



# MICHELE TEDESCO

Curriculum Vitae, Publication List & List of Presentations  
(Sep 2020)

## PERSONAL INFORMATION

Name	Michele Tedesco
E-mail	michele.tedesco@wetsus.nl
ORCID	0000-0002-3389-5168
Google Scholar	<a href="http://bit.ly/ScholarMTed">bit.ly/ScholarMTed</a>
ResearchGate	<a href="http://bit.ly/ResearchGateMTed">bit.ly/ResearchGateMTed</a>
LinkedIn	micheletedesco
twitter	MTedesco_Wetsus
Languages	Italian, English, Dutch

## SUMMARY

My research focuses on ion exchange membranes and related processes (electrodialysis, reverse/bipolar electrodialysis), from fundamental modeling to experimental investigation. Besides my research activities, I am also actively involved in coordination, writing, and management of EU-funded projects.

## EDUCATION

2015	<b>PhD, Chemical Engineering</b> University of Palermo, Italy PhD thesis: modeling, scale-up, and field testing of reverse electrodialysis with seawater and brines (9 publications and 2 book chapters based on PhD research)
2011	<b>MSc, Chemical Engineering</b> University of Palermo, Italy MSc thesis: modeling of reverse electrodialysis process

## CURRENT POSITION & ACTIVITIES

2017- **Scientific Project Manager, Theme Coordinator**  
*Wetsus, European Centre of Excellence for Sustainable Water Technology - Leeuwarden, The Netherlands*

Research interests ion exchange membranes, electrodialysis, desalination, electrochemical CO<sub>2</sub> capture

- Research activities
- Low-energy seawater desalination via multistage electrodialysis
  - Bipolar membrane electrodialysis for electric energy storage
  - Electrochemical processes for CO<sub>2</sub> capture from point source and direct air capture
  - Electrochemical characterization of electrodes for hydrogen evolution reaction

- Project management
- Project coordinator EU H2020 project BAoBaB (6 partners, 4 M€ budget)
  - Experience in writing proposals for EU/NL funded projects (H2020, ERC, LIFE, RVO, NWO)
  - Theme Coordinator "Sustainable Carbon Cycle" theme (academia-industry collaboration on electrochemical processes for CCU. Partners: Wageningen University, Alliander, Shell)

## PREVIOUS POSITIONS

2015 - 2017	<b>Postdoctoral Researcher</b> <i>Wetsus, European Centre of Excellence for Sustainable Water Technology - Leeuwarden, The Netherlands</i> Project: Fundamental modeling of (reverse) electrodialysis based on Nernst-Planck theory
2013	<b>Visiting Researcher</b> <i>Fujifilm Manufacturing Europe B.V. - Tilburg, The Netherlands</i> Project: Reverse electrodialysis heat engine using non-conventional salts

2012

**Visiting Researcher***University College London, Dept. of Chemical Engineering - London, UK*

Project: Process modeling and regression data analysis using gPROMS

## SUPERVISION OF PhD &amp; MSc STUDENTS

now

Supervisor/co-supervisor of 4 PhD students:

- Ragne Pärnamäe (Wetsus)  
Project: Electrochemical characterization of bipolar membranes
- Qingdian Shu (Wageningen University/Wetsus)  
Project: Novel methods for electrochemical capture and conversion of CO<sub>2</sub>
- Gijs Doornbusch (TU Eindhoven/Wetsus)  
Project: Multistage electro dialysis for low energy seawater desalination
- Louis Legrand (Wageningen University/Wetsus)  
Project: Capacitive processes for carbon capture and energy recovery from CO<sub>2</sub> emissions

2012-2019

Supervisor of 2 visiting PhD students and 18 MSc students (chemical engineering/environmental engineering)

## TEACHING ACTIVITIES

2016-

Involved in tutoring in the MSc course on "Chemical Reactor Design" (lecturer: dr. P.M. Biesheuvel), Wetsus Academy, The Netherlands

2012-2014

Involved in teaching, tutoring, and oral examination in the MSc courses on "Chemical Process Design" (lecturer: prof. dr. G. Micale) and "Membrane Process Technology" (lecturer: prof. dr. A. Cipollina), University of Palermo, Italy

## MAJOR COLLABORATORS

- Dr. ir. P.M. Biesheuvel, Dr. ir. H.V.M. Hamelers, Dr. ir. J. Post (Wetsus)
- Prof. Dr. G. Micale, Prof. Dr. A. Cipollina (University of Palermo, Italy)
- Dr. S. Mareev, Prof. Dr. V. Nikonenko (Kuban State University, Russia)
- Dr. J. Catalano (Aarhus University, Denmark)
- Prof. Dr. S. Velizarov (Universidade Nova de Lisboa, Portugal)

## AWARDS

2018

**EMS Travel Award for Young Academics***European Membrane Society*

Award for young academics selected as presenting authors at Euromembrane 2018 (Valencia, Spain). Selection based on CV and scientific quality and originality of the contribution

2014

**Best Presentation Award**2<sup>nd</sup> International Conference on Salinity Gradient Energy, Leeuwarden, The Netherlands

## ORGANISATION OF SCIENTIFIC MEETINGS

2020

- Conference co-chair and chair of organizing committee, 12<sup>th</sup> European Symposium on Electrochemical Engineering (ESEE 2021), June 13-17, 2021, Leeuwarden, The Netherlands  
Responsible for scientific program, abstracts review, coordination of organizing committee (10 people), and organizing tasks (sponsorship, communication, technical visits, conference website)

2019

- Chair of session on "ion exchange membrane processes", 13<sup>th</sup> Int. Symposium on Electrokinetics (ELKIN) - June 12-14, 2019, Massachusetts Institute of Technology, Cambridge, US

2018

- Organizer and Chair, 2<sup>nd</sup> Int. Workshop on Physics of Membrane Processes - September 2, 2018, Bologna, Italy

- 2017
- Chair of session on “CDI & ED Modeling”, Int. Conference on Capacitive Deionization, Electrosorption & Electrodialysis, 3-6 July 2017 - Seoul, Republic of Korea
  - Member Scientific and Organizing Committee, Membrane in Drinking and Industrial Water Production (MDIW), 6-8 February 2017 - Leeuwarden, The Netherlands
  - Organizer and Chair of symposium on “Novel theoretical approaches for membrane transport processes in drinking water production”, during MDIW Conference, 6-8 February 2017 - Leeuwarden, The Netherlands
  - Member Organizing Committee, Young Water Professional Benelux, 5-7 July 2017 - Gent, Belgium
- 2016
- Chair of session on “Reverse electrodialysis”, Desalination for Clean Water and Energy, 22-26 May 2016 - Rome, Italy

## COMMISSIONS OF TRUST

Reviewer for: J. of Membrane Science, Desalination, Water Research, Electrochimica Acta, J. of Greenhouse Gas Control, J. of CO<sub>2</sub> Utilization

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

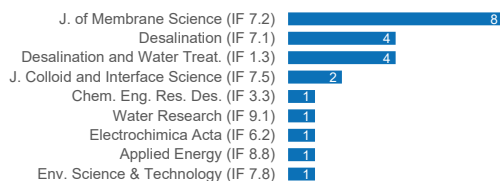
- 2017-  
2016-  
2016-
- Founder and Chair of “Physics of Membrane Processes” working group
  - Member, European Membrane Society (EMS)
  - Member, International Society of Electrochemistry (ISE)

## LIST OF PEER-REVIEWED PUBLICATIONS

**Total number of peer-reviewed publications: 23**

**Citations: >900** (Google Scholar)

**h-index: 16** (Google Scholar)



- 2020
1. P Dessì, L Rovira-Alsina, C Sánchez, GK Dinesh, W Tong, P Chatterjee, **M Tedesco**, P Farràs, HVM Hamelers, S Puig, “*Microbial electrosynthesis: towards sustainable biorefineries for production of green chemicals from CO<sub>2</sub> emissions*”, Biotechnology Advances, (under review)
  2. G Doornbusch, M van der Wal, **M Tedesco**, J Post, K Nijmeijer, Z Borneman, “*Multistage electrodialysis for desalination of natural seawater*”, J. of Membrane Science, (under review)
  3. Q Shu, L Legrand, P Kuntke, **M Tedesco**, HVM Hamelers, “*Electrochemical regeneration of spent alkaline sorbent from direct air capture*”, Environmental Science & Technology, 54 (2020) 8990-8998
  4. R Pärnamäe, S Mareev, V Nikonenko, S Melnikov, N Sheldeshov, V Zabolotskii, HVM Hamelers, **M Tedesco**, “*Bipolar membranes: a review on principles, latest developments, and applications*”, J. of Membrane Science, 118538
  5. G Doornbusch, M Bel, **M Tedesco**, J Post, Z Borneman, K Nijmeijer, “*Effect of membrane area and membrane properties in multistage electrodialysis on seawater desalination performance*”, J. of Membrane Science, 118303
  6. G Doornbusch, H Swart, **M Tedesco**, J Post, Z Borneman, K Nijmeijer, “*Current utilization in electrodialysis: Electrode segmentation as alternative for multistaging*”, Desalination 480 (2020) 114243
  7. L Legrand, Q Shu, **M Tedesco**, JE Dykstra, HVM Hamelers, “*Role of ion exchange membranes and capacitive electrodes in membrane capacitive deionization (MCDI) for CO<sub>2</sub> capture*”, J. Colloid and Interface Science 564 (2020) 478-490
- 2019
8. L Legrand, O Schaetzle, **M Tedesco**, HVM Hamelers, “*Electrical energy from CO<sub>2</sub> emissions by direct gas feeding in capacitive cells*”, Electrochimica Acta 319 (2019) 264-276
  9. A Campione, A Cipollina, IDL Bogle, L Gurreri, A Tamburini, **M Tedesco**, G Micale, “*A hierarchical model for novel schemes of electrodialysis desalination*”, Desalination 465 (2019) 79-93
  10. G Doornbusch, **M Tedesco**, JW Post, Z Borneman, K Nijmeijer, “*Experimental investigation of multistage electrodialysis for seawater desalination*”, Desalination 464 (2019) 105-114

- 2018
11. M La Cerva, L Gurreri, **M Tedesco**, A Cipollina, M Ciofalo, A Tamburini, G Micale, "Determination of limiting current density and current efficiency in electro dialysis units", *Desalination* 445 (2018) 138-148
  12. **M Tedesco**, HVM Hamelers, PM Biesheuvel, "Nernst-Planck transport theory for (reverse) electro dialysis: III. Optimal membrane thickness for enhanced process performance", *J. Membrane Science* 565 (2018) 480-487
- 2017
13. A Tamburini, **M Tedesco**, A Cipollina, G Micale, M Ciofalo, M Papapetrou, W van Baak, A Piacentino, "Reverse electro dialysis heat engine for sustainable power production", *Applied Energy* 206 (2017) 1334-1353
  14. A D'Angelo, **M Tedesco**, A Cipollina, A Galia, G Micale, O Scialdone, "Reverse electro dialysis performed at pilot plant scale: Evaluation of redox processes and simultaneous generation of electric energy and treatment of wastewater", *Water research* 125 (2017) 123-131
  15. MB Kristensen, A Bentien, **M Tedesco**, J Catalano, "Counter-ion transport number and membrane potential in working membrane systems", *J. Colloid and Interface Science* 504 (2017) 800-813
  16. **M Tedesco**, HVM Hamelers, PM Biesheuvel, "Nernst-Planck transport theory for (reverse) electro dialysis: II. Effect of water transport through ion exchange membranes", *J. Membrane Science* 531 (2017) 172-182
  17. **M Tedesco**, A Cipollina, A Tamburini, G Micale, "Towards 1kW power production in a reverse electro dialysis pilot plant with saline waters and concentrated brines", *J. Membrane Science* 522 (2017) 226-236
- 2016
18. **M Tedesco**, HVM Hamelers, PM Biesheuvel, "Nernst-Planck transport theory for (reverse) electro dialysis: I. Effect of co-ion transport through the membranes", *J. Membrane Science* 510 (2016) 370-381
  19. **M Tedesco**, C Scalici, D Vaccari, A Cipollina, A Tamburini, G Micale, "Performance of the first reverse electro dialysis pilot plant for power production from saline waters and concentrated brines", *J. Membrane Science* 500 (2016) 33-45
  20. M Bevacqua, A Carubia, A Cipollina, A Tamburini, **M Tedesco**, G Micale, "Performance of a RED system with ammonium hydrogen carbonate solutions", *Desalin. Water Treat.* 47 (2016) 23007-23018
- 2015
21. **M Tedesco**, E Brauns, A Cipollina, G Micale, P Modica, G Russo, J Helsen, "Reverse Electro dialysis with saline waters and concentrated brines: a laboratory investigation towards technology scale-up", *J. Membrane Science* 492 (2015) 9-20
  22. **M Tedesco**, P Mazzola, A Tamburini, G Micale, I DL Bogle, M Papapetrou, A Cipollina, "Analysis and simulation of scale-up potentials in reverse electro dialysis", *Desalin. Water Treat.* 55 (2015), 3391-3403
  23. **M Tedesco**, A Cipollina, A Tamburini, G Micale, J Helsen, M Papapetrou, "REAPower: Use of desalination brine for power production through reverse electro dialysis", *Desalin. Water Treat.* 53 (2015) 3161-3169
  24. **M Tedesco**, A Cipollina, A Tamburini, IDL Bogle, G Micale, "A simulation tool for analysis and design of reverse electro dialysis using concentrated brines", *Chem. Eng. Res. Des.*, 93 (2015) 441-456 ([Among the most cited articles published in 2015 in IChemE journals - IChemE Highlights 17/05/2016](#))
- 2012
25. **M Tedesco**, A Cipollina, A Tamburini, W van Baak, G Micale, "Modelling the reverse electro dialysis process with seawater and concentrated brines", *Desalin. Water Treat.* 49 (2012) 404-424

## BOOK CONTRIBUTIONS

- A Tamburini, A Cipollina, **M Tedesco**, L Gurreri, M Ciofalo, G Micale, "The REAPower project: power production from saline waters and concentrated brines", in: "Current Trends and Future Developments on (Bio-) Membranes", Elsevier, 2018
- A Cipollina, G Micale, A Tamburini, **M Tedesco**, L Gurreri, J Veerman, S Grasman, "Reverse electro dialysis: Applications", in: "Sustainable Energy from Salinity Gradients", Woodhead Publishing & Elsevier, 2016

## PATENTS

- HVM Hamelers, **M Tedesco**, Q. Shu, "Electrochemical device, system and method for electrochemical recovery and/or regeneration of carbon dioxide from a stream", NL2025044

## ORAL PRESENTATIONS IN INTERNATIONAL CONFERENCES

**Total number of oral presentations in international conferences (2012-2019): 21**

- 2019
- “Understanding cation transport and water dissociation in bipolar electro dialysis for energy storage applications”, 13<sup>th</sup> Int. Symposium on Electrokinetics (ELKIN) - June 12-14, 2019, Massachusetts Institute of Technology, Cambridge, US
- 2018
- European Water Tech Week - September 24-27, 2018, Leeuwarden, The Netherlands
  - “Nernst-Planck theory to identify optimal membrane thickness in electro dialysis”, 2<sup>nd</sup> Int. Workshop on Physics of Membrane Processes - September 2, 2018, Bologna, Italy
  - “Understanding the role of thickness of ion exchange membranes for enhanced process performance in (reverse) electro dialysis”, 69<sup>th</sup> Annual ISE Meeting - September 2-7, 2018, Bologna, Italy
  - “Does membrane thickness play a role in (reverse) electro dialysis?”, Euromembrane 2018, July 9-13, 2018, Valencia, Spain
- 2017
- “Introduction to Electro dialysis and Ion exchange membrane processes: Historical development, industrial applications and perspectives”, Int. Conference on Capacitive Deionization, Electrosorption & Electro dialysis - July 2017 - Seoul, Republic of Korea (**45 min tutorial, ~70 attendants**)
  - “Seawater desalination via electro dialysis: Understanding cation and water transport through the membranes”, Int. Conference on Capacitive Deionization, Electrosorption & Electro dialysis - July 2017 - Seoul, Republic of Korea (**Keynote**)
  - “Ion transport in weakly charged porous media and ion exchange membranes for Shock Electro dialysis desalination”, InterPore 9<sup>th</sup> Int. Conference on Porous Media & Annual Meeting - May 2017 - Rotterdam, The Netherlands
  - “Theory and perspectives on water desalination by shock electro dialysis”, Membrane in Drinking and Industrial Water Production (MDIW) - February 2017 - Leeuwarden, The Netherlands
- 2016
- “Modeling Ion and Water Transport in Shock Electro dialysis”, Interfaces Against Pollution - September 2016 - Lleida, Spain
  - “Influence of Water Transport in (Reverse) Electro dialysis”, 67<sup>th</sup> Annual Meeting of the International Society of Electrochemistry - August 2016 - The Hague, The Netherlands
  - “Optimisation analysis of Reverse Electro dialysis systems for power production from concentrated brines”, Desalination for Clean Water and Energy - May 2016 - Rome, Italy
- 2015
- “Modeling ion exchange membrane transport for energy harvesting and desalination”, CDI&E Conference 2015 - October 2015 - Saarbrücken, Germany
  - “Operation and perspectives of the first pilot plant fed with brackish water and saltworks brines”, Desalination for Clean Water and Energy - May 2015 - Palermo, Italy
- 2014
- “Performance analysis of the first reverse electro dialysis prototype plant operating with natural brackish water and saltworks brine”, Second International Conference on Salinity Gradient Energy - September 2014 - Leeuwarden, The Netherlands (**Awarded as Best Presentation**)
  - “Reverse electro dialysis process: analysis of optimal conditions for process scale-up”, Desalination for the Environment, Clean Water and Energy - May 2014 - Limassol, Cyprus
- 2013
- “Reverse electro dialysis process with seawater and concentrated brines: a COMSOL model for equipment design”, COMSOL Conference Rotterdam 2013 - October 2013 - Rotterdam, The Netherlands
  - “REAPower: use of desalination brine for power production through reverse electro dialysis”, International Conference WIN4Life - September 2013 - Tinos Island, Greece (**Invited**)
  - “SGP-RE energy production from seawater and brines: the REAPower project. Achievements and perspectives”, INES Seminar - May 2013 - Palermo, Italy
- 2012
- “Reverse electro dialysis with seawater and concentrated brine: a comprehensive process modelling”, International Workshop on Salinity Gradient Energy, September 2012 - Milan, Italy
  - “A multi-scale model for the reverse electro dialysis process with seawater and concentrated brines”, Desalination for the Environment, Clean Water and Energy - April 2012 - Barcelona, Spain