

PERSONAL INFORMATION

Federico Manzoni



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Date of birth 13 April 1997 | Nationality Italian

EDUCATION AND TRAINING

2021–2025 – EQF8

PhD in Theoretical Physics and Mathematical Physics

Institution Roma Tre University.

Grade Summa cum laude.

Thesis “Duality and asymptotic symmetries in gravisolitons and gauge theories”.

Academic fields FIS/02, MAT/04.

2022–2025 – EQF7

Master’s Degree in Mathematics – LM-40

Institution Sapienza University of Rome.

Grade 110/110 cum laude.

Thesis “Topological condensed matter: mathematical analysis of fully symmetric chains”.

Curriculum Algebra, geometry and topology.

Exams Advanced Analysis (30), Advanced Geometry (29), Advanced Algebra (25), Condensed Matter Physics II (30L), Dynamical Systems (30L), Gravitational Waves, Compact Stars and Black Holes (30), Stochastic Calculus (30), Algebraic Topology (30L), Algebraic Geometry (25), Riemannian Geometry (29), Functional Analysis (30), Advanced Probability (30).

2019–2021 – EQF7

Master’s Degree in Physics – LM-17

Institution Sapienza University of Rome.

Grade 110/110 cum laude.

Thesis “AdS/CFT extensions: unoriented quiver gauge theories”.

Curriculum Theory of fundamental interactions.

Exams Relativistic Quantum Mechanics (29), Condensed Matter Physics I (30), Physics Laboratory I (28), Fluid Mechanics and Kinetic Theories (30L), General Relativity (30), Quantum Electrodynamics (30), Mathematical Physics (30), Electroweak Interactions (30), Physics Laboratory II (30L), Nonlinear Waves and Solitons (30L), Quantum Gravity (30), Quantum Field Theory (29).

2016–2019 – EQF6

Bachelor’s Degree in Physics

Institution Sapienza University of Rome.

Grade 107/110.

Thesis “Classical relativistic string theory and application to dS space”.

Curriculum General physics.

2011–2016 – EQF4

Scientific High School Diploma

Institution Liceo Statale Maria Montessori, Rome.

Grade 84/100.

Thesis “Nirvana: between contemporary decadence, electromagnetic induction and psychotropic substances”.

Specialisation Scientific-technological.

POSTGRADUATE COURSES AND
CERTIFICATIONS

- ongoing **Signum Diploma of Specialisation in Tolkien Studies**
Specialisation courses in Tolkien studies.
- ongoing **EITCA/IS Information Technologies Security Academy**
Cybersecurity academy covering computational complexity, classical cryptography, quantum cryptography, computer system security, web application security and penetration testing.
- 2026 **EITCA/WD Web Development Academy**
Web development academy: [HTML and CSS Fundamentals](#), [JavaScript Fundamentals](#), [PHP and MySQL Fundamentals](#), [Webflow Fundamentals](#), [Webflow CMS and eCommerce](#), [Advanced Webflow](#), [WordPress Fundamentals](#), [Elementor for WordPress](#), [LearnDash WordPress LMS](#), [Adobe Dreamweaver](#), [Google Web Designer](#).
Overall grade: 92/100.
- 2026 **EITCA/AI Artificial Intelligence Academy**
Artificial intelligence academy: [Python Programming Fundamentals](#), [Machine Learning with Python](#), [TensorFlow Fundamentals](#), [Deep Learning with Python](#), [Deep Learning with TensorFlow](#), [Deep Learning with Keras](#), [Google Cloud Platform](#), [Google Cloud Machine Learning](#), [Google Vision API](#), [Advanced Deep Learning](#), [Advanced Reinforcement Learning](#), [Quantum Machine Learning](#).
Overall grade: 94/100.
- 2025 **Initial Teacher Training Qualification Master A027**
Master's programme, through Sapienza University of Rome, for initial teacher qualification, worth 60 ECTS credits, covering teaching, pedagogy, school legislation, inclusive education, linguistic-digital areas and psycho-socio-anthropological studies, with a final 180-hour in-school internship.
Overall grade: 10/10.
- 2025 **EIPASS IT Courses**
Training courses in digital skills, essential in the digital age, including IT security, Google Workspace, Word, Excel, PowerPoint and Access.
Overall grade: 99/100.
- 2024 **Master in Earth Sciences**
Master's programme, through EdX, on Earth Sciences topics such as [climate and climate change](#), [earthquakes](#), [volcanoes](#), [coastal disasters and their prevention](#).
Overall grade: A.

PUBLICATIONS AND OTHER
ACTIVITIES

- 2025 **Programme "The toolbox against gender-based violence"**
[Programme on the promotion of gender equality and equity and, more generally, diversity and inclusion, through specific topics such as physical, economic and psychological violence, stalking, online gender-based violence, harassment in professional relationships, and the fight against discrimination, stereotypes and gender prejudice.](#)
- 2024 **Programme "NoiBene"**

Transversal skills contributing to psychological well-being, self-fulfilment, the ability to communicate assertively and empathetically, and success in academic, professional and relational contexts: [assertiveness](#), [collaboration](#), [learning to learn](#), and [health, medical sciences, active listening](#).

2023 Visiting PhD at Perimeter Institute

Four-month international experience, from September to December, at the Perimeter Institute theoretical physics centre in Canada, involving collaboration on research topics.

2022 Visiting PhD at SISSA and ICTP

Participation, by selection and with limited admission, in the three-month visiting programme at SISSA, from May to July, and collaboration with researchers at ICTP.

2021–ongoing Conferences and seminars at national and international institutions

Conferences and seminars at national and international research institutions on research topics in physics, mathematics, pedagogy, natural sciences, biology, geology and Tolkien studies, with presentation of original research results through talks and seminars.

1. Nov 2022, seminar “Holography and AdS/CFT extensions”, Department of Mathematics and Physics, Roma Tre University, Rome;
2. Feb 2022, seminar “Asymptotic symmetries in Maxwell and Einstein theories”, Department of Mathematics and Physics, Roma Tre University, Rome;
3. Sep 2022, talk “Symplectic central charges in superconformal stringy inspired field theories”, III Siembra-HoLAGrav YFM, online;
4. Dec 2022, talk “Algebraic-geometrical orientifolds and IR dualities”, XVIII Avogadro Meeting on Strings, Supergravity and Gauge Theories, Turin;
5. Apr 2023, talk “IR duality driven by algebraic-geometrical orientifolds”, ICTP Superstring and Related Topics, Trieste;
6. May 2023, seminar “Higher groups and higher categories: a survival journey in the realm of generalized symmetries”, Department of Mathematics and Physics, Roma Tre University, Rome;
7. Jun 2023, seminar “The geometry of general relativity: a mathematician friendly introduction to gravity”, Guido Castelnuovo Department of Mathematics, Sapienza University of Rome, Rome;
8. Jul 2023, talk “2-symplexes and superconformal central charges”, Strings, Waterloo;
9. Sep 2023, talk “p-form gauge theories: duality and asymptotic symmetries”, New Frontiers in Theoretical Physics – XXXVII National Conference on Theoretical Physics, Cortona;
10. Feb 2024, seminar “Solitonic solutions of gravity: from Belinski–Zakharov transform to quantum gravity algebra”, SISSA, Trieste;
11. May 2024, talk “Axialgravisolitons and new perspective in non-perturbative and quantum gravity”, Fundamental Challenges in Theoretical Physics, Padua;
12. Jun 2024, seminar “Integrable structure of four-dimensional gravity and the spectral transform”, Max Planck Institute for Gravitational Physics, Potsdam;
13. Sep 2024, talk “Axialgravisolitons and corner proposal for quantum gravity”, Theories of the Fundamental Interactions, Naples;
14. Dec 2024, talk “Mathematical structure of asymptotic symmetries in p-form gauge theories”, XIX Avogadro Meeting on Strings, Supergravity and Gauge Theories, Padua;
15. Feb 2025, seminar “Asymptotic charges for exotic gauge fields: from p-forms to the Curtright dual graviton”, SISSA, Trieste;
16. Apr 2025, talk “String theory and IR duality of field theories: simplicial cohomology and algebraic-geometric toric transitions”, Strings and Geometry, Trieste;
17. Jun 2025, seminar “Higher-order asymptotic symmetries in scalar-form duality framework and their symplectic renormalization”, Durham University, Durham;
18. Sep 2025, seminar “Existence and uniqueness results of duality maps in exotic gauge theories”, Riemann Center for Geometry and Physics, Hannover;
19. Mar 2026, talk “From duality to BMS-like structures: the asymptotic charges of the Curtright field”, Foundations of General-Relativistic Gauge Field Theory, Turin;

20. Apr 2026, seminar "Higher form symmetries and Möbius-principal-equivariant bundle perspective on celestial CFTs", GGI, Florence;
21. Sep 2026, talk "Geometric/topological transitions in toric CY threefolds and IR duality", Mirror Symmetry, Calabi-Yau Threefolds, and Connections to Physics, Providence.

2021–ongoing Publications in international scientific journals and online archives

Publication of scientific papers, both single-authored and collaborative, written in English and published in international journals and archives. The physics and mathematics articles, available on the [INSPIRE profile](#), concern string theory, quantum gravity, gauge theories, gravitons and mathematical tools for theoretical physics, including existence and uniqueness theorems for differential equations, cohomological theories and several branches of modern geometry.

1. 2021, "Solitonic solutions and gravitational solitons: an overview", [nlin.SI];
2. 2022, "2-simplexes and superconformal central charges", [hep-th], PLB;
3. 2022, "Algebra-geometrical orientifolds and IR dualities", [hep-th], CTP;
4. 2024, "Axialgravitons at infinite corners", [gr-qc], CQG;
5. 2024, "Asymptotic charges of p -forms and their dualities in any D ", [hep-th];
6. 2024, "Duality, asymptotic charges and higher form symmetries in p -form gauge theories", [math-ph], EPJC;
7. 2025, "Duality, asymptotic charges and algebraic topology in mixed symmetry tensor gauge theories", [math-ph];
8. 2025, "On the solution of the harmonic-divgrad PDEs system", [math-ph];
9. 2025, "Higher-order p -form asymptotic symmetries in $D = p + 2$ ", [hep-th], IJTP;
10. 2026, "The asymptotic charges of Curtright dual graviton and Curtright extensions of BMS algebra", [hep-th], JPhysA;
11. 2026, "The Zak phase in topologically insulating chains: invariants and limitations", [math-ph], ATMP.
12. In progress, "Twistors and exotic gauge theories I", [math-ph];
13. In progress, "Twistors and exotic gauge theories II", [math-ph].

2021 Participation in experiments at Lab. G23 Sapienza

Design, execution and reporting of experiments at Lab. G23 Sapienza on topics related to LIGO/Virgo gravitational-wave interferometers.

WORK EXPERIENCE

Jan 2026 – Feb 2026

Adjunct Teacher

Salesian Institute Pio XI.

Remedial courses for first-term deficiencies.

Skills: teamwork, activity planning, instructional design, public speaking.

Oct 2024 – Dec 2024

Riemann Fellowship

Riemann Center for Geometry and Physics.

Collaboration with the centre's research groups.

Skills: teamwork, activity planning, research, public speaking.

May 2023 – May 2025

Consultant and Educational Collaborator

Qui si Risolve.

Design, review and quality control of digital learning materials for all levels of education.

Skills: critical analysis, creativity, teaching methodologies.

Jan 2022 – Jan 2023 Laudes Tutor

Laudes Cultural Association.

Tutoring students aged 12 to 20 in achieving goals in school and university contexts.

Skills: effective communication, emotional intelligence, time management.

Sep 2022 – Jun 2024 University Tutor under Contract

Roma Tre University.

Preparation and delivery of lessons, study support.

Skills: effective communication, time management, public speaking.

SKILLS

Digital Skills

Digital skill	Level
LaTeX	Advanced ●●●●●
Overleaf	Advanced ●●●●●
Python	Intermediate-Advanced ●●●●○
Jupyter Notebook	Intermediate-Advanced ●●●●○
Pandas	Intermediate ●●●○○
Scikit-Learn	Intermediate ●●●○○
Keras	Intermediate ●●●○○
TensorFlow	Intermediate ●●●○○
Mathematica	Intermediate-Advanced ●●●●○
Matlab	Intermediate ●●●○○
Simulink	Intermediate ●●●○○
PHP, SQL	Basic ●●○○○
Git, GitHub	Basic ●●○○○
Microsoft Windows	Intermediate-Advanced ●●●●○
Word, Excel, PowerPoint, Access	Advanced ●●●●●
macOS	Intermediate-Advanced ●●●●○
Pages, Numbers, Keynote	Advanced ●●●●●
Linux and Ubuntu	Basic-Intermediate ●●●○○
Google Workspace	Advanced ●●●●●
C, C++, C#	Basic ●●○○○
RStudio	Basic ●●○○○
gnuplot	Intermediate ●●●○○
Kojo	Intermediate-Advanced ●●●●○
Twine	Intermediate-Advanced ●●●●○
HTML, CSS, JavaScript	Intermediate ●●●○○
WordPress	Intermediate-Advanced ●●●●○
LearnDash	Intermediate ●●●○○
Padlet	Advanced ●●●●●
Kahoot!	Advanced ●●●●●
Adobe Dreamweaver	Basic-Intermediate ●●●○○
Google Web Designer	Basic-Intermediate ●●●○○

Interpersonal Skills

Skill	Level
Effective communication	Intermediate-Advanced ●●●●○
Problem solving	Advanced ●●●●●
Teamwork	Intermediate-Advanced ●●●●○
Adaptability	Intermediate ●●●○
Time management	Advanced ●●●●●
Critical thinking	Advanced ●●●●●
Empathy	Intermediate-Advanced ●●●●○
Leadership	Intermediate-Advanced ●●●●○
Creativity	Advanced ●●●●●
Organisational skills	Advanced ●●●●●
Active listening	Intermediate-Advanced ●●●●○
Stress management	Intermediate-Advanced ●●●●○
Reliability	Advanced ●●●●●
Flexibility	Intermediate-Advanced ●●●●○
Results orientation	Advanced ●●●●●

Language Skills

Mother tongue Italian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	C1	B2	B2	C1
Spanish	A2	B1	A1	A1	A2

Hobbies

– *Chess, Chinese checkers, backgammon and Risk player.*

Board games stimulate memory, concentration and problem-solving skills, while also reducing stress and increasing emotional well-being by fostering social bonds, empathy and resilience. More specifically, chess, Chinese checkers, backgammon and Risk support the development of focused and sustained attention, as well as the ability to devise strategies.

– *Reading essays and watching documentaries.*

As a supporter of lifelong learning, I like to spend part of my free time learning new things through essays and documentaries on specific topics ranging from archaeology and nature to philosophy and engineering.

– *Souls games player: Demon's Souls, Dark Souls, Bloodborne, Sekiro, Elden Ring.*

Souls games develop patience, resilience and strategic thinking when facing challenges. They require concentration, reflection and the ability to learn from mistakes, fostering perseverance, since every failure becomes an opportunity to improve. They also strengthen attention to detail and critical thinking, as the narrative in Souls universes is fragmented and players must reconstruct the story by exploring the environment, reading descriptions and connecting scattered clues.

– *Sports activity.*

Sports activity is essential for maintaining good health. In addition to its physical benefits, it helps manage stress, improves mood and supports rest, contributing to overall well-being.