

Personal Data

Last Name First Name

Tiraferri Alberto



Current Positions

Full Professor
Politecnico di Torino

Address

Corso Duca degli Abruzzi 24, 10129 Turin, Italy
Tel.: +39 011-090-7628, Fax: +39 011-090-7699
alberto.tiraferri@polito.it
www.polito.it/ensurewater

Education and previous positions

- 2015-2023 Associate Professor, Politecnico di Torino (Italy)
- 2023 (March-August) Visiting Associate Professor, University of Tokyo (Japan)
- 2013-2015 Post-doctoral Fellow (Marie Skłodowska-Curie), University of Geneva (Switzerland)
- 2012 Ph.D. in Chemical and Environmental Engineering, Yale University (USA)
- 2010 M.Sc. + M.Phil. in Chemical and Environmental Engineering, Yale University (USA)
- 2007 M.Sc. in Environmental Engineering, Politecnico di Torino (Italy)
- 2004-2005 Erasmus Programme bachelor student, University of Edinburgh (UK)
- 2022-2005 B.Sc. in Environmental Engineering, Università Politecnica delle Marche (Italy)

Professional experience

SUPERVISION

- 2015→ Graduated 4 Ph.D. students and 34 masters' students as main supervisor, 4 Ph.D. students as co-supervisor; supervised 3 post-doctoral researchers.
Currently supervising 6 Ph.D. students, supervising 2 masters' student.

CURRENT TEACHING ACTIVITIES

- 2023→ Instructor: "Blue gold: water supply and management in the new millennium", bachelor level course (PoliTO Honors School)
- 2017→ Instructor: "Water Desalination: Processes, Materials, and the Future", Ph.D. level course
- 2015→ Instructor: "Environmental Dynamics of Contaminants", master level course
- 2019→ Co-instructor: "Water and Wastewater Treatment", bachelor level course
- 2015-2021 Co-instructor: "Advanced Water and Wastewater Treatment", master level course

FELLOWSHIPS AND AWARDS

- 2021** Excellence in Review Award, journal *Environmental Science & Technology* (see DOI 10.1021/acs.est.1c00960)
- 2013-2015** E.U. Marie Skłodowska-Curie Intra-European Fellowship for career development, University of Geneva (Switzerland)
- 2010-2012** NWRI-AMTA Fellowship for Membrane Technology
- 2010** ACS Environmental Chemistry Graduate Student Award
- 2010** Co-recipient of the **Membrane X-Prize** offered by Oasys Water, Inc. for the fabrication of a forward osmosis membrane with high performance.

INSTITUTIONAL RESPONSIBILITIES

- 2024**→ Adjunct to the Vice-Rector for Scientific and Technological Innovation with functions related to fundamental and competitive research
- 2017-2023** Scientific manager of the Interdepartmental Center "[CleanWaterCenter@PoliTo](#)", undertaking research and technological transfer in the area of water and wastewater treatment and bringing together four Departments at Politecnico di Torino (Italy)
- 2015**→ Principal Investigator of the [en.sur.e water lab](#), Politecnico di Torino (Italy), undertaking research in the area of membrane processes for water treatment and resource recovery, water purification and decontamination with advanced oxidation, reclamation of polluted sites, and contaminant dynamics.
- 2015**→ Member of GITISA, Italian Group of Environmental Engineers.
- 2015**→ Member of the Faculty board of the Ph.D. School in Civil and Environmental Engineering, Politecnico di Torino (Italy)

ORGANIZATION OF SCIENTIFIC MEETINGS, EDITORIAL AND OTHER SERVICES

- 2023**→ Member of the Editorial Board and Associate Editor of the new international journal "*Journal of Water Technology*", ISSN (print): 2972-3337 | ISSN (online): 2972-3345S.
- 2020**→ Member of the Early Career Editorial Advisory Board of the prestigious journal "Environmental Science & Technology" (ACS); see DOI: 10.1021/acs.est.0c08384 (<https://axial.acs.org/2021/01/08/environmental-science-technology-early-career-advisory-board/>)
- 2018**→ Vice-President of the NGO "[Spring](#)"
- 2017**→ Associate Editor of the international journal "Frontiers in Environmental Science". E-ISSN: 2296-665X.
- 2016**→ Member of the International Board of the Conference IAP "*Interfaces Against Pollution*"
- 2013** Head of the scientific committee for the symposium "Membranes for Liquid Separation and Water Treatment: Environmental Applications and Future Perspectives", October 2013, Torino, Italy

PATENTS

- Composite biomimetic membranes with artificial water channels", WO/2021/048182 (2021)
- Zodrow, K.R.; Eggensperger, C.; Tiraferri, A.; Giagnorio, M.; Holland, M.; Schiffman, J.: "Living filtration membrane", WO/2020/181167 (2020)
- Sethi, R.; Gallo, A.; Bianco, C.; Tosco, T.; Tiraferri, A.: "Method for the synthesis of a zero-valent metal using dithionite catalyzed by pre-reduction of a noble metal", WO/2019/106526 (2020)

- Sethi, R.; Bianco, C.; Tiraferri, A.; Tosco, T.; Patiño Higueta, J. E.: “Method for the control of deposition and / or delayed destabilization of colloids and their distribution in filter media”, IT201600122632A1
- Giannelis, E.; Wang, Y.; Elimelech, M.; Tiraferri, A.; Mauter, M.: “Nanoparticle-Functionalized Membranes, Methods of Making Same, and Uses of Same”, WO/2012/166701 (2012)

INVITED KEYNOTE, PLENARY LECTURES, AND SEMINARS

- Invited keynote speaker at **ISBEC 2023**, Tsukuba, Japan, 9-10 March 2023, keynote titled “Water Recovery in Water-intensive Energy Production Processes: Two Case Studies”
- Invited speaker at **11th Italy-Korea Workshop** “Membrane technology for Climate Change”, Sorrento, Italy, 24-26 November 2022, presentation titled “Dewatering of Microalgae Biomass Using Ceramic Membranes and Reuse of The Permeate Stream as New Cultivation Medium”
- Invited keynote speaker at **EuroMembrane 2022**, Sorrento, Italy, 20-24 November 2022, keynote titled “Exploiting osmotic driving force for concentration and dewatering: Optimization, examples, and challenges”
- Invited departmental seminar at **Stanford University, Department of Civil and Environmental Engineering, Palo Alto, USA**, “Recent Advances and Future Directions of Forward Osmosis for Water and Wastewater Management”, 13 June 2022
- Invited departmental seminar at **King Abdullah University of Science and Technology (KAUST)**, “Recent Advances and Future Directions of Forward Osmosis for Water and Wastewater Management”, 10 February 2022 (online)
- Invited seminar at **Sharjah Museum of Islamic Art, United Arab Emirates**, “Present and Future of Water Desalination”, in the framework of the event “Drop by Drop the Water Falls from the Sky: Water, Islam, and Art”, organized by Italian Culture Institute - Embassy of Italy to the EAU, Abu Dhabi, 12 June 2021
- Invited Speaker at “**Geneva Colloids 2021**”, keynote titled “Iron-chitosan complex for the catalytic oxidation of micropollutants in water”, 8-9 April 2021, Geneva, Switzerland
- Invited keynote speaker at **ICOM "International Congress on Membranes & Membrane Processes" 2020**, Online, 7-11 December 2020, keynote titled “Produced Water Management and Water Purification by Advanced Oxidation Processes and Membrane Separation”
- Invited seminar at the **workshop "Nano-materials and Nano-Technologies in Clean-Tech Applications" in Tel Aviv, Israel** on March 14-16, 2018, organized by the Israeli Ministry of Science and Technology (MOST) and the Italy-Israel Chamber of Commerce. Seminar title: "Recent progresses in the use of nanomaterials to reclaim contaminated aquifers and in membrane-based water treatment"
- Invited keynote speaker at **11th Conference on Colloid Chemistry, May 28-30 2018, Eger, Hungary**, keynote titled "Colloidal Behavior and Injection Strategies of Iron Oxide Nanoparticles for Aquifer Nanoremediation"
- Invited departmental seminar at **Ben Gurion University of the Negev, The Zuckerberg Institute for Water Research (ZIWR), The Department of Desalination & Water Treatment (DWT), Midreshet-Ben Gurion, Israel**, “Surfaces and Adsorbed Layers of Macromolecules: Implications and Applications in Environmental Systems”, November 1, 2016
- Invited departmental seminar at **Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany**, “Macromolecules and Membrane Fouling: Mechanisms of Adsorption and Routes to Fouling Prevention”, July 28, 2016
- Invited departmental seminar at **Institut Européen des Membranes (IEM), CNRS, Montpellier, France**, “Purifying Water Using Membranes: an Engineering Perspective on Current Challenges and

Possible Solutions”, June 10, 2016

- Invited departmental seminar at **Johns Hopkins University, Department of Geography and Environmental Engineering, Baltimore, USA**, "Adsorption of Macromolecules on Solid Substrates: Tuning Layer Properties for Environmental Applications", July 2, 2014

Publication and Reviewer Track Record

Total publications in international peer-reviewed journals: **111**.

H-index ISI-Scopus: 41; Scholar: 44. Citations: ~7950 (Scopus).

[Google Citations and Publications](#)

[Scopus Author ID: 24280776400](#)

ORCID ID: 0000-0001-9859-1328

Reviewer of more than 200 articles for international peer-reviewed journals, including but not limited to: *Chemical Engineering Journal*; *Chemosphere*; *Desalination*; *Environmental Science & Technology*; *Industrial & Engineering Chemistry Research*; *Journal of Cleaner Production*; *Journal of Colloid and Interface Science*; *Journal of Hazardous Materials*; *Journal of Membrane Science*; *PNAS*; *Separation and Purification Technology*; *Science of the Total Environment*; *Water Research*.

Reviewer for **Agencies and Funding Calls**: European Commission; Natural Sciences and Engineering Research Council of Canada (NSERC); Helmholtz Association; Netherlands Organization for Scientific Research; Swiss National Science Foundation (SNSF Professorship); Israel Science Foundation (ISF); Research Foundation - Flanders (Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO), Belgium; BARD - The US-Israel Agricultural Research & Development Fund

Publication List

[asterisk symbol * indicates corresponding author(s)]

- 111 Hong, S.; Di Vincenzo, M.; Tiraferri, A.; Bertozzi, E.; Górecki, R.; Davaasuren, B.; Li, X.; Nunes, S. P.* (2024) "Precision ion separation via self-assembled channels", *Nature Communications*, 15, 3160, 10.1038/s41467-024-47083-0
- 110 Ricceri, F.; Blankert, B.; Ranieri, L.; Picioareanu, C.; Ghaffour, N.; Vrouwenvelder, J. S.; Tiraferri, A.; Fortunato, L.* (2023) "Understanding the evolution of organic fouling in membrane distillation through driving force and resistance analysis", *Journal of Membrane Science*, 686, 121993, 10.1016/j.memsci.2023.121993
- 109 Malaguti, M.; Presson, L. K.; Tiraferri, A.; Hickenbottom, K.; Achilli, A.* (2024) "Productivity, selectivity, and energy consumption of pilot-scale vacuum assisted air-gap membrane distillation for the desalination of high-salinity streams", *Desalination*, 117511, In press, 10.1016/j.desal.2024.117511
- 108 Wu, Q.; Chen, C.; Shu, J.; Ren, X.; Zhang, Y.; Tiraferri, A.; Liu, B.* (2024) "Efficiency of a Combined Biological Aerated Filter and Ultrafiltration Process for Removal of Odor Compounds in Rural Drinking Water", *Separation and Purification Technology*, 321, 126991, 10.1016/j.seppur.2024.126991
- 107 Sheikhi, M.; Lupato, S.; Bianco, C.; Sethi, R.*; Tiraferri, A.* (2024) "Plastic Microfibers from Household Textile Laundering: A Critical Review of their Release and Impact Reduction", *Critical Reviews in Environmental Science and Technology*, In press, 10.1080/10643389.2024.2329513
- 106 Shu, J.; Wu, Q.; Ren, X.; Tang, P.; Chen, G.; Cheng, X.; Chen, C.; Tiraferri, A.; Liu, B.* (2024)

- “Efficiency and mechanisms of biochar aerogels-assisted biodegradation of taste & odor compounds in a one-step membrane bioreactor for rural drinking water production”, *ACS ES&T Engineering*, 4 (2), 300-309, 10.1021/acsestengg.3c00233
- 105 Morciano, M.; Malaguti, M.; Ricceri, F.; Tiraferri, A.*; Fasano, M.* (2024) “Process optimization of osmotic membrane distillation for the extraction of valuable resources from water streams”, *npj Clean Water*, 7, 1, 10.1038/s41545-023-00294-2, Open Access
- 104 Bertozzi, E.; Craveri, L.; Malaguti, M.; Ricceri, F.; Carone, M.; Riggio, V.; Tiraferri, A.* (2024) “Concentration of phycocyanin and coffee extracts in aqueous solutions with osmotically-assisted membrane distillation”, *Separation and Purification Technology*, 330 part B, 125360, 10.1016/j.seppur.2023.125360, Open Access
- 103 Naeimi Tabasian, A.; Ricceri, F.; Morciano, M.; Boscheri, G.; Perelli, R.; Fasano, M.*; Tiraferri, A.* (2024) “Modeling and Experimental Evaluation of Membrane Distillation aimed at Urine Treatment for Direct Potable Reuse in Space Stations”, *Desalination*, 572, 117119, 10.1016/j.desal.2023.117119, Open Access
- 102 Ren, X.; Wu, Q.; Shu, J.; Chen, C.; Tiraferri, A.; Liu, B.* (2023) “Efficient removal of organic matters and typical odor substances in rural drinking water using Ozone-BAC-UF combined system to meet new water quality standards in China”, *Separation and Purification Technology*, 327, 124899, 10.1016/j.seppur.2023.124899
- 101 Farinelli, G.*; Garcia Gil, A.; Marugan, J.; Minella, M.; Fabbri, D.; Laurenti, E.; Tiraferri, A.; Vione, D. (2023) “The dominant role of the peroxymonosulfate radical for removing contaminants in a Fenton process with metabisulfite”, *Environmental Chemistry Letters*, 10.1007/s10311-023-01645-8
- 100 Tian, L.; Yang, Y.; Chen, G.; Tiraferri, A.; Liu, B.* (2023) “Efficient lithium extraction from shale gas wastewater using sodium alginate/H1.33Mn1.67O4 composite granular adsorbents”, *ACS ES&T Engineering*, 3 (11), 1676-1685, 10.1021/acsestengg.3c00167
- 99 Malaguti, M.; Craveri, L.; Ricceri, F.; Riggio, V.; Zanetti, M.; Tiraferri, A.* (2023) “Dewatering of *Scenedesmus o.* substrate of cultivation with microfiltration: potential and challenges for water reuse and effective harvesting”, *Engineering*, In Press, 10.1016/j.eng.2023.07.010, Open Access
- 98 Tiraferri, A.; Malaguti, M.; Mohamed, M.; Giagnorio, M.; Aschmoneit, F. J.* (2023) “Standardizing practices and flux predictions in membrane science via simplified equations and membrane characterization”, *npj Clean Water*, 6, 58, 10.1038/s41545-023-00270-w, Open Access
- 97 Ji, X.; Tiraferri, A.; Zhang, X.; Liu, P.; Gan, Z.; Crittenden J. C.; Ma, J.; Liu, B.* (2023) “Dissolved organic matter in complex shale gas wastewater analyzed with ESI FT-ICR MS: Typical characteristics and potential of biological treatment”, *Journal of Hazardous Materials*, 447, 130823, 10.1016/j.jhazmat.2023.130823
- 96 Wu, Q.; Chen, C.; Zhang, Y.; Tang, P.; Ren, X.; Shu, J.; Liu, X.; Cheng, X.; Tiraferri, A.; Liu, B.* (2023) “Safe Purification of Rural Drinking Water by Biological Aerated Filter Coupled with Ultrafiltration”, *Science of the Total Environment*, 868, 161632, 10.1016/j.scitotenv.2023.161632
- 95 Tian, L.; Liu, Y.; Tang, P.; Yang, Y.; Wang, X.; Chen, T.; Bai, Y.; Tiraferri, A.; Liu, B.* (2022)

- “Lithium extraction from shale gas flowback and produced water using $H_{1.33}Mn_{1.67}O_4$ adsorbent”, *Resources, Conservation and Recycling*, 185, 106476, [10.1016/j.resconrec.2022.106476](https://doi.org/10.1016/j.resconrec.2022.106476)
- 94 Giagnorio, M.*; Morciano, M.*; Zhang, W.; Hélix-Nielsen, C.; Fasano, M.; Tiraferri, A. (2022) “Coupling of forward osmosis with desalination technologies: System-scale analysis at the water-energy nexus”, *Desalination*, 543, 116083, [10.1016/j.desal.2022.116083](https://doi.org/10.1016/j.desal.2022.116083), Open Access
- 93 Yang, Y.; Tian, L.; Borch, T.; Tariq, H.; Li, T.*; Bai, Y.; Su, Y.; Tiraferri, A.; Crittenden, J. C.; Liu, B.* (2022) “Safety and Technical Feasibility of Sustainable Reuse of Shale Gas Flowback and Produced Water after Advanced Treatment Aimed at Wheat Irrigation”, *ACS Sustainable Chemistry & Engineering*, 10, 38, 12540-12551, [10.1021/acssuschemeng.2c02170](https://doi.org/10.1021/acssuschemeng.2c02170)
- 92 Ricceri, F.; Blankert, B.; Ghaffour, N.; Vrouwenvelder, J. S.; Tiraferri, A.*; Fortunato, L.* (2022) “Unraveling the role of feed temperature and cross-flow velocity on organic fouling in membrane distillation using response surface methodology”, *Desalination*, 540, 115971, [10.1016/j.desal.2022.115971](https://doi.org/10.1016/j.desal.2022.115971)
- 91 Xie, W.; Tian, L.; Tang, P.; Cui, J.; Wang, T.; Zhu, Y.; Bai, Y.; Tiraferri, A.; Crittenden, J. C.; Liu, B.* (2022) “Shale gas wastewater characterization: comprehensive detection, evaluation of valuable metals, and environmental risks of heavy metals and radionuclides”, *Water Research*, 220, 118703, [10.1016/j.watres.2022.118703](https://doi.org/10.1016/j.watres.2022.118703)
- 90 Ricceri, F.; Malaguti, M.; Derossi, C.; Zanetti, M.; Riggio, V.; Tiraferri, A.* (2022) “Microalgae Biomass Concentration and Reuse of Water as New Cultivation Medium using Ceramic Membrane Filtration”, *Chemosphere*, 307 (Part 1), 135724, [10.1016/j.chemosphere.2022.135724](https://doi.org/10.1016/j.chemosphere.2022.135724)
- 89 Song, Z.; Tiraferri, A.; Yuan, r.; Cao, J.; Tang, P.; Xie, W.; Crittenden, J. C.; Liu, B.* (2022) “Theoretical evaluation of the evaporation rate of 2D solar-driven interfacial evaporation and of its large-scale application potential”, *Desalination*, 537, 115891, [10.1016/j.desal.2022.115891](https://doi.org/10.1016/j.desal.2022.115891)
- 88 Malaguti, M.; Novoa, A. F.; Ricceri, F.; Giagnorio, M.; Vrouwenvelder J. S.; Tiraferri, A.*; Fortunato, L.* “Control strategies against algal fouling in membrane processes applied for microalgae biomass harvesting”, *Journal of Water Process Engineering*, 47, 102787, [10.1016/j.jwpe.2022.102787](https://doi.org/10.1016/j.jwpe.2022.102787)
- 87 Xie, W.; Tian, L.; Tang, P.; Cui, J.; Wang, T.; Zhu, Y.; Bai, Y.; Tiraferri, A.; Crittenden, J. C.; Liu, B.* (2022) “Shale gas wastewater characterization: comprehensive detection, evaluation of valuable metals, and environmental risks of heavy metals and radionuclides”, *Water Research*, 220, 118703, [10.1016/j.watres.2022.118703](https://doi.org/10.1016/j.watres.2022.118703)
- 86 Nejad, S. M.; Seyedpour, S. F.; Aktij, S. A.; Firouzjaei, M. D.; Elliott, M.; Tiraferri, A.; Sadrzadeh, M.*; Rahimpour, A.* (2022) “Loose Nanofiltration Membranes Functionalized with in Situ-Synthesized Metal Organic Framework for Water Treatment”, *Materials Today Chemistry*, 24, 100909, [10.1016/j.mtchem.2022.100909](https://doi.org/10.1016/j.mtchem.2022.100909)
- 85 Farinelli, G.*; Coha, M.; Vione, D.; Minella, M.; Tiraferri, A.* (2022) “Formation of Halogenated By-products upon Water Treatment with Peracetic Acid”, *Environmental Science & Technology*, 56 (8), 5123-5131, [10.1021/acs.est.1c06118](https://doi.org/10.1021/acs.est.1c06118), Open Access
- 84 Bert, R.*; Manes, C.; Tiraferri, A. (2022) “New facility for membrane fouling investigations

- under customisable hydrodynamics: validation and preliminary experiments with pulsating cross-flow”, *Membranes*, 12 (3), 34, [10.3390/membranes12030334](https://doi.org/10.3390/membranes12030334), Open Access
- 83 Baig, M. I.; Pejman, M.; Willott, J.; Tiraferri, A.; de Vos, W.* (2022) “Polyelectrolyte complex hollow fiber membranes prepared via Aqueous Phase Separation”, *ACS Applied Polymer Materials*, 4 (2), 1010-1020, [10.1021/acsapm.1c01464](https://doi.org/10.1021/acsapm.1c01464), Open Access
- 82 Liu, X.; Tang, P.; Liu, Y.; Xie, W.; Chen, C.; Li, T.; He, Q.; Bao, J.; Tiraferri, A.; Liu, B.* (2022) “Efficient removal of organic compounds from shale gas wastewater by coupled ozonation and moving-bed-biofilm submerged membrane bioreactor”, *Bioresource Technology*, 344 (A), 126191, [10.1016/j.biortech.2021.126191](https://doi.org/10.1016/j.biortech.2021.126191)
- 81 Ricceri, F.; Farinelli, G.; Giagnorio, M.; Zamboi, A.; Tiraferri, A.* (2022) “Optimization of physico-chemical and membrane filtration processes to remove high-molecular weight polymers from produced water in enhanced oil recovery operation”, *Journal of Environmental Management*, 302 (A), 114015, [10.1016/j.jenvman.2021.114015](https://doi.org/10.1016/j.jenvman.2021.114015)
- 80 Firouzjaei, M. D.; Pejman, M.; Sharifian, M. G.; Aktij, S. A.; Zolghadr, E.; Rahimpour, A.*; Sadrzadeh, M.; Shamsabadi, A. A.; Tiraferri, A.*; Elliott, M.* (2022) “Functionalized Polyamide Membranes Yield Suppression of Biofilm and Planktonic Bacteria while Retaining Flux and Selectivity”, *Separation and Purification Technology*, 282 (A), 119981, [10.1016/j.seppur.2021.119981](https://doi.org/10.1016/j.seppur.2021.119981)
- 79 Xie, W.; Tang, P.; Wu, Q.; Chen, C.; Song, Z.; Li, T.; Bai, Y.; Lin, S.; Tiraferri, A.; Liu, B.* (2022) “Solar-driven desalination and resource recovery of shale gas wastewater by on-site interfacial evaporation”, *Chemical Engineering Journal*, 428, 132624, [10.1016/j.cej.2021.132624](https://doi.org/10.1016/j.cej.2021.132624)
- 78 Di Vincenzo, M.; Tiraferri, A.; Musteata, V.-E.; Chisca, S.; Deleanu, M.; Ricceri, F.; Cot, D.; Nunes, S. P.; Barboiu, M.* (2021) “Tunable membranes incorporating artificial water channels for high-performance brackish/low salinity water reverse osmosis desalination”, *PNAS*, 118 (37), e2022200118, [10.1073/pnas.2022200118](https://doi.org/10.1073/pnas.2022200118)
- 77 Tang, P.; Shi, M.; Zhang, Y.; Lin, D.; Li, T.; Zhang, W.; Tiraferri, A.; Liu, B.* (2021) “Can pre-ozonation be combined with gravity-driven membrane filtration to treat shale gas wastewater?”, *Science of the Total Environment*, 797, 149181, [10.1016/j.scitotenv.2021.149181](https://doi.org/10.1016/j.scitotenv.2021.149181)
- 76 Hu, M.; Wu, Q.; Chen, C.; Liang, S.; Liu, Y.; Bai, Y.; Tiraferri, A.; Liu, B.* (2021) “Facile preparation of antifouling nanofiltration membrane by grafting zwitterions for reuse of shale gas wastewater”, *Separation and Purification Technology*, 276, 119310, [10.1016/j.seppur.2021.119310](https://doi.org/10.1016/j.seppur.2021.119310)
- 75 Farinelli, G.; Coxa, M.; Minella, M.; Fabbri, D.; Pazzi, M.; Vione, D.; Tiraferri, A.* (2021) “Evaluation of Fenton and modified Fenton oxidation coupled with membrane distillation for produced water treatment: Benefits, challenges, and effluent toxicity”, *Science of the Total Environment*, 796, 148953, [10.1016/j.scitotenv.2021.148953](https://doi.org/10.1016/j.scitotenv.2021.148953)
- 74 Pejman, M.; Firouzjaei, M. D.; Aktij, S. A.; Zolghadr, E.; Das, P.; Elliott, M.*; Sadrzadeh, M.; Sangermano, M.; Rahimpour, A.*; Tiraferri, A.* (2021) “Effective strategy for UV-mediated grafting of biocidal Ag-MOFs on polymeric membranes aimed at enhanced water ultrafiltration”, *Chemical Engineering Journal*, 426, 130704, [10.1016/j.cej.2021.130704](https://doi.org/10.1016/j.cej.2021.130704)

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- 72 Giagnorio, M.*; Casasso, A.; Tiraferri, A. (2021) "Environmental sustainability of forward osmosis: the role of draw solute and its management", *Environment International*, 152, 106498, [10.1016/j.envint.2021.106498](https://doi.org/10.1016/j.envint.2021.106498), Open Access
- 71 Xie, W.; Tiraferri, A.; Ji, X.; Chen, C.; Bai, Y.; Crittenden, J. C.; Liu, B.* (2021) "Green and sustainable method of manufacturing anti-fouling zwitterionic polymers-modified poly(vinyl chloride) ultrafiltration membranes", *Journal of Colloid and Interface Science*, 591, 343-351, [10.1016/j.jcis.2021.01.107](https://doi.org/10.1016/j.jcis.2021.01.107)
- 70 Farinelli, G.; Di Luca, A.; Kaila, V. R. I.; MacLachlan, M. J.*; Tiraferri, A.* (2021) "Fe-Chitosan Complexes for Oxidative Degradation of Emerging Contaminants in Water: Structure, Activity, and Reaction Mechanism", *Journal of Hazardous Materials*, 408, 124662, [10.1016/j.jhazmat.2020.124662](https://doi.org/10.1016/j.jhazmat.2020.124662), Open Access
- 69 Di Vincenzo, M.; Tiraferri, A.; Musteata, V.-E.; Chisca, S.; Sougrat, R.; Huang, L.-B.; Nunes, S. P.; Barboiu, M.* (2021) "Biomimetic artificial water channels membranes for enhanced desalination", *Nature Nanotechnology*, 16, 190-196, [10.1038/s41565-020-00796-x](https://doi.org/10.1038/s41565-020-00796-x)
- 68 Coha, M.; Farinelli, G.; Tiraferri, A.*; Minella, M.*; Vione, D. (2021) "Advanced oxidation processes in the removal of organic substances from produced water: Potential, configurations, and research needs", *Chemical Engineering Journal*, 414, 128668, [10.1016/j.cej.2021.128668](https://doi.org/10.1016/j.cej.2021.128668)
- 67 Tang, P.; Li, J.; Tian, L.; Sun, Y.; Xie, W.; He, Q.; Chang, H.; Tiraferri, A.; Liu, B.* (2021) "Efficient integrated module of gravity driven membrane filtration, solar aeration and GAC adsorption for pretreatment of shale gas wastewater", *Journal of Hazardous Materials*, 405, 124166, [10.1016/j.jhazmat.2020.124166](https://doi.org/10.1016/j.jhazmat.2020.124166)
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Grants and Funded Projects

Total value of public and industrial funding awarded: EUR ~4,543,000

- of which from competitive calls: EUR ~3,719,000
- of which from industrial contracts: EUR ~824,000

<i>Title / Topic</i>	<i>Role</i>	<i>Type / Call</i>	<i>Funder and Budget</i>	<i>Period and Duration</i>
Experimental pre-feasibility study of removal of sulfolane and alkanolamines from groundwater using nanofiltration/reverse osmosis and adsorption on activated carbon	Sole Contractor	Industry	Eni Rewind EUR 46,500	2023-2024 (ongoing)
National Research Centre for Agricultural Technologies (Agritech)	Participant in WP 6.2: “Circular management models for exploitation of waste materials”	PNRR (Italian National Recovery and Resilience Plan)	Italian Government (from EU funding) Total Budget of National project: EUR ~320,000,000 (32 Universities, 14 Enterprises) Total Budget for en.sur.e. water lab: EUR ~126,000	2022-2025 (ongoing) 36 months
Extended Partnership (Partenariato Esteso) on Circular and Sustainable Made-in-Italy (acronym: 3A-Italy)	Participant in Spoke 5: “Closed-loop, sustainable, inclusive factories and processes”	PNRR (Italian National Recovery and Resilience Plan)	Italian Government (from EU funding) Total Budget of National project: EUR ~121,000,000 (12 Universities, 13 Enterprises) Total Budget for en.sur.e. water lab: EUR ~138,000	2022-2025 (ongoing) 36 months
Sustainable membrane distillation for industrial water reuse and	Consortium Coordinator	EU Horizon Europe	European Commission	2022-2026 (ongoing)

decentralised desalination approaching zero waste (MEloDIZER)	(18 partners)	(HORIZON-CL4-2022-RESILIENCE-01)	Total Budget: EUR 9,680,207 Funded by EU: EUR 7,007,474 Budget for Politecnico di Torino: EUR 1,398,125	48 months
Development of a model of the current Thales Alenia Space system for water treatment in outer space (Warmkit breadboard), of alternative components, of different layouts, and thermodynamic analysis.	Co-contractor	Industry	Thales Alenia Space EUR 75,500	2022 4 months
Development of software packages for the calculation of the sequence of processes suitable for the treatment of produced and flowback waters with objectives of safe disposal, re-injection, or reuse.	Sole contractor	Industry	Eni Rewind EUR 28,880	2021-2022 (ongoing) 12 months
CleanWaterCenter @ PoliTo	Assignee of Seed Funds and First Manager of the Center	Competitive university-wide call	Politecnico di Torino - Competitive Call for Interdepartmental Centers EUR 1,670,00 (of which 470,000 for personnel costs)	2017-2023 6 years
Simulation of the behavior of commercial membranes in the selective separation of boron and chlorides.	Sole contractor	Industry	Eni Rewind EUR 9,520	2022 2 months
Experimental evaluation of nanofiltration and low-pressure reverse osmosis membranes for the filtration of contaminated water in TAF plant of Priolo.	Sole contractor	Industry	Eni Rewind EUR 14,980	2021 5 months

Investigation of protein adsorption on devices used for the administration of pharmaceuticals.	Partner	Industry	Nuova Ompi (Stevanato Group) EUR 9,000 Total budget: EUR 22,000	2021 3 months
Experimental evaluation of nanofiltration and low-pressure reverse osmosis membranes for the filtration of contaminated water in TAF plant of Manfredonia.	Sole contractor	Industry	Eni Rewind EUR 13,020	2020-2021 6 months
Identification and evaluation of processes and of their sequence aimed at the treatment of produced and flowback waters with objectives of safe disposal, re-injection, or reuse.	Sole contractor	Industry	Syndial EUR 95,526	2019-2020 15 months
Bio-inspired Polymeric CATalytic MEmbrane for the Selective Degradation of Contaminants in Water: From Cytochromes to Reactors	Sole assignee	Competitive university-wide call	Politecnico di Torino EUR 50,000	2019-2020 18 months
Optimization of the ISAF - ITRAP plant (Gela phosphogypsum landfill) for the removal of fluorides and nitrites on resins and for the minimization of the formation of organohalogen compounds.	Sole contractor	Industry	Eni Rewind EUR 66,240	2019-2020 14 months
Treatment of contaminated groundwater and landfill eluate using forward osmosis (FO) technology	Sole contractor	Industry	Eni EUR 261,660	2017-2019 2.5 years
Investigation of the presence of aliphatic chlorinated compounds, nitrites and fluorides in the effluent of the ISAF - ITRAP plant (Gela phosphogypsum landfill) and mechanisms associated with failure to remove them from the effluent.	Sole contractor	Industry	Syndial EUR 41,420	2019 10 months

Evaluation of the technical suitability of the "Mini Blue Water III" plant (Viggiano, PZ) to achieve the expected treatment objectives and its level of sustainability.	Coordinator	Industry	Eni Rewind EUR 51,216 Total budget: EUR 76,824	2019 4 months
Forward Osmosis to Reuse Produced Water in the Oil & Gas Industry	Sole assignee	Public	Compagnia di San Paolo EUR 144,301	2017-2019 2 years
StepPolyMem: novel thin-film composite (TFC) membranes prepared by stepwise fabrication of oligoamide film on porous templates	Coordinator of the Italian side	Italy-Israel International Cooperation	Ministry of Foreign Affairs (MAECI) - Bilateral projects Italy-Israel Budget for Politecnico di Torino: EUR 192,637 Total budget: EUR 291,997	2015-2017 2 years

<i>Documented participation in additional funded projects</i>				
<i>Title / Topic</i>	<i>Assignee of the project</i>	<i>Funder and Call</i>	<i>Duration</i>	<i>Participation</i>
Renewable Energies for Water Treatment and REuse in Mining Industries (REMIND)	Prof. Mariachiara Zanetti	European Commission H2020-MSCA-RISE-2018	November 2018 - April 2024 (ongoing)	TBD
Infra-P "CO ₂ Circle Lab"	Prof. Massimo Santarelli	Regione Piemonte Bandi Infra-P POR FESR Piemonte 2014-2020	April 2018 - October 2020	No person-months involved in this project, whose purpose is the creation of a new research infrastructure. Participation in implementation of LAM-DIATI: Multimodal Analyses

				Laboratory at DIATI department
Colloidal Iron Oxide Nanoparticles for the REclamation of Toxic Metal Contaminated GROUNDwater Aquifers, Drinking Water Wells, and River Bank Filtrations (REGROUND)	Prof. Rajandrea Sethi	European Commission H2020-WATER-2014-2015	September 2015 - August 2018	7 person-months for an equivalent of EUR -40,000
Near-surface Geothermal Resources in the Territory of the Alpine Space (GRETA)	Prof. Rajandrea Sethi	European Commission Interreg Alpine Space	December 2012 - December 2015	4 person-months for an equivalent of EUR -23,000