

Marina Micari

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- Date of Birth: 21st August 1993
- Place of birth: Palermo, Italy
- Nationality: Italian
- Languages: Italian, English

WORK EXPERIENCE

Ecole polytechnique fédérale de Lausanne (EPFL), Sion

POSTDOCTORAL RESEARCHER

June 2020 - present

- ♦ Activities - Engineering the design of membrane modules for gaseous streams separation to optimize the energy efficiency; scaling-up of graphene membrane modules.
- ♦ Supervisor - Prof. Kumar Varoon Agrawal (kumar.agrawal@epfl.ch).
- ♦ Institute of Chemical Sciences and Engineering (ISIC), Laboratory of Advanced Separation.

German Aerospace Center (DLR), Stuttgart

PHD IN CHEMICAL ENGINEERING

June 2017 - May 2020

- ♦ Thesis title - "Integration of Desalination and Purification Processes for the Treatment and Valorisation of Industrial Brines".
- ♦ Activities - Development and implementation in Python of techno-economic models for pre-treatment and concentration technologies; integration of the models into a simulation platform; technical, economic and environmental assessments of the integrated treatment systems.
- ♦ Supervisor - Prof. Valentin Bertsch (valentin.bertsch@lee.rub.de).
- ♦ Institute of Engineering Thermodynamics, Department of Energy System Analysis.

University of Palermo

RESEARCH ASSISTANT

November 2016 - May 2017

- ♦ Research group of Prof. Micale (UNIPA) within the EU project RED-Heat-to-Power.
- ♦ Supervisor/Contacts: Prof. Giorgio Micale (giorgiod.maria.micale@unipa.it) and Prof. Andrea Cipollina (andrea.cipollina@unipa.it).
- ♦ Activities - Development and optimisation of a mathematical model, describing the Reverse Electrodialysis technology, implemented on the software gPROMs; development and analysis of integrated models to simulate different Reverse Electrodialysis Heat Engines.

FujiFilm Manufacturing Europe, Tilburg

RESEARCH INTERN

March 2016 - July 2016

- ♦ Contact - Willem Van Baak (willem@waterfuture.nl)
- ♦ Activities - Experimental tests on ion exchange membranes and Reverse Electrodialysis units, to investigate salts transport through polymeric materials.

DEGREES AND QUALIFICATIONS

Italian Engineering Society

QUALIFICATION LICENSE

March 2016

University of Palermo

MASTER DEGREE IN CHEMICAL ENGINEERING
with maximum marks and honours
(110/110 cum laude)

Academic years 2014 - 2016

- ♦ Department of Industrial and Digital Innovation, University of Palermo.
- ♦ Master thesis: "Closed Loop Reverse Electrodialysis: Experiments and Mathematical Modelling"
- ♦ Supervisors: Prof. Giorgio Micale, Dr. Andrea Cipollina, Dr. Willem Van Baak.

University of Palermo	BACHELOR DEGREE IN CHEMICAL ENGINEERING <i>with maximum marks and honours</i> <i>(110/110 cum laude)</i>	Academic years 2011 - 2014
<ul style="list-style-type: none"> ◆ Department of Chemical, Management, Computer and Mechanical Engineering, University of Palermo. ◆ Bachelor thesis: “Valutazione del Contenuto di Idrossiapatite in Scaffold per Bone Tissue Engineering” ◆ Supervisors: Prof. Valerio Brucato, Prof. Vincenzo La Carrubba; Dr. Gioacchino Conoscenti. 		

TRAINING PERIODS

ETH Zurich	ACADEMY OF SUSTAINABILITY AND TECHNOLOGY Appenzell	23-28 June 2019
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Plataforma Solar de Almeria, Almeria, Spain	3-WEEKS STAGE	November 2016 - December 2016
<ul style="list-style-type: none"> ◆ Objectives - Implementation of an integrated model of the closed-loop system for Salinity Gradient Power heat engines, starting from an already implemented model for the RED unit and the MED model developed by the research group of the Plataforma Solar de Almería. 		

University of Warsaw, Poland	ERASMUS PLUS, 3-WEEKS INTENSIVE PROGRAM	September 2015
<ul style="list-style-type: none"> ◆ Joint innovative training and teaching/learning program in enhancing development and transfer knowledge of application of ionizing radiation in material processing” (Coordinators: Prof. Yongxia Sun and Prof. Clelia Dispenza) 		

TECHNICAL SKILLS AND COMPETENCES

- Extensive experience in Python programming language, including libraries for numerical computing and machine learning (numpy, scipy, scikit-learn)
- Good knowledge of gPROMs Model Builder, Matlab and Engineering Equation Solver;
- Laboratory experience with Reverse Electrodialysis stack and apparatus to measure ion selective membrane properties and RED stack electrical outputs.
- Academic IELTS certification (overall band score: 7.5).

SUPERVISION

- I supervised three students for their master thesis, focused on the modelling of membrane crystallizers for Magnesium Hydroxide and on the implementation of population balances and kinetics of the crystallization reaction.
- I supervised a student to design and carry on an experimental campaign for the characterization of nanofiltration membranes in presence of real wastewater effluents in collaboration with TU Delft and within the EU project Zero Brine.

Techno-economic Analysis of Integrated Treatment Chains for the Valorisation of Neutral Coal Mine Effluents.

Accepted for publication at *Journal of Cleaner Production* IF: 6.4

M. Micari ✉, A. Cipollina, A. Tamburini ✉, M. Moser, G. Micale, V. Bertsch.

[Corresponding author – Part of PhD thesis – Application of the method developed during the PhD to the case study of the coal mine effluent to identify the most performing treatment chain]

Experimental and Theoretical Characterization of Commercial Nanofiltration Membranes for the Treatment of Ion Exchange Resins Spent Brine

Journal of Membrane Science. IF: 7.0 4 Article 118117 – July 2020 (doi.org/10.1016/j.memsci.2020.118117)

M. Micari ✉, D. Diamantidou, B. Heijman, M. Moser, A. Haidari, H. Spanjers, V. Bertsch

[Corresponding author – Part of PhD thesis – Joint experimental and simulation campaign to characterize nanofiltration membranes in presence of the brine produced by the regeneration of ion exchange resins]

Towards the Implementation of Circular Economy in the Water Softening Industry: A Technical, Economic and Environmental Analysis.

Journal of Cleaner Production IF: 6.4 Article 120291 – January 2020 (doi.org/10.1016/j.jclepro.2020.120291)

M. Micari ✉, M. Moser, A. Cipollina, A. Tamburini ✉, V. Bertsch, G. Micale.

[Corresponding author – Part of PhD thesis – First paper in which the method developed during the thesis has been presented and applied to compare treatment chains for the effluent of the regeneration of ion exchange resins and to identify the most performing one]

Combined Membrane and Thermal Desalination Processes for the Treatment of Ion Exchange Resins Spent Brine.

Applied Energy IF: 8.4 Article 113699 – November 2019 (doi.org/10.1016/j.apenergy.2019.113699)

M. Micari ✉, A. Cipollina, A. Tamburini ✉, M. Moser, V. Bertsch, G. Micale.

[Corresponding author – Part of PhD thesis – Detailed energetic and economic analysis of an integrated treatment process for a specific effluent]

Techno-economic assessment of multi-effect distillation process for the treatment and recycling of ion exchange resin spent brines.

Desalination IF: 6.6 vol 456, p 38-52 – April 2019 (doi.org/10.1016/j.desal.2019.01.011)

M. Micari, M. Moser, A. Cipollina, B. Fuchs, B. Ortega-Delgado, A. Tamburini ✉, G. Micale.

[Part of PhD thesis – Development and implementation of the Multi-Effect Distillation model and application to the treatment of a specific effluent]

Towards the first proof of the concept of a Reverse ElectroDialysis-Membrane Distillation Heat Engine.

Desalination IF: 6.6 vol 453, p.77-88– March 2019 (doi.org/10.1016/j.desal.2018.11.022)

M. Micari, A. Cipollina, F. Giacalone, G. Kosmadakis, M. Papapetrou, G. Zaragoza, G. Micale, A. Tamburini ✉.

[Implementation and simulation of an integrated model for a reverse electro dialysis-membrane distillation heat engine and identification of the optimal operating conditions]

Performance Analysis of a RED-MED Salinity Gradient Heat Engine.

Energies IF: 2.7 vol 11, 3385 – December 2018 (doi.org/10.3390/en11123385)

P. Palenzuela, **M. Micari**, B. Ortega-Delgado, F. Giacalone, G. Zaragoza, D. Alarcon-Padilla, A. Cipollina, A ✉. Tamburini, G. Micale.

[Implementation and simulation of an integrated model for a reverse electro dialysis-multi-effect distillation heat engine and identification of the optimal operating conditions]

Effect of different aqueous solutions of pure salts and salt mixtures in reverse electro dialysis systems for closed-loop application.

Journal of Membrane Science IF: 7.0 vol. 551, p. 315-324 – April 2018 (doi.org/10.1016/j.memsci.2018.01.036)

M. Micari, M. Bevacqua, A. Cipollina, A. Tamburini, W. Van Baak, T. Putts, G. Micale ✉.

[Part of Master thesis – Experimental characterization of ion exchange membranes for reverse electro dialysis application in presence of various salt solutions and mixtures]

Techno-economic Analysis of Concentration Technologies for the Treatment and Recycling of Industrial Wastewater Effluents

M. Micari, M. Moser, A. Cipollina, A. Tamburini, S. Casas, M. Martínez, J. Farnós, V. Bertsch, G. Micale
14th Conference on Sustainable Development of Energy, Water and Environment Systems
Dubrovnik, 1 – 6 October 2019.

Combined Membrane and Thermal Desalination Processes for the Treatment of Ion Exchange Resins Spent Brine

M. Micari, M. Moser, A. Cipollina, B. Fuchs, M. Bevacqua, A. Tamburini, G. Micale,
13th Conference on Sustainable Development of Energy, Water and Environment Systems
Palermo, 30 September – 4 October 2018.

A comprehensive Sensitivity Study on the Performance of the Multi-Effect Distillation Technology

M. Moser, **M. Micari**, B. Fuchs, A. Cipollina, G. Micale
13th Conference on Sustainable Development of Energy, Water and Environment Systems
Palermo, 30 September – 4 October 2018.

Combined Membrane and Thermal Desalination Processes for the Treatment of Ion Exchange Resins Spent Brine – Techno-economic Assessment of Multi-Effect Distillation

M. Micari, M. Moser, A. Cipollina, B. Fuchs, M. Bevacqua, A. Tamburini, G. Micale
Desalination for the Environment: Clean Water and Energy
Athens, 3-6 September 2018.

Combined Membrane and Thermal Desalination Processes for the Treatment of Industrial Brines – Nanofiltration Model and Results (poster)

M. Micari, M. Moser, B. Fuchs, M. Bevacqua, A. Cipollina, A. Tamburini, G. Micale
Euromembrane Conference
Valencia, 9-13 July 2018.

Multi-Effect Distillation: A Key Component for a Circular Economy Approach in Industrial Waste-Water – A preliminary Techno-economic Assessment,

M. Micari, M. Moser, A. Cipollina, B. Fuchs, B. Ortega-Delgado, A. Tamburini, G. Micale
5th international Conference on Recycling and Waste Management
London, 5-6 March 2018.

PATENTS

Electricity Generation Through Reverse Electrodialysis

W. Van Baak, A. Emdadi, **M. Micari**, M. Bevacqua
Publication number: WO2018/229505, 2018