
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**DOTTORATO DI RICERCA / PhD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Activities and Publications Report

PhD Student: Enea Vincenzo Napolitano

Student DR number: DR996971

PhD Cycle: XXXVIII

PhD Chairman: Prof. Stefano Russo

PhD program student's start date: 01/01/2023

PhD program student's end date: 31/12/2025

Supervisor: Prof. Elio Masciari

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PhD scholarship funding entity: PNRR project RESTART

General information

Enea Vincenzo Napolitano received in year 2022 the Master Science degree in Data Science from the University of Napoli Federico II. Within the PhD program in Information Technology and Electrical Engineering, he attended a curriculum in Computer Engineering. He received a grant from PNRR project RESTART.

Study activities

Attended Courses

Year	Course Title	Type	Credits	Lecturer	Organization
1 st	IoT Data Analysis	Ad hoc course	4	Dr. Raffaele Della Corte	ITEE PhD Program
1 st	Using Deep Learning Properly	Ad hoc course	4	Dr. Andrea Apicella	ITEE PhD Program
1 st	How to Boost your PhD	Ad hoc course	4	Prof. Antigone Marino	University of Naples Federico II
1 st	Statistical data analysis for science and engineering research	Ad hoc course	4	Prof. Roberto Pietrantuono	ITEE PhD Program
1 st	I pilastri della Trasformazione Digitale	Ad hoc course	3	Dr. Francesco Tortorelli	ITEE PhD Program
1 st	Scienza moderna e disciplina giuridica dell'Intelligenza Artificiale	Ad hoc course	6	Prof. Lucio Franzese	ITEE PhD Program
1 st	Academic Entrepreneurship	Ad hoc course	4	Prof. Pierluigi Rippa	University of Naples Federico II
1 st	Percorso per il rafforzamento delle competenze sulla progettazione europea	External course	3,4	Ministero dell'Università e della Ricerca	Ministero dell'Università e della Ricerca, Ateneo Federico II
2 nd	Strategic Orientation for STEM Research & Writing	Ad hoc course	4	Chie Shin Fraser	ITEE PhD Program

Attended PhD Schools

Year	School title	Location	Credits	Dates	Organizer(s)
1 st	16th International Summer School on Software Engineering (ISSSE 2023)	Fisciano (SA)	3	12-13-14-15/06/2023	University of Salerno

Attended Seminars

Year	Seminar Title	Credits	Lecturer	Lecturer affiliation	Organization
1 st	Is control a problem solved for aerial Robotic Research?	0.2	Prof. Antonio Franchi	Sapienza University of Rome	ITEE
1 st	5G Academy	1.8	5G Academy	5G Academy	5G Academy
1 st	Industry 4.0 Fundamentals in Bosch Application	1	Polytechnic of Bari	Polytechnic of Bari	Polytechnic of Bari
1 st	Embracing Data Imperfections Via Domain Enriched Visual Task Learning	0.2	Prof. Antonio De Maio	University of Naples Federico II	ITEE
1 st	Algorithm Unrolling: Efficient, Interpretable Deep Learning for Signal and Image Processing	0.2	Prof. Antonio De Maio	University of Naples Federico II	ITEE
1 st	MLOps: Achieving Operational Velocity with Faster Delivery and Collaboration	0.2	Prof. Tarry Singh	University of Texas at Dallas - USA	ITEE
1 st	Unleashing the Power of LLMs: a Historical perspective on Generative AI	0.2	Prof. Tarry Singh	University of Texas at Dallas - USA	ITEE
1 st	Analysis and control of functional brain networks	0.2	SS Meridionale	SS Meridionale	SS Meridionale
1 st	The state of the art of AI and Physics-Based Simulations in drug discover	0.2	Andrea Beccari	University of Naples Federico II	ICTH
1 st	Enhancing qubit readout with Bayesian Learning	0.2	Dr. Nicola Lo Gullo	University of Calabria	Department of Physics
1 st	Traffic Engineering with Segmented Routing: optimally addressing popular use case	0.2	Prof. Pascal Mérindol	Université de Strasbourg	DIETI
1 st	Ricerca e formazione nella società della transizione digitale	1	CINI	CINI	CINI
1 st	Come scrivere un articolo scientifico?	0.3	Dr. Davide Migliorini	Springer	Springer
1 st	Come funzionano le riviste?	0.3	Maria Cristina Acocella	Springer	Springer

2 nd	Exploring the Frontiers of Modern Cryptography	0,3	Prof. Antonis Michalas	Tampere University, Finland	ITEE
2 nd	Social Network Analysis: Methods and Applications	0,4	Prof. Tanmoy Chakraborty	IIT Delhi, India	ITEE
3 rd	Can we rely on AI?	0,2	Prof. Paolo Rech	UniTrento	ITEE
3 rd	FAIR 2nd Year Workshop	0,8	Resilient AI Researchers	FAIR	FAIR
3 rd	Trusted Execution Environments for QPUs	0,2	Prof. Jakub Szefer	Northwestern University	ITEE
3 rd	Argumentation-Based Reasoning Frameworks for Public Interest Communication in Healthcare	0,4	Prof. Sergio Flesca	University of Calabria	ITEE

Research activities

Enea Vincenzo Napolitano participated in the research activities of the PICUSLab group. He worked specifically on the theme of sustainability in artificial intelligence, with a strong focus on assessing and reducing the environmental footprint of advanced data-driven systems. His contribution concerns the development of metrics and methodologies to estimate CO₂-equivalent emissions of AI tasks, the design of context-aware emission tracking frameworks for AI models and infrastructures and the integration of environmentally-responsible criteria into the deployment of smart-city technologies and digital-transformation projects in public administration.

Tutoring and supplementary teaching activities

Enea Vincenzo Napolitano has served as co-supervisor for two MSc theses and has provided guidance and support to several students during the preparation of their theses.

Credits summary

PhD Year	Courses	Seminars	Research	Tutoring / Supplementary Teaching
1 st	35.4	7.2	17.4	0
2 nd	5	0.7	54.3	0
3 rd	0	1.6	58.4	0

Research periods in institutions abroad and/or in companies

PhD Year	Institution / Company	Hosting tutor	Period	Activities
2 nd	University of Houston, Houston, USA	Prof. Carlos Ordonez	May 2024 – November 2024	Research on data management optimization and the development of advanced algorithms for sparse matrix processing.

PhD Thesis (*abstract 100-500 words*)

In the PhD Thesis, Enea Vincenzo Napolitano deals with the problem of measuring and mitigating the environmental impact of Artificial Intelligence systems. The research addresses the growing ecological cost of AI, particularly the CO₂ emissions associated with model training and operation, and the lack of standardized methodologies for estimating and reporting these impacts. The candidate's original contribution concerns the formulation of a unified analytical metric that models the main variables influencing the carbon footprint of AI tasks, the development of a hybrid estimation methodology that integrates multiple tracking tools to improve accuracy and comparability, and a large-scale empirical study assessing sustainability awareness in the machine learning research community.

Research products

Research results appear in 5 papers published in international journals, 21 papers published in international conferences.

List of scientific publications

International journal papers

Borraccia, Salvatore, Elio Masciari, and Enea Vincenzo Napolitano. *Green metrics for AI: A hybrid strategy for environmental impact assessment*. **Array** (2025): 100528.

Masciari, Elio, and Enea Vincenzo Napolitano. *Assessing awareness of environmental sustainability in machine learning research*. **World Wide Web** 28.4 (2025): 43.

Masciari, Elio, and Enea Vincenzo Napolitano. *An effective measure for evaluating the environmental impact of AI tasks: E. Masciari, EV Napolitano*. **Computing** 107.7 (2025): 153.

Indrio, Flavia, et al. *Functional gastrointestinal disorders predictors in neonates and toddlers: A machine learning approach to risk assessment*. **Heliyon** 11.1 (2025).

di Torrepadula, Franca Rocco, et al. *Machine learning for public transportation demand prediction: A systematic literature review*. **Engineering Applications of Artificial Intelligence** 137 (2024): 109166.

International conference papers

Borraccia, Salvatore, Elio Masciari, and Enea Vincenzo Napolitano. *A Hybrid Approach to Estimating AI Carbon Emissions*. *International Conference on Database and Expert Systems Applications*. Cham: Springer Nature Switzerland, 2025.

Masciari, Elio, and Enea Vincenzo Napolitano. *Optimizing Transitive Closure Computation for High Performance Computing and Security*. *2025 33rd Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP)*. IEEE, 2025.

Conza, Maria Luisa, et al. *Enhancing Employee Health Through an Experimental Diet: Insights from Machine Learning Analysis*. *2025 33rd Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP)*. IEEE, 2025.

Napolitano, Enea Vincenzo, Elio Masciari, and Carlos Ordonez. *Integrating flow and structure in diagrams for data science*. *2024 IEEE International Conference on Big Data (BigData)*. IEEE, 2024.

Masciari, Elio, and Enea Vincenzo Napolitano. *Environmental sustainability of AI: Estimating CO₂e emissions across cloud, edge, and fog paradigms*. *International Conference on Web Information Systems Engineering*. Singapore: Springer Nature Singapore, 2024.

Masciari, Elio, and Enea Vincenzo Napolitano. *Sustainability and High Performance Computing*. *International Conference on Information Integration and Web Intelligence*. Cham: Springer Nature Switzerland, 2024.

Masciari, Elio, and Enea Vincenzo Napolitano. *The environmental cost of high performance computing system simulation*. *2024 32nd Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)*. IEEE, 2024.

Indrio, Flavia, et al. *Infantile Predictors of Functional Gastrointestinal Disorders: A Machine Learning Approach to Risk Assessment*. (2024).

Fioretto, Simona, Elio Masciari, and Enea Napolitano. *Machine Learning for KPI Development in Public Administration*. *Proceedings of the 13th International Conference on Data Science, Technology and Applications, DATA 2024*. SciTePress, 2024.

Benfenati, Domenico, et al. *AI in Medicine: Activities of the CINI-AIIS Lab at University of Naples Federico II*. *CEUR Workshop Proceedings*. Vol. 3762. CEUR-WS, 2024.

Bassi, Nicola, and Enea Vincenzo Napolitano. *Drive BELT: A Strategic Decision-Making Tool for Optimizing Naval and Rail Freight Logistics*.

Napolitano, Enea Vincenzo. *Intelligent technologies for urban progress: exploring the role of AI and advanced telecommunications in smart city evolution*. *European Conference on Advances in Databases and Information Systems*. Cham: Springer Nature Switzerland, 2023.

Amato, Flora, et al. *Evolving justice sector: An innovative proposal for introducing AI-based techniques in court offices*. *International Conference on Electronic Government and the Information Systems Perspective*. Cham: Springer Nature Switzerland, 2023.

Fioretto, Simona, Elio Masciari, and Enea Vincenzo Napolitano. *Dossier classification to support workflow management optimization*. *International Conference on Numerical Computations: Theory and Algorithms*. Cham: Springer Nature Switzerland, 2023.

Napolitano, Enea Vincenzo, et al. *How pandemic affected the adoption of e-health systems*. *Proceedings of the 27th International Database Engineered Applications Symposium*. 2023.

Anniciello, Arianna, et al. *Digital Twins for Traffic Congestion in Smart Cities: A Novel Solution Using Data Mining Techniques*. *KMIS*. 2023.

Fioretto, Simona, Elio Masciari, and Enea Vincenzo Napolitano. *Can the Study of Trajectories Help to Extract Information from Business Processes?* *PMAI@IJCAI*. 2023.

Fioretto, Simona, Elio Masciari, and Enea Vincenzo Napolitano. *A Joint Analysis of Trajectory Mining and Process Mining for Smartphone User Behaviour*. *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*. Cham: Springer Nature Switzerland, 2023.

Napolitano, Enea Vincenzo. *Trajectory Mining for Smart Cities: A Focus on Indoor Localization using 5G Technology*. *SEBD*. 2023.

Amato, Flora, et al. *Introducing AI-Based Techniques in the Justice Sector: A Proposal for Digital Transformation of Court Offices*. *SEBD*. 2023.

Anniciello, Arianna, et al. *Covid-19 impact on health information technology: the rapid rise of e-Health and Big Data driven innovation of healthcare processes*. *2022 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, 2022.

Awards and Prizes

Best Reviewer @MEDI2024

Activities and Publications – Final Report

UNINA PhD in Information Technology and Electrical Engineering – XXXVIII Cycle

PhD candidate: Enea Vincenzo Napolitano

Date 12/12/2025

PhD student signature

Enea Vincenzo Napolitano

Supervisor signature

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