CURRICULUM VITAE

EUROPEAN FORMAT

PERSONAL INFORMATION

Name, Surname	**RACHELE CASTALDO**
E-mail	rachele.castaldo@cnr.it, rachele.castaldo@ipcb.cnr.it
Institute	Institute of Polymer Composites and Biomaterials of National Research Council of Italy
Position	Research Scientist

EDUCATION

• Date	May 12th, 2017
• Name of Institution	University of Naples Federico II - Department of Chemical, Materials and Production Engineering (DICMaPI)
• Qualification	PhD in Industrial Product and Process Engineering – Thesis on "Preparation and characterization of hyper-crosslinked resins and nanocomposites", DOI: 10.6093/UNINA/FEDOA/11835
• Date	March, 2015
• Name of Institution	University of Naples Federico II
• Qualification	Professional Industrial Engineering habilitation
• Date	May 20th, 2013
• Name of Institution	University of Naples Federico II - DICMaPI
• Qualification	Master degree in Materials Engineering
• Date	March 22th, 2010
• Name of Institution	University of Naples Federico II - DICMaPI
• Qualification	Bachelor degree in Materials Science and Engineering

WORK EXPERIENCE

Dates (from – to)	September 9st, 2013 – to date
Name and address of employer	National Research Council of Italy – Institute for Polymers, Composite and Biomaterials, Pozzuoli, Naples
Type of business or sector	Research Unit
Occupation or position held	Research assistant (2013-2019), Researcher III Level (2019-to date)
Main activities and responsibilities	Research activity in the development of functional nanomaterials and composites for advanced application in the fields on environmental remediation, conservation of cultural heritages, sustainable packaging and recycling of polymer composites.

TEACHING EXPERIENCE

Dates (from – to)	2014 – 2018
Name and address of employer	University of Naples Federico II - DICMaPI
Type of business or sector	Teaching sector
Occupation or position held	Teaching assistant
Main activities and responsibilities	Teaching assistant in Chemistry for bachelor degree in Materials Science and Engineering; tutoring of bachelor and master degree students in Materials Engineering

INTERNATIONAL APPOINTMENTS

Dates (from – to)	February 3rd - 20th, 2020
Name and type of organisation	Technion - Israel Institute of Technology, Haifa (IL)
Principal subjects	Design and development of high internal phase emulsion polymers (polyHIPE) containing hyper-crosslinked resins for adsorption of pollutants from water and air
Title of qualification awarded	Visiting Researcher

NATIONAL AND INTERNATIONAL AWARDS

- Young Researcher Award, awarded by the Scientific Committee of Conference NINE2021 - Nanotechnology Based Innovative Applications for the Environment. Online conference, March 31th, 2021
- Young Investigator Award 2019 – Advanced Materials, awarded by CNR - DSCTM (Chemical Science and Material Technologies Department). Bressanone, Italy, October 30th, 2019
- Short Term Mobility funding by CNR for a research project to develop at the Technion Israel Institute of Technology. 2019
- Best Presentation Award awarded by the Scientific Committee of the Polychar 26 International Conference. Tiblisi, Georgia, September 13th, 2018

RESEARCH ACTIVIVIES

Research Interests

- Design and synthesis of polymers and nanocomposites with tailored functionality and controlled micro/meso/macroporosity for the capture of pollutants from water and air.
- Design and synthesis of high surface mesoporous silica nanoparticles for the smart delivery of active agents in protective coatings for cultural heritage artifacts.
- Characterization of specific surface area, micro/mesoporous structure, absolute and selective gas/vapors adsorption/desorption capacity of materials through volumetric adsorption/desorption analyses.
- Development of smart hybrids based on graphene derived materials and lamellar phyllosilicates with sensing and barrier properties to gases and water vapor.
- Development of sustainable thermoplastic polymer blends and nanocomposites.
- Development of sustainable recycling solutions for end-of-life polymer based composite materials

International and National Research Projects Participation

Participation to the research activities developed in the framework of the following projects:

- EU project H2020 “ECOBULK - Circular Process for Eco-Designed Bulky Products and Internal Car Parts” – G.A. 730456 (2017-2021).
- EU Project H2020 “INNOVACONCRETE – Innovative materials and techniques for the conservation of 20th century concrete-based cultural heritage” – G.A. 760858 (2018-2021).
- EU Project H2020 “APACHE – Active & Intelligent Packaging materials and display cases as a tool for preventive conservation of Cultural heritage” – G.A 814496 (2019-2022).
- National Project PRIN “PANACEA – A technology PlAtform for the sustainable recovery and advanced use of NAnostructured CEllulose from Agri-food residues” – Progetto n. 2017LEPH3M (2019-2022).
- National Project PON “TEX-STYLE – New smart and sustainable multi-sector fabrics for creative design and made-in-Italy style” – Progetto ARS01_00996 (2020-2022).
- National Project “ATOS – Automazione della separazione di rifiuti di plastica finalizzata al loro riutilizzo mediante riciclo meccanico” – Research Contract Lavorgna srl – CNR-IPCB (2020-2022).
- National Project “Development of new lead-free nanocomposite systems for X-ray protection” – Research Contract TEKNOS srl – CNR-IPCB (2021-2022).
- National Project “FLEX2 – New flexible films for food packaging with high gas barrier made by coatings based on cellulose nanofibers” – Research Contract CRDC Nuove Tecnologie – IPCB-CNR (2020-2022).
- National project “FUNK ITALY – Design of functionalized, innovative and sustainable 'Made in Italy' products” – Bando Cluster tecnologici nazionali – MIUR – Project n. CTN02_00053_10024434 (2017-2020).

- National Project “RIPA-PAUN – Parco archeologico urbano di Napoli” – Progetto POR Campania – FESR 2014-2020 (2017-2020).
- National project “FLEX – Film per imballaggio alimentare a migliorata barriera e riciclabilità mediante coating e adesivi a base di filler nanostrutturati 2D” – Research Contract CRDC Nuove Tecnologie – IPCB-CNR (2018-2020).
- National Project Progetto Premiale CNR 2012 "Energia da Fonti Rinnovabili" (2013-2015).

Scientific Committees & Societies

- Member of the International Adsorption Society (https://www.int-ads-soc.org)
- Member of Scientific Committee of the “µMED International Conference on Microplastics Pollution in the Mediterranean Sea (Capri, September 15-18, 2019)
- Member of Scientific Committee of the International Conference Polychar27 (Naples, October 14-17, 2019)
- Member of Scientific Committee of the “µMED International Conference on Microplastics Pollution in the Mediterranean Sea (Capri, September 15-18, 2019)

Reviewer and Editing Activity

- Rewiever for several international scientific (ISI) journals, among Elsevier, Springer, Wiley and MDPI
- Guest Editor of the Special issue “Advanced Polymer Based Materials: Production, Characterization and Applications” in Polymers – MDPI, 2020
- Guest Editor of the Special issue “Mechanochemical Treatments of Polymers and Organic Materials” in Polymers – MDPI, 2022

Scientific Conferences

- Dr. Rachele Castaldo has disseminated her research activities in over 20 among national and international conferences

SCIENTIFIC PUBLICATIONS

Dr. Rachele Castaldo is co-author of more than 50 research products. Among them, 32 are publications published in international scientific (ISI) journals. Her H-index value is 15 from Google Scholar and Scopus. Her total citations are more than 600 at the date of June 30th, 2022.

Scientific papers published in ISI Journals are reported as follows (* denotes the role of corresponding author):

1. M Volgare, R Avolio, **R Castaldo**, ME Errico, H El Khiar, G Gentile, A. Sinjur, D. Susnik, A. Znidarsic, M. Cocca, Microfiber Contamination in Potable Water: Detection and Mitigation Using a Filtering Device, Microplastics 1 (3), 322-333
2. R. Argenziano, M. L. Alfieri, Y. Arntz, **R. Castaldo**, D. Liberti, D. M. Monti, G. Gentile, L. Panzella, O. Crescenzi, V. Ball, A. Napolitano, M. d'Ischia, Non-covalent small molecule partnership for redox-active films: beyond polydopamine technology. Journal of Colloid and Interface Science, 2022, In Press
3. M. Guerritore, F. Olivieri, R. Avolio, **R. Castaldo***, M. Cocca, M. E. Errico, M. Lavorgna, B. Silvestri, V. Ambrogi, G. Gentile, Hierarchical micro-to-macroporous silica nanoparticles obtained by their grafting with hyper-crosslinked resin. Microporous and Mesoporous Materials, 2022, DOI: 10.1016/j.micromeso.2022.111864
4. A. Imbrogno, J. Islam, C. Santillo, **R. Castaldo**, L. Sygellou, C. Larrigy, R. Murray, E. Vaughan, M. K. Hoque, A. J. Quinn, D. Iacopino, Laser-Induced Graphene Supercapacitors by Direct Laser Writing of Cork Natural Substrates. ACS Applied Electronic Materials, 2022, DOI: 10.1021/acsaelm.1c01202
5. I. Bonadies, R. Capuano, R. Avolio, **R. Castaldo**, M. Cocca, G. Gentile, M. E. Errico, Sustainable Cellulose-Aluminum-Plastic Composites from Beverage Cartons Scraps and Recycled Polyethylene. Polymers, 2022, DOI: 10.3390/polym14040807
6. M. Guerritore, F. Olivieri, **R. Castaldo***, R. Avolio, M. Cocca, M. E. Errico, M. R. Galdi, C. Carfagna, G. Gentile, Recyclable-by-design mono-material flexible packaging with high barrier properties realized through graphene hybrid coatings. Resources, Conservation and Recycling, 2022, DOI: 10.1016/j.resconrec.2021.106126

7. **R. Castaldo***, R. Avolio, M. Cocca, M. E. Errico, M. Lavorgna, J. Šalplachta, C. Santillo, G. Gentile, Hierarchically porous hydrogels and aerogels based on reduced graphene oxide, montmorillonite and hyper-crosslinked resins for water and air remediation. Chemical Engineering Journal, 2022, DOI: 10.1016/j.cej.2021.133162

8. F. Olivieri, **R. Castaldo***, M. Cocca, G. Gentile*, M. Lavorgna, Innovative Silver-Based Capping System for Mesoporous Silica Nanocarriers Able to Exploit a Twofold Anticorrosive Mechanism in Composite Polymer Coatings: Tailoring Benzotriazole Release and Capturing Chloride Ions. ACS Applied Materials & Interfaces, 2021, DOI: 10.1021/acsami.1c15231

9. M. Volgare, F. De Falco, R. Avolio, **R. Castaldo**, M. E. Errico, G. Gentile, V. Ambrogi, M. Cocca, Washing load influences the microplastic release from polyester fabrics by affecting wettability and mechanical stress. Scientific Reports, 2021, DOI: 10.1038/s41598-021-98836-6

10. **R. Castaldo***, R. Avolio, M. Cocca, M. E. Errico, M. Avella, G. Gentile, Amino-functionalized hyper-crosslinked resins for enhanced adsorption of carbon dioxide and polar dyes. Chemical Engineering Journal, 2021, DOI: 10.1016/j.cej.2021.129463

11. D. Pirone, M. Mugnano, P. Memmolo, F. Merola, G. C. Lama, **R. Castaldo**, L. Miccio, V. Bianco, S. Grilli, P. Ferraro, Three-dimensional quantitative intracellular visualization of graphene oxide nanoparticles by tomographic flow cytometry. Nano Letters, 2021, DOI: 10.1021/acs.nanolett.1c00868

12. R. Capuano, I. Bonadies, **R. Castaldo**, M. Cocca, G. Gentile, A. Protopapa, Roberto Avolio, M. E. Errico, Valorization and Mechanical Recycling of Heterogeneous Post-Consumer Polymer Waste through a Mechano-Chemical Process. Polymers, 2021, DOI: 10.3390/polym13162783

13. F. Rizzi, **R. Castaldo**, T. Latronico, P. Lasala, G. Gentile, M. Lavorgna, M. Striccoli, A. Agostiano, R. Comparelli, N. Depalo, M. L. Curri, E. Fanizza, High surface area mesoporous silica nanoparticles with tunable size in the sub-micrometer regime: Insights on the size and porosity control mechanisms. Molecules, 2021, DOI: 10.3390/molecules26144247

14. F. Olivieri, **R. Castaldo**, M. Cocca, G. Gentile, M. Lavorgna, Mesoporous silica nanoparticles as carriers of active agents for smart anticorrosive organic coatings: A critical review. Nanoscale, 2021, DOI: 10.1039/D1NR01899J

15. **R. Castaldo**, M. Salzano de Luna, C. Siviello, G. Gentile, M. Lavorgna, E. Amendola, M. Cocca, On the acid-responsive release of benzotriazole from engineered mesoporous silica nanoparticles for corrosion protection of metal surfaces. Journal of Cultural Heritage, 2020, DOI: 10.1016/j.culher.2020.01.016

16. M. Guerritore, **R. Castaldo***, B. Silvestri*, R. Avolio, M. Cocca, M. E. Errico, M. Avella, G. Gentile, V. Ambrogi, Hyper-crosslinked polymer nanocomposites containing mesoporous silica nanoparticles with enhanced adsorption towards polar dyes. Polymers, 202, DOI: 10.3390/polym12061388

17. M. Mugnano, G. C. Lama, **R. Castaldo**, V. Marchesano, F. Merola, D. Del Giudice, A. Calabuig, G. Gentile, V. Ambrogi, P. Cerruti, P. Memmolo, V. Pagliarulo, P. Ferraro, S. Grilli, Cellular uptake of mildly oxidized nanographene for drug-delivery applications. ACS Applied Nano Materials, 2019, DOI: 10.1021/acsanm.9b02035

18. **R. Castaldo**, M. Iuliano, M. Cocca, V. Ambrogi, G. Gentile, M. Sarno, A new route for low pressure and temperature CWAO: A PtRu/MoS2_Hyper-crosslinked nanocomposite. Nanomaterials, 2019, DOI: 10.3390/nano9101477

19. **R. Castaldo**, F. De Falco, R. Avolio, E. Bossanne, F. Cicaroni Fernandes, M. Cocca, E. Di Pace, M. E. Errico, G. Gentile, D. Jasiński, D. Spinelli, S. A. Urios, M. Vilkki, M. Avella, Critical factors for the recycling of different end-of-life materials: Wood wastes, automotive shredded residues, and dismantled wind turbine blades. Polymers, 2019, DOI: 10.3390/polym11101604

20. M. Cantarella, S. C. Carroccio, S. Dattilo, R. Avolio, **R. Castaldo**, C. Puglisi, V. Privitera, Molecularly imprinted polymer for selective adsorption of diclofenac from contaminated water. Chemical engineering journal, 2019, DOI: 10.1016/j.cej.2019.02.146

21. S. Coppola, G. Nasti, V. Vespini, L. Mecozzi, **R. Castaldo**, G. Gentile, M. Ventre, P. A.

Netti, P. Ferraro, Quick liquid packaging: Encasing water silhouettes by three-dimensional polymer membranes. Science advances, 2019, DOI: 10.1126/sciadv.aat518

22. M. Salzano de Luna, C. Ascione, C. Santillo, L. Verdolotti, M. Lavorgna, G. G. Buonocore, **R. Castaldo**, G. Filippone, H. Xia, L. Ambrosio, Optimization of dye adsorption capacity and mechanical strength of chitosan aerogels through crosslinking strategy and graphene oxide addition. Carbohydrate polymers, 2019, DOI: 10.1016/j.carbpol.2019.02.002
23. **R. Castaldo**, V. Ambrogi, R. Avolio, M. Cocca, G. Gentile, M. E. Errico, M. Avella, Functional hyper-crosslinked resins with tailored adsorption properties for environmental applications. Chemical Engineering Journal, 2019, DOI: 10.1016/j.cej.2019.01.054
24. **R. Castaldo**, G. C. Lama, P. Aprea, G. Gentile, V. Ambrogi, M. Lavorgna, P. Cerruti, Humidity-driven mechanical and electrical response of graphene/cloisite hybrid films. Advanced Functional Materials, 2019, DOI: 10.1002/adfm.201807744
25. R. Avolio, **R. Castaldo**, M. Avella, M. Cocca, G. Gentile, S. Fiori, M.E. Errico, PLA-based plasticized nanocomposites: Effect of polymer/plasticizer/filler interactions on the time evolution of properties. Composites Part B: Engineering, 2018, DOI: 10.1016/j.compositesb.2018.07.011
26. **R. Castaldo**, G. Gentile, M. Avella, C. Carfagna, V. Ambrogi, Microporous Hyper-Crosslinked Polystyrenes and Nanocomposites with High Adsorption Properties: A Review. Polymers, 2017, DOI: 10.3390/polym912065
27. **R. Castaldo**, G. C. Lama, P. Aprea, Gennaro Gentile, M. Lavorgna, V. Ambrogi, P. Cerruti, ffect of the oxidation degree on self-assembly, adsorption and barrier properties of nano-graphene. Microporous and Mesoporous Materials, 2017, DOI: 10.1016/j.micromeso.2017.10.026
28. M. Salzano de Luna, **R. Castaldo**, R. Altobelli, R. Altobelli, L. Gioiella, G. Filippone, G. Gentile, V. Ambrogi, Chitosan hydrogels embedding hyper-crosslinked polymer particles as reusable broad-spectrum adsorbents for dye removal. Carbohydrate Polymers, 2017, DOI: 10.1016/j.carbpol.2017.09.006
29. M. Salzano de Luna, R. Altobelli, L. Gioiella, **R. Castaldo**, G. Scherillo, G. Filippone, Role of Polymer Network and Gelation Kinetics on the Mechanical Properties and Adsorption Capacity of Chitosan Hydrogels. Journal of Polymer Science, Part B: Polymer Physics, 2017, DOI: 10.1002/polb.24436
30. **R. Castaldo**, R. Avolio, M. Cocca, G. Gentile, M. E. Errico, M. Avella, C. Carfagna and V. Ambrogi, A Versatile Synthetic Approach toward Hyper-Cross-Linked Styrene-Based Polymers and Nanocomposites. Macromolecules, 2017, DOI: 10.1021/acs.macromol.7b00812
31. **R. Castaldo**, R. Avolio, M. Cocca, G. Gentile, M. E. Errico, M. Avella, C. Carfagna and V. Ambrogi, Synthesis and adsorption study of hyper-crosslinked styrene-based nanocomposites containing multi-walled carbon nanotubes. RSC Advances, 2017, DOI: 10.1039/c6ra25481k
32. R. Avolio, **R. Castaldo**, G. Gentile, V. Ambrogi, S. Fiori, M. Avella, M. Cocca, M.E. Errico, Plasticization of poly(lactic acid) through blending with oligomers of lactic acid: Effect of the physical aging on properties. European Polymer Journal, 2015, DOI: 10.1016/j.eurpolymj.2015.02.040

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Pozzuoli, June 30th 2022

Dr Rachele Castaldo