)
- Recognition, evaluation and certification of competences (M-PED/01)
- Teaching and learning II (M-PED/03)

Qualifications

- (June 29, 2022) Italian **secondary teaching** qualifications in **Mathematics**.

Awards

- (October 1, 2020 - December 31, 2023) **Full PhD Scholarship** granted by University of Bergamo.
- (March 3, 2023) **Study award “Marco Manera” 2023** - University of Pavia.
Research project “A Stochastic Optimization Programming Model for a Waste Collection Problem”, in collaboration with Francesca Maggioni (University of Bergamo), Ana Barbosa-Póvoa e Tânia Ramos (Instituto Superior Técnico, University of Lisbon), Daniele Vigo (University of Bologna).
- (March 13, 2023) **Local winner of the Three Minutes Thesis (3MT) competition - VII edition** - University of Pavia.
Title of the presentation: “Maths in the trash? A mathematical model for waste collection”.
- (February 1, 2022 - June 30, 2022) **International Mobility Grant - XII edition** granted by University of Pavia.

Research interests

Operations Research, Optimization under Uncertainty, Optimization for Machine Learning, Optimization for Waste Management, Stochastic Programming, Robust Optimization, Didactics of Mathematics.

Research Projects

- Member of the research unit at University of Bergamo for the project PRIN 2020 “ULTRAOPTYMAL: Urban Logistics and sustainable TRANsportation: OPTimization under uncertainTY and MACHine Learning”, project code 20207C8T9M. Principal Investigator: Prof. Francesca Maggioni.
Website: <https://ultraoptymal.unibg.it>

List of publications

- [1] De Leone, R., Maggioni, F., Spinelli, A. (2024): *A Multiclass Robust Twin Parametric Margin Support Vector Machine with an Application to Vehicles Emissions*. In: Nicosia, G., Ojha, V., La Malfa, E., La Malfa, G., Pardalos, P.M., Umeton, R. (eds) Machine Learning, Optimization, and Data Science. LOD 2023. Lecture Notes in Computer Science, vol 14506. Springer, Cham.
https://doi.org/10.1007/978-3-031-53966-4_22
- [2] Maggioni, F., Spinelli, A. (2024): *A Robust Nonlinear Support Vector Machine Approach for Vehicles Smog Rating Classification*. In: Bruglieri, M., Festa, P., Macrina, G., Pisacane, O. (eds) Optimization in Green Sustainability and Ecological Transition. ODS 2023. AIRO Springer Series, vol 12. Springer, Cham.
https://doi.org/10.1007/978-3-031-47686-0_19
- [3] Spinelli, A., Maggioni, F., Pereira Ramos, T., Barbosa-Póvoa, A., Vigo, D. (2024): *A Rolling Horizon Heuristic Approach for a Multi-Stage Stochastic Waste Collection Problem* (submitted, under revision).
- [4] Maggioni, F., Spinelli, A. (2024): *A Novel Robust Optimization Model for Nonlinear Support Vector Machine* (submitted, under revision).
- [5] De Leone, R., Maggioni, F., Spinelli, A. (2024): *A Robust Twin Parametric Margin Support Vector Machine for Multiclass Classification* (in preparation).
- [6] Spinelli, A., Bezzi, D., Jabali, O., Maggioni, F. (2024): *A Stochastic Electric Vehicle Routing Problem under Uncertain Energy Consumption* (in preparation).

Research periods abroad

- (February 1, 2022 - June 30, 2022) **Visiting PhD student** at Instituto Superior Técnico, University of Lisbon (PT).
Research collaboration with Prof. Ana Barbosa-Póvoa, Prof. Tânia Ramos, Prof. Francesca Maggioni and Prof. Daniele Vigo.
- (March 1, 2016 - July 15, 2016) **Research stage** in Applied Mathematics at Paris-Sud University and IN-SERM (FR).
Research collaboration with Prof. Astrid Decoene, Prof. Jean-Baptiste Lagaert and Prof. Paola Causin.

Talks and seminars

- (September 18, 2024) *A stochastic electric vehicle routing problem under uncertain energy consumption* - EURO Summer Institute 2024 (ESI2024), Ischia (IT).
- (July 1, 2024) *A rolling horizon heuristic approach for a multi-stage stochastic waste collection problem* - 33rd EURO Conference, Technical University of Denmark (DK).
- (September 7, 2023) *A rolling horizon heuristic approach for a multi-stage stochastic waste collection problem* - ODS2023, Ischia (IT).
- (November 24, 2022) *A rolling horizon methodology for a multi-stage stochastic waste collection problem* - CEG-IST Seminar, Instituto Superior Técnico, University of Lisbon (PT).
- (August 30, 2022) *A robust optimization model for nonlinear Support Vector Machine* - ODS2022, University of Florence (IT).
- (July 5, 2022) *A robust optimization model for nonlinear Support Vector Machine* - 32nd EURO Conference, Aalto University (FIN).
- (February 23, 2022) *A robust optimization model for nonlinear Support Vector Machine* - VI AIROYoung Workshop, Roma Tre University (IT).
- (February 22, 2022) *Potenzialità e responsabilità della scuola per favorire l'inclusione nelle STEM*, University of Bergamo (IT).
- (October 22, 2021) *Piacere, sono... un modello matematico: un esempio di 'buon problema' tra scuola primaria e scuola secondaria*, PIMat, University of Catania (IT).
- (March 11, 2021) *(DIS)parità di genere nelle discipline STEM*, for the International Women's Day, University of Brescia (IT).
- (March 3, 2021) *Matematica e differenze di genere: riflessioni e spunti didattici*, University of Bergamo (IT).
- (November 4, 2020) *STEM e differenze di genere: alcune riflessioni*, University of Brescia (IT).
- (October 21, 2020) *Matematica in poltroncina. Viaggio tra matematici e matematiche nell'immaginario cinematografico*, Cagliari FestivalScienza 2020 (IT).
- (December 3, 2019) *La trasferibilità delle conoscenze: il caso di diritto e matematica*, La didattica delle scienze economico giuridiche nei percorsi 24 CFU, University of Brescia (IT).
- (November 6, 2019) *Diritto e Matematica: l'uso di strumenti matematici nelle applicazioni economico-giuridiche*, University of Brescia (IT).
- (October 10, 2018) *Perché gli studenti fanno sempre gli stessi errori?*, XXXV convegno UMI-CIIM, University of Cagliari. (IT).

Teaching

A.Y. 2024/2025

- **Teaching assistant of the course “Ricerca Operativa”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo.

A.Y. 2023/2024

- **Adjunct professor of the course “Operational Research”** (MAT/09). Faculty of Mathematical, Physical and Natural Sciences, Catholic University of the Sacred Heart of Brescia.
- **Teaching assistant of the course “Ricerca Operativa”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Optimization for Healthcare Problems”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo.
- **Lecturer of the course “Modelli Matematici”** (MAT/09). Percorsi universitari e accademici di formazione iniziale dei docenti delle scuole secondarie di primo e secondo grado, classe A-26 Matematica - University of Brescia and University of Bergamo (Centro CE.F.I.).

A.Y. 2022/2023

- **Teaching assistant of the course “Ricerca Operativa”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Analisi Matematica I”** (MAT/05). Department of Engineering and Applied Sciences, University of Bergamo.

A.Y. 2021/2022

- **Teaching assistant of the course “Ricerca Operativa”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Corso di alfabetizzazione di matematica”** (SECS-S/06). Department of Management, University of Bergamo.

A.Y. 2020/2021

- **Teaching assistant of the course “Statistica”** (SECS-S/01). Department of Management, University of Bergamo.
- **Teaching assistant of the course “Corso di alfabetizzazione di matematica”** (SECS-S/06). Department of Management, University of Bergamo.

A.Y. 2019/2020

- **Adjunct professor of the course “Elementi di Matematica”** (SECS-S/06). Department of Management, Economics and Quantitative Methods, University of Bergamo.
- **Lecturer of the course “Didattica speciale: codici del linguaggio logico e matematico (scuola primaria)”** (M-PED/03). Corso di formazione per il conseguimento della specializzazione per le attività di sostegno (scuola primaria) - University of Bergamo.

- **Teaching assistant of the course “Statistica”** (SECS-S/01). Department of Management, University of Bergamo.
- **Teaching assistant of the course “Geometria e Algebra Lineare”** (MAT/03). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Mathematical Methods for Engineers”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Analisi Matematica e Geometria”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Analisi Matematica I”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Corso di alfabetizzazione di matematica”** (SECS-S/06). Department of Management, Economics and Quantitative Methods, University of Bergamo.

A.Y. 2018/2019

- **Teaching assistant of the course “Geometria e Algebra Lineare”** (MAT/03). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Mathematical Methods for Engineers”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Analisi Matematica I”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Corso di alfabetizzazione di matematica”** (SECS-S/06). Department of Management, Economics and Quantitative Methods, University of Bergamo.

A.Y. 2017/2018

- **Teaching assistant of the course “Geometria e Algebra Lineare”** (MAT/03). Department of Management, Information and Production Engineering, University of Bergamo.
- **Teaching assistant of the course “Analisi Matematica I”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo.

Work experiences

- (September 3, 2022 - present) **Mathematics teacher** at Istituto Statale di Istruzione Superiore “L. Einaudi”, Dalmine (on leave for research activities).
- (October, 2017 - present) **Collaborator and founder of the association “Diamo i Numeri!”**. Organization of collaborative maths activities and teacher training courses at primary and middle schools. Planning and development of applied mathematical topics in high schools. Experiences:
 - Istituto Comprensivo “Bagnatica” (Bagnatica). School years 2018/2019, 2019/2020.
 - Istituto Comprensivo “A. Moro” (Gorlago). School years 2017/2018, 2018/2019, 2019/2020.
 - Istituto Comprensivo “Borgo di Terzo” (Borgo di Terzo). School years 2017/2018, 2018/2019, 2019/2020.

- Istituto Comprensivo “A. Tiraboschi” (Paladina). School year 2018/2019.
- (September, 2018 - September, 2022) **Collaborator of the MatNet-CQIIA center**, University of Bergamo. Organization and realization of mathematical laboratories for high school students and teachers. Experiences:
 - Design and management of the entry test MatNet in Mathematics for high school students (February 2022 - September 2022).
 - Summer School “Matematica e Scienze della Vita: modelli e algoritmi della salute” (September 5, 2022 - September 7, 2022), San Pellegrino Terme.
 - Design and management of the entry test MatNet in Mathematics for high school students (May 2021 - September 2021).
 - Summer School “Matematica e società: genere, algoritmo, democrazia” (September 1, 2021 - September 3, 2021), Bergamo.
 - “Progetto PLS-POT” (March 1, 2021 - April 16, 2021). Online labs for high-school students preparing for admission tests in Economics and Management.
 - “Waiting for Summer School” (September 2, 2020 - September 10, 2020).
 - Design and management of the entry test MatNet in Mathematics for high school students (May 2020 - September 2020).
 - “Progetto PAEC-POT” (November 4, 2019 - April 30, 2020). The project has been performed in three different high schools: IS “L. Lotto” (Trescore Balneario), Scuola “IMIBERG” (Bergamo), ITCTS “Vittorio Emanuele II” (Bergamo).
 - “Laboratorio PLS di autovalutazione” (April 16, 2019 - May 22, 2019), performed at high school “L. Einaudi” (Dalmine).
 - Design and management of the entry test MatNet in Mathematics for high school students (May 2019 - September 2019).
 - Summer School “La matematica oggi” (September 2, 2019 - September 4, 2019), San Pellegrino Terme.
 - Summer School “La matematica tra il nulla e il tutto” (September 3, 2018 - September 5, 2018), San Pellegrino Terme.
- (September 4, 2021 - June 30, 2022) **Mathematics teacher** at Istituto Superiore “L. Lotto”, Trescore Balneario.
- (October 8, 2020 - June 30, 2021) **Mathematics and Physics teacher** at Istituto Superiore “L. Federici”, Trescore Balneario.
- (September 11, 2018 - June 30, 2019) **Mathematics and Physics teacher** at Scuola d’Arte Applicata “A. Fantoni”, Bergamo.
- (May 2018) **Osservatore esterno per la rilevazione degli apprendimenti del Sistema Nazionale di Valutazione** at Istituto Comprensivo “San Paolo D’Argon”.
- (September 10, 2017 - June 30, 2018) **Mathematics teacher** at Scuola d’Arte Applicata “A. Fantoni”, Bergamo.
- (June 19, 2017 - August 25, 2018) **Remedial courses in Mathematics and Physics** at Istituto di Istruzione superiore “G. Natta”, Bergamo.

- (June 19, 2017 - July 5, 2017) **Remedial courses in Mathematics and Physics** at Liceo Scientifico “F. Lussana”, Bergamo.
- (May 12, 2017 - June 29, 2017) **Mathematics and Science teacher** at Scuola secondaria di primo grado “S. Lucia”, Bergamo.
- (November 22, 2016 - December 22, 2016) **Mathematics and Physics teacher** at Liceo delle scienze umane e Liceo musicale “P. Secco Suardo”, Bergamo.

Languages

- Italian (Native language)
- English (Proficient)
- French (Conversant)
- Portuguese (Proficient) - level B1, exam DEPLE (10/01/2023)

Computer skills

- ECDL full
- Strong knowledge of LaTeX system
- Strong knowledge of MatLab
- Basic knowledge of Stata
- Basic knowledge of AMPL
- Basic knowledge of GAMS
- Basic knowledge of Python
- Basic knowledge of Julia Programming

Additional information

- **Fellow of the course “Operational Research”** (MAT/09). Faculty of Mathematical, Physical and Natural Sciences, Catholic University of the Sacred Heart of Brescia. Academic year 2023/2024.
- **Fellow of the course “Optimization for Healthcare Problems”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo. Academic year 2023/2024.
- **Fellow of the course “Ricerca Operativa”** (MAT/09). Department of Management, Information and Production Engineering, University of Bergamo. Academic years 2021/2022, 2023/2024.
- **Fellow of the course “Statistica”** (SECS-S/01). Department of Management, University of Bergamo. Academic years 2019/2020, 2020/2021, 2021/2022.

- **Fellow of the course “Elementi di Matematica”** (SECS-S/06). Department of Management, University of Bergamo. Academic years 2020/2021, 2021/2022.
- **Fellow of the course “Analisi Matematica I”** (MAT/05). Department of Management, Information and Production Engineering, University of Bergamo. Academic years 2018/2019, 2019/2020, 2022/2023.
- (September 29, 2022 - present) **President of the association “Diamo i Numeri”**
Webpage: <https://diamo-i-numeri.it>

Bergamo, September 28, 2024