

CURRICULUM VITAE ET STUDIORUM



Name and surname: **Lorenzo Federico**

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INTRODUCTION TO THE CANDIDATE

Researcher in the field of soil ecology, with experience in assessing the quality of terrestrial ecosystems. Main expertise includes evaluating the effects of physical and chemical contaminants and other stressors associated with climate change on edaphic organisms; analysing structural and functional biodiversity; and characterising ecotoxicological risk. Research activity is focused on studying behavioural responses of soil organisms. Among the main scientific outcomes is the development of a gregarious behaviour indicator in terrestrial isopods, supported by innovative methodologies also based on artificial intelligence, for which a design patent has been filed.

QUALIFICATIONS

- 14/05/2026: PhD cum laude in Chemical, Geological and Environmental Sciences, University of Milano-Bicocca. Thesis title: "Development of a new biosensor based on behavioural responses of *Porcellionides pruinosus* (Ord. Isopoda) as a screening tool for detecting the quality of soil ecosystems".
- 18/10/2022: Master's Degree in Biodiversity and Biological Evolution (110/110 cum laude), University of Milan. Thesis title: "Surviving marine acidification: analysis of biomarkers in calcifying molluscs *Patella* spp. and *Mytilus galloprovincialis* from the CO₂ vent of Ischia island (Italy)".
- 12/03/2019: Bachelor's Degree in Natural Sciences (110/110 cum laude), University of Palermo. Thesis title: "The *Posidonia oceanica* (L.) Delile meadow: biological indicators in monitoring activities under the Marine Strategy Framework Directive (Directive 2008/56/EC)".

TEACHING ACTIVITIES

Adjunct Professor:

- 03/03/2026–30/03/2026: Adjunct Professor for "Laboratory for Biological Quality Analysis" (SSD BIO/07, BIOS-05/A), 10 hours, 1 CFU, Degree Programme in Environmental and Territorial Sciences and Technologies, University of Milano-Bicocca, Italy.

Tutoring activities:

- AY 2026/2027: Tutor (Type A, 20 hours) for the Master's Degree Programme "Economics and Technologies for Sustainability", teaching module "Planetary boundaries as basis for sustainability concepts – F7603Q005", module "Managing impact of production on the environment – F7603Q00502, BIOS-05/A", University of Milano-Bicocca, Italy.
- AY 2025–2026 and 2026–2027: Tutor (Type A, 48 hours) for the Bachelor's Degree Programme "Economics and Science for Environmental Sustainability (ESES)", course "Ecosystems and technosystems: aspects of sustainable societies – E3304M005, BIOS-05/A", University of Milano-Bicocca, Italy.
- 03/04/2025–25/09/2025: Computer Tutor (n° 408282), teaching class A50.
- 04/12/2023–30/09/2024: Thesis Support Tutorship Type H (n° 0434658) for the Master's Degree Programme in Environmental and Territorial Sciences and Technologies, University of Milano-Bicocca.

Subject Expert (Cultore della materia):

- For the course ECOTOXICOLOGY [F7501Q085, BIOS-05/A], Master's Degree in Environmental and Territorial Sciences and Technologies, University of Milano-Bicocca, Italy, for AY 2024/2025 and 2025/2026.
- For the course [F0601Q105, BIOS-05/A] STRESS ECOLOGY, Master's Degree in Biology, University of Milano-Bicocca, Italy, for AY 2023/2024 and 2024/2025.

Seminars:

- 07/07/2026: Seminar lecture "Bioindication and remediation of soils through edaphic invertebrates", delivered by

Prof. Sara Remelli for Master's students in Environmental Sciences and Resources, University of Parma, Italy.

PRIZES

- 2026: Winner of the Antonio Moroni Prize – Italian Society of Ecology (SItE).
- 2025: 1st Best Young Italian Scientist Award – Society of Environmental Toxicology and Chemistry (SETAC) – Italian Language Branch (ILB).

RESEARCH PROJECTS

The candidate has been involved in the following research projects:

- P3, 2025–2026: PRIN project – NANOpastics Toxicity Evaluation and Risk (management) in teRrestrial Agro-Ecosystems (NanoTERRAE). Role: Type A research fellow. Activities: study of the behavioural effects of plastics in agricultural environments on soil detritivorous organisms.
- P2, 2024–2025: LIFE CAPTURE – Combining novel analytical protocols for PFAS contamination with technologies for sustainable remediation. Role: working group member. Activities: study of the behavioural effects of PFAS on soil organisms.
- P1, 2023–2025: Multilayered Urban Sustainability Action – MUSA – S.C.A R.L., funded by the European Union – NextGenerationEU, under the National Recovery and Resilience Plan (NRRP) Mission 4, Component 2, Investment Line 1.5: Strengthening of research structures and the creation of R&D ‘innovation ecosystems’, established by ‘territorial leaders in R&D’. Role: PhD student. Activities: development of new biosensors for assessing the ecological quality of soil.

ABROAD RESEARCH PERIODS

- 2024–2025: Research placement at the Centre for Environmental and Marine Studies (CESAM) at the University of Aveiro, Portugal, under the supervision of Professor Susana Loureiro.

EXPERTIES IN FUND MANAGEMENT AND FUNDRAISING

- 2024: Team Leader of the winning project in the 4th BiUniCrowd Call – Università del Crowdfunding Milano Bicocca: ‘Lots of little piggies! Biosensors for monitoring soil quality’. Organisation: UNIMIB.

PATENTS

- 31 March 2026: Filing of a patent application (No. 102026000008788) entitled “System and associated method for monitoring the ecological quality of natural soils or for characterising the ecological risk posed by chemical and physical substances potentially present in soils through the analysis of the gregarious behaviour of terrestrial isopods”.

TRAINING COURSES

- 2026: 4th Training School on “Infrared and Raman Instrumentation for Microplastic Detection” at the Leibniz Institute of Photonic Technology (Leibniz IPHT), Jena, Germany. Organising body: ICPLASTIC – ‘ISO-compatible, efficient and reproducible protocols/equipment for micro- and nanoplastic detection through machine learning’, as part of COST (European Cooperation in Science and Technology).
- 2025: ‘ERC/MSCA Proposal Writing Workshop’, organised as part of training in European project design for the preparation of competitive research proposals. Organiser: UNIMIB.
- 2025: Course on the safe handling of industrial and cryogenic gases, aimed at providing theoretical and practical training on the correct management, handling and storage of compressed and cryogenic gases. Organiser: UNIMIB.
- 2023: General training course for workers on health and safety in the workplace, in accordance with Article 37 of Legislative Decree 81/2008 and the State-Regions agreements. Organiser: UNIMIB.

PEER REVIEW ARTICLES

Number of publications: **13**; *h*-index (Scopus): **5**

Effects on soil organisms:

1. **Federico, L.^{†*}**, Rosatelli, A., Lamanna, N., Termopoli, V., Lange, H., Franzetti, A., Gandolfi, I., Villa, S. (2026). Ecological Facilitation: Terrestrial Isopods indirectly Modulate Collembolan Behaviour in Biochar-Amended Soils. *SEL*, accepted for publication (August 11th, 2026).

2. **Federico, L.^{†*}**, Parzer, R., Rizzi, C., Nigro, L., Monti, G. S., Villa, S. (2026). Potential of Henry's Law Constant as a Predictive Indicator of Behavioural Effect in *Porcellionides pruinosus*: Implications for Ecological Impact Assessment. *ETC*, v226. <https://doi.org/10.1093/etojnl/v226>
3. **Federico, L.[†]**, Peixoto, S., Gonçalves, S.F., Loureiro, S., Villa, S.^{*}, Morgado, R.G. (2026). Aggregation behavior of Terrestrial Isopods as an Indicator to assess Biotic and Abiotic Stressors. *ETC*, 157. <https://doi.org/10.1093/etojnl/v226>
4. **Federico, L.^{†*}**, Tatangelo, V., Pittino, F., Russo, C., Vegini, E., Citterio, S., Franzetti, A., Villa, S. (2026). The potential use of behavioural bioassays as a first-tier approach for screening urban soil biodiversity: a pilot study. *Urb. Ecosyst.*, 29(1), 42. <https://doi.org/10.1007/s11252-026-01908-6>
5. Masseroni, A.[†], **Federico, L.[†]**, Becchi, A., Quinto, M., Saliu, F., Villa, S.^{*} (2026). Effects of Pristine and Aged LDPE and PP Microplastic Leachates on Behavioural Responses of the Soil Arthropods *Folsomia candida* and *Porcellionides pruinosus*. *Toxics*, 14(6), 502. <https://doi.org/10.3390/toxics14060502>
6. Nigro, L.[†], **Federico, L.^{*}**, Tatangelo, V., Villa, S. (2026). Root Growth as an Early Indicator of PFAS Phytotoxicity in Plants. *Toxics*, 14(6), 455. <https://doi.org/10.3390/toxics14060455>
7. **Federico, L.[†]**, Monti, G. S.^{*}, Loureiro, S., Villa, S. (2024). Disaggregation behavior in the terrestrial isopod *Porcellionides pruinosus* as a new ecotoxicological endpoint for assessing infochemical disrupting activity. *Ecol. Indic.*, 167, 112602 <https://doi.org/10.1016/j.ecolind.2024.112602>

Effects on aquatic organisms:

8. Caronni, S.[†], **Federico, L.^{*}**, Panzalis, P., Villa, S., Citterio, S. (2025). Changes in the Structure of the Bacterial Community Associated With *Ericaria amentacea* Blades Under Disturbed Conditions. *Plant Environ. Int.*, 6(5), e70089. <https://doi.org/10.1002/pei3.70089>
9. Signorini, S. G.[†], Munari, M., **Federico, L.**, Fare, F., Fontana, M., Caruso, D., Freitas, R., Paciello, S., D'Aniello, I., Gambi, M.C., Della Torre, C.^{*} (2024). Living under natural conditions of ocean acidification entails energy expenditure and oxidative stress in a mussel species. *Mar. Poll. Bull.*, 203, 116470. <https://doi.org/10.1016/j.marpolbul.2024.116470>
10. Masseroni, A.[†], **Federico, L.**, Villa, S.^{*} (2024). Ecological fitness impairments induced by chronic exposure to polyvinyl chloride nanospheres in *Daphnia magna*. *Heliyon*, 10(23). <https://doi.org/10.1016/j.heliyon.2024.e40065>

Exposure of contaminants:

11. Rico, A.^{†*}, Picazo, A., Chavez, J., Campo, J., Colomer-Vidal, P., Muñoz-Arnanz, J., Jiménez, B., Rizzi, C., **Federico, L.**, Villa, S., Palacios, J.F., Rochera, C., Amador, P., Camacho, A. (2025). Impacts of the 2024 flash flood on water quality, pathogenic bacteria and organic contaminant risks in the Albufera wetland (Valencia, Spain). *Environ. Res.*, 123515. <https://doi.org/10.1016/j.envres.2025.123515>

Environmental risk assessment article:

12. **Federico, L.[†]**, Masseroni, A., Rizzi, C., Villa, S.^{*} (2023). Silent contamination: the state of the art, knowledge gaps, and a preliminary risk assessment of tire particles in urban parks. *Toxics*, 11, 445, <https://doi.org/10.3390/toxics11050445>

Ecosystem services articles

Federico, L.[†], Vogiatzakis, I.N., Luzzati, T., Villa, S.^{*}, Padoa-Schioppa, E. (2026). Ecological Inflation: a new paradox in the evaluation of ecosystem services. *Ecosyst. Serv.*, 80, 101884. <https://doi.org/10.1016/j.ecoser.2026.101884>

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CONGRESS

Invited Speaker:

1. 2026: Presentation title: "Linking Behavioural Bioassays and Soil Biodiversity as an Integrated Strategy for Environmental Quality Assessment" at the 36th Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC) Europe, Maastricht, Netherlands.
2. 2025: Presentation title: "A new sub-lethal ecotoxicological endpoint relating to alterations in gregarious behaviour in *Porcellionides pruinosus*" at the 4th Conference on Applied Ecotoxicology, organised by ISPRA – the Higher Institute for Environmental Protection and Research, Livorno branch, Italy.

Member of the organising committee:

3. 2026: Member of the organising committee for the 35th Young Researchers' Meeting in Ecology and Aquatic

Sciences, organised by the Italian Society of Ecology (S.It.E.) at the University of Milan-Bicocca, Milan, Italy.

Oral presentations:

1. 2026: Presentation title: "Breaking plastic, breaking balance: multi-level effects of mulches on terrestrial isopods" at the Plastics & Environment Workshop, 3rd Edition, University of Milan-Bicocca, Milan, Italy.
2. 2025: Presentation title: "Novel sub-lethal ecotoxicological endpoint based on gregarious behaviour alterations in *Porcellionides pruinosus*" at the 4th Congress of the Society of Environmental Toxicology and Chemistry (SETAC), University of Naples Federico II, Naples, Italy.
3. 2025: Presentation title: "Linking Behavioural Bioassays and Soil Biodiversity as an Integrated Strategy for Environmental Quality Assessment" at the 34th Congress of the Italian Society of Ecology, Vanvitelli University, Caserta, Italy.
4. 2025: Presentation title: "Soil under pressure: what terrestrial isopod aggregation patterns reveal about ecosystem health" at the 7th Eurosoil Congress and 10th Iberian Soil Science Congress, Seville, Spain.
5. 2024: Presentation title: "Towards the proposal of a new biosensor to monitor soil contamination levels" at the 11th ECOTOX LDS – Study Days on Research and Application of Ecotoxicological Methodologies, organised by ISPRA – Higher Institute for Environmental Protection and Research, Livorno branch, Italy.
6. 2024: Presentation title: "Disaggregation behaviour in the terrestrial isopod *Porcellionides pruinosus* as a new endpoint for soil quality assessment" at the 33rd Congress of the Italian Society of Ecology (Italian Society of Ecology), La Sapienza University, Rome, Italy.
7. 2024: Presentation title: "Alteration of gregarious behaviour in terrestrial isopod populations induced by abiotic and biotic factors" at the 33rd Congress of the Italian Society of Ecology (Italian Society of Ecology), La Sapienza University, Rome, Italy.
8. 2024: Presentation title: "A new ecological screening tool based on the aggregation of the terrestrial isopod *Porcellionides pruinosus* for assessing soil quality" at the SETAC Italian Language Branch Meeting (SETAC ILB), University of Milan, Milan, Italy.
9. 2024: Presentation title: "Disaggregation behaviour in the terrestrial isopod *Porcellionides pruinosus* as a new ecotoxicological endpoint for assessing infochemical disrupting activity" at the 34th Annual Meeting of SETAC Europe, Seville, Spain.
10. 2025: Titolo presentazione: "Soil under pressure: what terrestrial isopod aggregation patterns reveal about ecosystem health" at the 7th Eurosoil Congress and 10th Iberian Soil Science Congress, Siviglia, Spagna.

Poster:

1. 2026: Title: "A First Modelling Approach to Predict Behavioural Alterations in *Porcellionides pruinosus*" at the 36th Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC) Europe, Maastricht, Netherlands.
2. 2024: Title: "The role of bacterial coats in defining the health status of macroalgae of the *Cystoseira* genus" at the 33rd Congress of the Italian Society of Ecology, La Sapienza University, Rome, Italy.
3. 2023: Title: "Living under CO₂ pressure: investigation of oxidative stress enzymes and metabolic markers in two calcifying molluscs from the CO₂ vents of Ischia Island (Italy)" at the 33rd Annual Meeting of SETAC Europe, Dublin, Ireland.
4. 2022: Title: "Living under CO₂ pressure: investigation of oxidative stress enzymes and metabolic markers in two calcifying molluscs from the CO₂ vents of Ischia Island (Italy)" at the 32nd Congress of the ESCPB, Anton Dohrn Zoological Station, Ischia, Italy.

TERZA MISSIONE

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- 2026: 8th national edition of the Falling Walls Lab, University of Milan-Bicocca, Italy. Title: Breaking the wall of soil health AI-assessment.
 - 2025: 20th edition of Meet Me Tonight, Researchers' Night, University of Milan, Italy. Title: Earth Pigs: Sentinels of Soil Quality.
 - 2024: "Not Just the Environment, but Scientific Dialogues", G. Parodi High School, Alessandria, Italy.
 - 2023: "Lessico Naturale" at the expert panels on natural capital and climate change, Giacomo Feltrinelli Foundation, Milan, Italy.
 - 2023: "Bicocca Green Game" at the Vivaio Bicocca, University of Milan-Bicocca, Italy.
 - 2023: "Protecting Pollinators: Best Practices for the Correct Use of Plant Protection Products", organised by BASF (Badische Anilin- und Soda Fabrik), Cesano Maderno, Lombardy, Italy.

Milano, 01/10/2026

Signed
