

Silvia Fiore

Date of birth: [REDACTED] | **Nationality:** Italian | **Gender:** Female | **Phone:** (+39) 0111977613 (Work) | **Email address:** silvia.fiore@polito.it | **Address:** DIATI (Department of Land, Environment and Infrastructure Engineering), corso Duca degli Abruzzi 24, 10129, Torino, Italy (Work)

● WORK EXPERIENCE

15 MAR 2024 - CURRENT - TORINO, ITALY

FULL PROFESSORPOLITECNICO DI TORINO

- instructor of the courses "Environmental Chemistry" and "Circular Economy and Environmental Sustainability" in the Environmental Engineering BSc program and of the course "Agricultural Waste Management" in the AgriTech Master program
- coordinator of the Circular Economy Lab at DIATI
- supervisor of 3 PhD students (ongoing), previously of 13 PhD students and 15 research fellows
- coordinator of projects funded by companies and public institutions
- responsible of research unit in competitive projects funded with national and EU funds
- responsible for Sustainability at DIATI

16 OCT 2014 - 14 MAR 2024 - TURIN, ITALY

ASSOCIATE PROFESSORPOLITECNICO DI TORINO

1 OCT 2006 - 14 OCT 2014 - TURIN, ITALY

ASSISTANT PROFESSOR (PERMANENT POSITION)POLITECNICO DI TORINO

1 NOV 2002 - 30 SEP 2006 - TURIN, ITALY

POST DOC RESEARCH FELLOWPOLITECNICO DI TORINO

1 NOV 1999 - 31 OCT 2002 - TURIN, ITALY

PHD IN GEOENGINEERINGPOLITECNICO DI TORINO

RESEARCH TOPICS

My scientific activity involves both fundamental research and pilot/full-scale applications, and it is strongly oriented towards the techno-economic feasibility of the research findings. The main research topics covered are listed in the following (in decreasing order of significance).

-Treatment and **recycling of industrial/special waste** (e-waste/WEEE, end-of-life vehicles and tyres, foundry waste, bottom ash from solid waste incineration, lithium-ion batteries, solid oxide fuel cells):

physic-mechanical and chemical processes, Life Cycle Thinking tools, techno-economic assessment of full-scale applications.

-Conversion of **industrial waste** (agro-industrial, food-processing and cosmetic) into high-value products via **biorefineries** (anaerobic digestion, fermentation), **Life Cycle Thinking tools, techno-economic assessment of full-scale applications.**

-**Water treatment** (potabilization processes, disinfection by-products, emerging contaminants), **Life Cycle Thinking tools.**

-**Wastewater treatment** (municipal/industrial wastewater), **energy efficiency, greywater treatment via "green walls", and Life Cycle Thinking tools.**

- **Biochar engineered applications** (e.g., additive for anaerobic digestion processes, adsorbent for emerging contaminants, adsorption/desorption of nutrients for agriculture), **Life Cycle Thinking tools, techno-economic assessment of full-scale applications.**

- **Circularity and sustainability assessment** applied to companies in the sector of **industrial vehicles, agricultural and construction equipment, remanufacturing operations** (spare parts and electronic control units).

- **Pyrolysis processes** applied to waste biomass (agro-industrial waste) and non recyclable waste materials (contaminated mixed plastics and rubber), **Life Cycle Thinking tools, techno-economic assessment of full-scale applications.**

- **Assessment of the environmental performances of Italian companies registered to EMAS** (Eco-management and Audit Scheme) **in various sectors:** waste incineration, biowaste management, and hydroelectric energy production.

RELEVANT RESEARCH PROJECTS (COMPETITIVE)

- **ReGrab Recupero di metallic critici e GRAfite dalla Black mass di batterie esauste** (codice progetto MI_MPC_00021), bando MASE Materie Prime Critiche 2023. Role: Scientific responsible.

- **LeAD Leveraging Anaerobic Digestion through environmental stresses.** Call Horizon HORIZON-MSCA-2023-DN-01-01. Project ID 101168769. Role: **responsible for Politecnico di Torino as PhD supervisor.**

- **TALENT4IBERIA Career development of international talents of the energy research fields in the Iberian Peninsula.** Horizon MSCA COFUND 2022 project coordinated by the Government of Extremadura (Spain), role: **responsible for Politecnico di Torino as host institution.** project ID 101128265. The project lasts 54 months from January 2024.

- **PNRR Centro Nazionale AgriTech, Spoke 8 – Circular Economy in agriculture through waste valorization and recycling.** I am involved in the activities of task 8.3.2 “Valorisation and biological regeneration of wastes as resources, organic fertilizers, or amendments to improve carbon storage and soil quality” and task 8.4.2 “Multidimensional sustainability assessment of circular technologies in agriculture” (Sept 2022-Dec 2025)

- **PNRR PE11 3A-Italy “MICS Made in Italy Circolare e Sostenibile” Spoke 5 - Closed-loop, sustainable, inclusive factories and processes.** I am involved in the projects “**AMELIE - New approaches to recovery critical METals from spent Lithium-ions battEries**” (from March 2023 to February 2026) and “**Fast4C - Fashion-Tech Design for Circularity**” (from March 2023 to 30 April 2025).

- **BEST4Hy** Sustainable Solutions for recycling of end-of-life Hydrogen technologies (January 2021-January 2024), **Horizon 2020 project.** Role: **coordinator of research unit at DIATI**, Politecnico di Torino.

- **NICE** Innovative and enhanced nature-based solutions for sustainable urban water (June 2021-May 2025), **Horizon 2020 project.** Role: member of the research unit.

- **HYDRA** Hybrid power-energy electrodes for next generation lithium-ion batteries (September 2020-August 2024), **Horizon 2020 project.** Role: member of the research unit.

- **Material recovery from e-waste**, funded by the **Italian Ministry of Environment and Sea** (January 2019-August 2021), role: **National Coordinator** (project title: *Recupero di materia da RAEE/R1-R2*).

- **BASH-TREAT** Optimization of bottom ash treatment for an improved recovery of valuable fractions, **ERA-MIN2 project** (May 2018-April 2022), role: **Coordinator of Research Unit at Politecnico di Torino.**

- **REGIOSIM** New approaches in training specialists in Environmental Engineering for regional sustainable development and correlation to actual requirements of the labor market (May 2014- November 2015), funded by **Romanian Government**, role: **Coordinator of Research Unit at Politecnico di Torino.**

RELEVANT RESEARCH PROJECTS (FUNDED BY COMPANIES AND PUBLIC INSTITUTIONS)

- Recovery of critical raw materials from lithium-ion batteries' black mass, condensers and magnets (September 2024-February 2026) funded by IREN; role: **coordinator.**

- Evaluation of Circular Economy perspectives for EVA waste (December 2024-March 2025) funded by NIRI; role: **coordinator.**

- Analysis of the potential reduction of GHG intensity of rice straw: pyrolysis as sustainable approach to rice production (January-November 2025) funded by BASF; role: **coordinator.**

- Analysis of the sustainability of the management of spare parts (September 2020-September 2021), funded by CNH Industrial Parts and Services; role: **coordinator**.
- Assessment of the performances of Cossato wastewater treatment plant (July 2019-July 2021), funded by CORDAR Biella Servizi SpA; role: **coordinator**.
- Investigation of critical issues and optimization perspectives for WEEE management (January 2018-January 2019), funded by APIRAEE, role: **Coordinator**.
- Design and start-up of a pilot scale digester for L'Oréal plant in Settimo Torinese (October 2017-October 2018), funded by L'Oréal Saipo Industriale SpA, role: **Coordinator**.
- Feasibility study about the anaerobic digestion of the wastes of L'Oréal plant in Settimo Torinese, Turin (March 2016-April 2017), funded by L'Oréal Saipo Industriale SpA, role: **Coordinator**.
- Evaluation of formaldehyde content in paper waste(March 2016-May 2017), funded by Ahlstrom Italy SpA, role: **Coordinator**.
- Environmental Monitoring Plan of ILVA SpA steel plant in Taranto, Italy (November 2013-March 2014), funded by ILVA SpA, role: **Coordinator**.
- Management and design intervenes for the optimization of the performances of a small wastewater treatment plant(February 2012-December 2013), funded by Alpi Acque SpA, role: **Coordinator**.
- Management, design and start-up of the wastewater treatment plant of a talc mine in Italy (3 grants in 2008-2012), funded by Imerys Talc Italy SpA, role: **Coordinator**.

RELEVANT SCIENTIFIC PUBLICATIONS (LAST 5 YEARS)

- Gavrilescu, A. Enache, D. Ibanescu, C. Teodosiu, S. Fiore (2021) Sustainability assessment of waste electric and electronic management systems: development and validation of the SUSTWEEE methodology. *Journal of Cleaner Production*, 306, p. 127214.
- M. Bruno, M. Abis, K. Kuchta, F. G. Simon, R. Gronholm, M. Hoppe, S. Fiore (2021) Material flow, economic and environmental assessment of municipal solid waste incineration bottom ash recycling potential in Europe. *Journal of Cleaner Production*, 317, p. 128511.
- V. Santucci, S. Fiore (2021) Recovery of polyurethane from E-waste – Part I: Investigation of the oil sorption potential. *Materials*, 14, p. 6230.
- V. Santucci, S. Fiore (2021) Recovery of polyurethane from E-waste – Part II: Investigation of the adsorption potential for wastewater treatment. *Materials*, 14, p. 7587.
- M. Bruno, L. Sotera, S. Fiore (2022) Analysis of the influence of mobile phones' material composition on the economic profitability of their manual dismantling. *Journal of Environmental Management*, 309, p. 114677.
- D. Barouta, A. Alassali, C. Picuno, M. Bruno, E. Syranidou, S. Fiore, K. Kuchta (2022) E-plastics in a circular economy: a comprehensive regulatory review. *Journal of Cleaner Production*, 355, p. 131711.
- M. Bruno, S. Fiore (2023) Material flow analysis of Lithium-ion battery recycling in Europe: environmental and economic implications. *Batteries*, 9, p. 231.
- M. Chiappero, F. Berruti, S. Fiore (2023) Biomethane potential of wine lees from mesophilic anaerobic digestion. *Biochemical Engineering Journal*, 196, p. 108954.
- C. Comoglio, S. Castelluccio, S. Fiore (2023) Environmental reporting in the hydropower sector: analysis of EMAS registered hydropower companies in Italy. *Frontiers in Environmental Science*, 11, p. 1178037.
- M. Bruno, S. Fiore (2024) Low-cost and environmentally friendly physic-mechanical pre-treatments to recycle lithium-ion phosphate cathodes. *Journal of Environmental Chemical Engineering*, 12, p. 112106.
- M. Bruno, C. Francia, S. Fiore (2024) Closed-loop recycling of lithium iron phosphate cathodic powders via citric acid leaching. *Environmental Science and Pollution Research*.
<https://doi.org/10.1007/s11356-024-32837-6>
- M. Bruno, S. Fiore (2024) Review of lithium-ion batteries' supply-chain in Europe: material flow analysis and environmental assessment. *Journal of Environmental Management*, 358, p. 1207558.
- L. Nastasi, S. Fiore (2024) Environmental assessment of lithium-ion battery lifecycle and of their use in commercial vehicles. *Batteries*, 10, p. 90.
- S. Castelluccio, S. Fiore, C. Comoglio (2024) Environmental reporting in Italian thermal power plants: insights from a comprehensive analysis of EMAS environmental statements. *Journal of Environmental Management*, 359, p. 121035.
- S. H. Akyildiz, S. Fiore, M. Bruno, H. Sezgin, I. Yalcin-Enis, B. Yalcin, R. Bellopede (2024) Release of

microplastic fibers from synthetic textiles during household washing. Environmental Pollution, 357, p. 124455.

- M. Laghezza, S. Fiore, F. Berruti (2024) A review on the pyrolytic conversion of plastic waste into fuels and chemicals. Journal of Analytical and Applied Pyrolysis, 179, p. 106479.
- H. Lee, S. Fiore, F. Berruti (2024) Adsorption of methyl orange and methylene blue on activated biocarbon derived from birchwood pellets. Biomass and Bioenergy, 191, p. 107446.
- M. Bruno, C. Francia, S. Fiore (2024) Selective leaching for the recycling of lithium, iron and phosphorous from lithium-ion battery cathodes' production scraps. Batteries, 10, p. 415.
- S. Castelluccio, I. Orlandella, S. Fiore, C. Comoglio (2025) Evaluating the environmental performances of thermal power plants: a study on EMAS registered Italian sites. Journal of Cleaner Production, 490, p. 144677.
- I. Orlandella, S. Fiore (2025) Life cycle assessment of the production of biofertilizers from agricultural waste. Sustainability, 17, p. 421.

● EDUCATION & TRAINING

TURIN, ITALY

MASTER DEGREE IN CHEMISTRY- UNIVERSITY OF TURIN

Website: www.unito.it

● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

● SKILLS

Microsoft Office