Personal Data

Last Name ***First Name***

Tiraferri Alberto

Current Positions

Full Professor
Politecnico di Torino

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Corso Duca degli Abruzzi 24, 10129 Turin, Italy
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Education and previous positions

2023→ **Full Professor**, Politecnico di Torino (Italy)
2023 (March-August) Visiting Associate Professor, University of Tokyo (Japan)
2015-2023 **Associate Professor**, Politecnico di Torino (Italy)
2013-2015 **Post-doctoral Fellow** (Marie Sklodowska-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 **7 Ph.D. students** and 36 masters' students as main supervisor, 4 Ph.D. students as co-supervisor; supervised **3 post-doctoral researchers**.
Currently supervising **4 Ph.D. students**, 1 masters' student, 1 post-doctoral fellow.

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: **"Contaminant Dynamics"**, master level course
2023→ Co-instructor: **"Advanced Water and Wastewater Treatment"**, master level course

2019-2023 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 Sklodowska-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

2016-2024 Departmental **Referent for Research**, Department of Environment, Land and Infrastructure Engineering (DIATI), Politecnico di Torino

2017-2023 **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

2024 **Head** of the local organizing committee of the international conference ***"Interfaces Against Pollution 2024"***, held in Torino on September 15-18, 2024.

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"

2016→ Member of the **International Board of the Conference IAP** "*Interfaces Against Pollution*"

2013 **Head** of the local scientific committee for the symposium "Membranes for Liquid Separation and Water Treatment: Environmental Applications and Future Perspectives", October 2013, Torino, Italy

PATENTS

- Barboiu, M D.; Di Vincenzo, M.; Tiraferri, A.: "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 Higuita, 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: **128**.

H-index ISI-Scopus: 45; Scholar: 47. **Citations**: **~9500** (Scopus).

Google Citations and Publications

Scopus Author ID: 24280776400

ORCID ID: 0000-0001-9859-1328

Reviewer of **more than 220 articles for international peer-reviewed journals**, including but not limited to: *Chemical Engineering Journal; Nature Water; 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)]

128 Naeimi Tabasian, A.; Saija, A.; Morciano, M.; Fasano, M.*; Tiraferri, A.; Chiavazzo, E. (2025) "Performance analysis of a scalable solar-assisted pilot scale adsorption desalination and cooling system", *Energy Conversion and Management*, 343, 120190, 10.1016/j.enconman.2025.120190

127 Lupato, S.; Granetto, M.; Tiraferri, A.*; Sethi, R.* (2025) "Sensitive quantification and morphological analysis of microfibers in laundry wastewater: Standardization and validation of a fluorescence-based method", *Journal of Hazardous Materials*, 495, 138947, 10.1016/j.jhazmat.2025.138947

126 Wang, Y.; Chen, L.; Chen, X.; Yang, C.; Cheng, X.; Liu, W.; Tiraferri, A.; Ma, J.; Liu, B.* (2025) "Overlooking the Effect of Alcohol Quenchers Can Mislead Mechanistic Understanding in Ferrate-based Advanced Oxidation Processes", *Separation and Purification Technology*, 370, 133193, 10.1016/j.seppur.2025.133193

125 Hashimoto, T.*; Tiraferri, A.; Takizawa, S. (2025) "Effects of Brownian force and pore structure on the removal of nanoparticles by porous membranes", *Chemical Engineering Science*, 316, 122010, 10.1016/j.ces.2025.122010

124 Li, X.; Li, X.; Liang, Q.; CHen, G.; Wang, W.; Bao, J.; Qin, J.; Tang, S.; Lin, X.; Tiraferri, A.; Liu, B.* (2025) "Efficient recovery of lithium from the reverse osmosis concentrate of shale gas wastewater treatment: Adsorption performance and mechanism of Al-doped manganese-based adsorbent particles prepared via hydrophilic modification", *Desalination*, 613, 118997, 10.1016/j.desal.2025.118997

123 Brocchetto, G.; Sciscenko, I.; Minella, M.; Craveri, L.; Bertozzi, E.; Malaguti, M.; Coha, M.; Tiraferri, A.; Vione, D.* (2025) “Combination of membrane-based pre-treatment techniques and heterogeneous photocatalysis to obtain high-quality effluents from produced water”, *Molecules*, 30(12), 2532, 10.3390/molecules30122532

122 Wang, Y.; Chen, X.; Chen, L.; Chen, X.; Yang, C.; Chen, G.; Shu, J.; Liu, W.; Tiraferri, A.; Liu, B.* (2025) “Ultra-efficient degradation of isoquinoline from shale gas wastewater with the diethylamine-ferrate(VI) system: The key role of Fe(IV)/Fe(V) active species”, *Journal of Hazardous Materials*, 492, 138215, 10.1016/j.jhazmat.2025.138215

121 Meo, R. R.; Craveri, L.; Bertozzi, E.; Malaguti, M.; Tiraferri, A.; Morciano, M.*; Fasano, M.* (2025) “Systematic exploration of direct solar absorption potential to enhance direct contact membrane distillation”, *Desalination*, 606, 118740, 10.1016/j.desal.2025.118740

120 Li, C.; Tiraferri, A.; Tang, P.; Ma, J.; Liu, B.* (2025) “Current status, potential assessment, and future directions of biological treatments of unconventional oil and gas wastewater”, *Water Research*, 275, 123127, 10.1016/j.watres.2025.123217

119 Sheikhi, M.; Bianco, C.; Tiraferri, A.*; Sethi, R.* (2025) “Evaluating Microfiber Emissions and Point-of-Use Filtration Efficiency in Household Washing and Drying Cycles”, *Journal of Hazardous Materials*, 137646, 10.1016/j.jhazmat.2025.137646

118 Li, F.; Yu, X.; Yand, Y.; Tao., W.; Zhu, M.; Zhang, D.; Shi, S.; Li, H.; Tang, P.; Tiraferri, A.; Liu, B.* (2025) “Impacts of shale gas wastewater leaks on neighboring crops: physiological and morphological responses of tomatoes”, *Process Safety and Environmental Protection*, 195, 106786, 10.1016/j.psep.2025.106786

117 Di Vincenzo, M.; Tiraferri, A.; Gòrecki, R.; Martin, A.; Gopalsamy, K.; Malaguti, M.; Davaasuren, B.; Hedhili, M. N.; Hong, S.; Szekely, G.; Dumitrescu, Da.; Nunes, S. P.* (2025) “2-Hydroxy-N-(diphenylmethyl)acetamide nanocomposite membranes for highly selective desalination”, Journal of Membrane Science, 721, 123785, 10.1016/j.memsci.2025.123785

116 Li, X.; Li, X.; Chen, G.; Zhang, D.; Tian, L.; Chen, J.; Liu, C.; Li, B.; Tiraferri., A.; Liu, B.* (2024) “Efficient recovery of lithium from shale gas wastewater: Fe, Ni, and Al doping of H1.33Mn1.67O4 for improved adsorption capacity and manganese loss reduction”, Journal of Cleaner Production, 473, 143554, 10.1016/j.jclepro.2024.143554

115 Carone, M.; Malaguti, M.; Zanetti, M.; Tiraferri., A.; Riggio, V.* (2024) “Towards sustainable water management for Galdieria sulphuraria cultivation”, Science of the Total Environment, 950, 175267, 10.1016/j.scitotenv.2024.175267

114 Li, X.; Li, X.; Chen, G.; Li., H.; Duan, Y.; Sun, Y.; Tiraferri, A.; Liu, B.* (2024) “Efficient recovery of lithium from spent lithium-ion battery raffinate by Mn and Al-based adsorbents: pretreatment, adsorption mechanism, and performance comparison”, Separation & Purification Technology, 354 (Part 1), 128652, 10.1016/j.seppur.2024.128652

113 Mohamed, M.; Tagliabue, M.*; Tiraferri, A.* (2024) “Technical Feasibility of Extraction of Freshwater from Produced Water with Combined Forward Osmosis and Nanofiltration”, Membranes, 14(5), 107, 10.3390/membranes14050107

112 Malaguti, M.; Craveri, L.; Ricceri, F.; Riggio, V.; Zanetti, M.; Tiraferri, A.* (2024) “Dewatering of *Scenedesmus o.* substrate of cultivation with microfiltration: potential and challenges for water reuse and effective harvesting”, Engineering, 38, 155-163, 10.1016/j.eng.2023.07.010,

Open Access

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.; Picioreanu, 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

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, 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

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

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

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

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

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

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

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

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, 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, 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, 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

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

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

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

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

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

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Grants and Funded Projects

Total value of public and industrial funding awarded: EUR ~4,526,000

- of which from competitive calls: EUR ~3,719,000
- of which from industrial contracts: EUR ~810,000

Title / Topic	*Role*	*Type / Call*	*Funder and Budget*	*Period and Duration*
Technical feasibility of the treatment train to remediate industrially-contaminated groundwater for safe effluent discharge into surface water and for zero liquid discharge of waste	**Sole Contractor**	**Industry**	**Eni Rewind** **EUR 43,680**	2025 6 months
Removal of sulfolane, alkanolamines, aldehydes, and vanadium from contaminated groundwater: technical feasibility of the individual unit operations	**Sole Contractor**	**Industry**	**Eni Rewind** **EUR 49,634**	2024 4 months
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**	2022-2025 (ongoing) 36 months

			en.sur.e. water lab: EUR ~138,000	
Sustainable membrane distillation for industrial water reuse and decentralised desalination approaching zero waste (MEloDIZER)	**Consortium Coordinator** (17 Partners)	**EU Horizon Europe** (HORIZON-CL4-2022-RESILIENCE-01)	**European Commission** Total Budget: EUR 9,680,207 Funded by EU: EUR 7,007,474 **Budget for Politecnico di Torino: EUR 1,398,125**	2022-2026 (ongoing) 48 months
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 12 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 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 1,670,000** (of which 470,000 for personnel	2017-2023 6 years

			costs)	
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

Documented participation in additional funded projects				
Title / Topic	***Assignee of the project***	***Funder and Call***	***Duration***	***Participation***
Renewable Energies for Water Treatment and REuse in Mining Industries (REMIND)	**Prof. Mariachiara Zanetti**	**European Commission** **H2020-**	November 2018 – April 2024 (ongoing)	TBD

		MSCA-RISE-2018		
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