

PERSONAL INFORMATION **Elena Spennati**PROFESSIONAL AND
EDUCATIONAL EXPERIENCES

- 2024 **Research grant (ING-IND/27):** Catalysts and catalytic processes for the production of H₂ and/or its use in the synthesis of e-fuels, with funding PNRR - PE2 -NEST - Network 4 Energy Sustainable Transition, under thematic area 2 "Energy Scenarios of the Future". CUP D33C22001330002.
Supervisor: Prof. Gabriella Garbarino (from 01/03/2023 to present).
- 2021 **Research grant (ING-IND/27):** Development of heterogeneous catalysts for the conversion of oxygenated compounds to high value-added chemicals.
Supervisor: Prof. Gabriella Garbarino (from 01/10/2021 to 28/02/2023).
- 2021 **PhD in n Civil, Chemical and Environmental Engineering**, curriculum in Chemical, Material and Process Engineering.
Thesis: Winery wastewater treatment by microalgae co-culture for low-cost biomass production in a biorefinery concept." (ING-IND/27). Supervisors: Prof. Guido Busca, Prof. Attilio Converti and Prof. Patrizia Perego (11/06/21, University of Genoa)
- 2019 **Acquisition of 24 CFUs for teaching qualification**
University of Genoa
- 2017 **Acquisition of the license to practice as an industrial engineer**
University of Genoa, I session of the year 2017
- 2017 **Master's degree in Chemical Engineering**
Thesis: Thermal and catalytic conversion of exhausted microalgae biomass after proteins and lipids recovery. Supervisors: Professors Guido Busca, Attilio Converti (31/03/2017, University of Genoa)
- 2015 **Bachelor's degree in Chemical Engineering**
Thesis: Initial study on the preparation and characterization of Cu-SAPO catalysts for CSR-DeNO_x applications. Supervisors: Prof. Luis Arrebola, Prof. Maria Ageles Larrubia (Universidad de Malaga, Spagna) and Guido Busca. (30/03/2015, University of Genoa)

STUDY AND RESEARCH
PERIODS ABROAD

- 2020 **Research period abroad:**
University of Sydney (Sydney, Australia) and University of Technology Sydney (Sydney, Australia)
Project: Protein extraction from microalgae by innovative technologies and evaluation of resistance to cell wall rupture by image analysis.
Supervisors: Prof Fariba Dehghani and Prof. Peter Ralph.
(08/01/20-28/07/20)

2016 Erasmus + for studying abroad:
TU Dortmund (Dortmund, Germania)
(03/03/2016–22/08/2016)

2014-2015 Erasmus + for traineeship:
Universidad de Malaga (Malaga, Spain)
(15/09/2014–22/02/2015)

TEACHING ACTIVITIES

Planned and carried out at the University of Genova, Department of Civil, Chemical and Environmental Engineering (DICCA).

2022-2024 Contract professor:
Mass balances in chemical processes: from laboratory to industrial applications” for the course “Refinery and petrochemistry and green industrial organic chemistry” – code 98732.
2024-3 hours
2023-7 hours

2022-2024 Contract professor:
Mass balances in chemical processes: from laboratory to industrial applications” for the course “Industrial chemical products” – code 98731.
2024-4 hours
2023-8 hours

2022-2024 Professor:
PhD course of “Characterization of powdered materials” (7 hours). (3 CFU)

2017-2023 Correlator of 7 bachelor/master thesis and tutor and supervisor in the laboratory for conducting 13 thesis at the Laboratory of Surface Chemistry and Industrial Catalysis and Laboratory of Industrial Biotechnology.

AWARD AND GRANT FOR CONGRESS PARTECIPATION

2023 DAAD (Deutscher Akademischer Austauschdienst) fellowship
Participation to “Green Hydrogen research Tour” (24-29/09/2023, Germany)

2023 Best PhD thesis award:
Exacto SpA, best PhD thesis in Clean Energy e Circular Economy field. (17/11/2023, Genova)

2022 Best PhD thesis award:
Rotary Euroflora Festival di Nervi per i giovani” per la promozione della ricerca scientifica riservato ai giovani
(22/06/2022, Genova)

2022 Grant for congress participations from SCI (Società Chimica Italiana):
- XXIII GIC National Congress on Catalysis (14-16/06/2023, Genova, Italy)
- XXII Congresso Nazionale della divisione di chimica industriale (7-8/11/2022, Catania, Italy)
- XXII GIC National Congress on Catalysis (11-14/09/2022, Riccione, Italy)
- Giornate Italo-Francesi della Chimica (26-27/04/2022, Toulon, France)

CONGRESS AND SEMINARS ORGANIZATION

2023 International Workshop “Catalysis for carbon neutrality and energy transition”, 13/06/2023, Genova (IT). From 09/2022 to 06/2023

- 2023 XXIII Congresso Nazionale di Catalisi GIC 2023 “Catalysis as a golden lighthouse for green chemistry and energy-related technologies”, 14-16/06/2023, Genova (IT). From 09/2022 to 06/2023
- 2022 DICCA seminars series 2022. From 09/2021 to 07/2022.

PUBLICATIONS

1. Ebrahim Atakoohi, S., et al., 2024. *Catal. Today*, 114848. <https://doi.org/10.1016/j.cattod.2024.114848>
2. Freccero, R., et al., 2024. *Appl. Catal. B: Environ.* 343, 123532. <https://doi.org/10.1016/j.apcatb.2023.123532>
3. Busca, G., et al., 2024. *Catalysts* 14 (2), 95. <https://doi.org/10.3390/catal14020095>
4. Busca, G., et al., 2023. *Energies* 16, 5304. <https://doi.org/10.3390/en16145304>
5. Ebrahim Atakoohi, S., et al., 2023. *Molecules* 2023, 28, 6516. <https://doi.org/10.3390/molecules28186516>
6. Fasolini, A.[§], Spennati E. [§], 2023. *Catal. Today*, 423, 114271. [§]equal contribution <https://doi.org/10.1016/j.cattod.2023.114271>
7. Spennati, E., et al. 2023. *Catal. Today*, 418, 114131. <https://doi.org/10.1016/j.cattod.2023.114131>
8. Spennati, E. et al., 2023. *Catal. Today*, 420, 114164. <https://doi.org/10.1016/j.cattod.2023.114131>
9. Spennati, E. et al., 2023. *Biomass Convers*, 1-15. <https://doi.org/10.1007/s13399-023-04118-8>
10. Spennati, E. et al., 2023. *Int. J. Hydrog. Energy*, HE38177_proof. <https://doi.org/10.1016/j.ijhydene.2023.01.181>
11. Riani, P. et al., 2023. *Int. J. Hydrog. Energy*, HE37998_proof. <https://doi.org/10.1016/j.ijhydene.2023.01.002>
12. Spennati, E. et al., 2022. *Sep. Purif. Technol.* 121088. <https://doi.org/10.1016/j.seppur.2022.121088>
13. Spennati, E. et al., 2021. *Algal research* 60, 102519. <https://doi.org/10.1016/j.algal.2021.102519>
14. Spennati, E., et al. 2020. *Energies* 13, 5246. <https://doi.org/10.3390/en13205246>
15. Spennati, E. et al., 2020. *Energies* 13, 2490. <https://doi.org/10.3390/en13102490>
16. Casazza, A.A. et al., 2020. *Fuel Process. Technol.* 201, 106336. <https://doi.org/10.1016/j.fuproc.2020.106336>
17. Solisio, C. et al., 2020. *Chem. Eng. Technol.* 43, 240–247. <https://doi.org/10.1002/ceat.201900463>
18. Spennati, E. et al., 2019. *Chem. Eng. Trans.* 74, 1471–1476. <https://doi.org/10.3303/CET1974246>
19. Casazza, A.A. et al., 2019. *Chem. Eng. Trans.* 74, 1141–1146. <https://doi.org/10.3303/CET1974191>

AUTHOR OF ABSTRACT PRESENTED TO NATIONAL AND INTERNATIONAL CONGRESS

The speaker is underlined.

1. Spennati E., Pampararo G., Busca G., Riani P., Garbarino G. “Investigating the role of surface reconstruction for Ni,Cu/Al₂O₃ in ethanol dehydrogenation”. ICC2024, 14-19/07/2024, Lione (France)
2. Spennati E., Pampararo G., Garbarino G., Riani P. “(Cu, Ni) catalysts for ethanol dehydrogenation: effect of support and synthetic route”. XIV Convegno INSTM, 9-12/06/2024, Cagliari (Italy)
3. P. Riani, E. Spennati, R. Freccero, G. Garbarino. “Ce- and La- modified Ni- based catalysts for CO₂ hydrogenation to methane”. NAM28, 18-23/06/2023, Providence, Rhode Island (USA). (Oral presentation)
4. E. Spennati, A. Fasolini, G. Busca, F. Basile, G. Garbarino. “Hydrotalcite-derived Ni/Mg(Al)O mixed oxides for CO₂ methanation: performances, surface studies and kinetic development”. XXIII GIC, 14-16/06/2023, Genova (Italy). (Poster presentation)
5. R. Freccero, E. Spennati, P. Riani, G. Garbarino. “Ni-containing intermetallic catalyst precursors for CO₂ hydrogenation”. XXIII GIC, 14-16/06/2023, Genova (Italy). (Poster presentation)
6. S. Atakoohi, E. Spennati, P. Riani, G. Garbarino, “Design and assessment of Ni- and Ru- supported catalysts for CO₂ methanation”. XXIII GIC, 14-16/06/2023, Genova (Italy). (Oral presentation)
7. M. Iturrate-Urquijo, E. Spennati, P. Riani, G. Busca, A. Aranzabal, G. Garbarino. “Catalytic performance of modified ZSM-5 zeolite for bioethanol conversion”. XXIII GIC, 14-16/06/2023, Genova (Italy). (Oral presentation)
8. M. Percivale, E. Spennati, P. Riani, R. Millini, G. Garbarino. “Nickel- and iron-based catalysts for CO₂/light alkanes pool tandem reactions”. XXIII GIC, 14-16/06/2023, Genova (Italy). (Oral presentation)
9. E. Spennati, P. Riani, G. Busca, G. Garbarino. “Co-based catalysts for CO₂ hydrogenation: methanation vs. reverse Water Gas Shift activity”. XXII Congresso nazionale della chimica industriale, 8-9/11/2022, Catania (Italy). (Oral presentation)

10. E. Spennati, P. Riani, G. Busca, G. Garbarino. "A study of silica addition effect to Ni/Al₂O₃ catalysts for Sabatier reaction". XXII GIC, 11-14/09/2022, Riccione (Italy). (Oral presentation)
11. E. Spennati, R. Freccero, P. Riani, G. Garbarino. "Catalytic performances of lanthanides promoted Ni- catalysts for Sabatier reaction". XXII GIC, 11-14/09/2022, Riccione (Italy). (Oral presentation)
12. E. Spennati, G. Garbarino, P. Riani, G. Busca. "Support Effects on the Hydrogenation of CO₂ over Cobalt Catalysts at Atmospheric Pressure". XXII GIC, 11-14/09/2022, Riccione (Italy). (Oral presentation)
13. E. Spennati, P. Riani, G. Busca, G. Garbarino. "Catalytic activity of Si-modified Ni/Al₂O₃ catalysts for CO₂ hydrogenation to methane". GRICU 2022, 3-6/07/2022, Ischia (Italy). (Oral presentation)
14. S. Ebrahim Atakoohi, E. Spennati, A.A. Casazza, P. Riani, G. Garbarino. "Valuable c-based chemical intermediates and biochar from "end of life" olive stone waste: analysis in thermal pyrolytic conditions". GRICU 2022, 3-6/07/2022, Ischia (Italy). (Poster presentation)
15. E. Spennati, P. Riani, G. Busca, G. Garbarino, "A study of Ni/SiO₂ catalysts for CO₂ hydrogenation" Giornate Italo-Francesi della Chimica 26-27 Aprile 2022, Tolone (FR), (Poster presentation).
16. E. Spennati, A. A. Casazza, G. Busca, A. Converti. "Depurazione di acque reflue dell'industria vinicola mediante co-cultura di *Chlorella vulgaris* e *Arthrospira platensis* e valorizzazione della biomassa prodotta". Workshop giovani AISAM 2019, 28/10/2019, Firenze (Italy). (Oral presentation)
17. A. A. Casazza, E. Spennati, S. Mirzadeh, A. Converti. "Trattamento in continuo di acque reflue dell'industria vitivinicola mediante microalghe". AISAM2020, 07/09/2020, Padova (Italy). (Poster presentation)
18. A.A. Casazza, E. Spennati, M. Rovatti. "Trattamento di acque reflue da percolato di discarica mediante microalghe". GRICU 2019, Il contributo dell'ingegneria chimica italiana alla sostenibilità globale, 30/06/2019-03/07/2019, Palermo (Italy). (Oral presentation)
19. E. Spennati, A. A. Casazza, P. Perego. "Purification and recovery of c-phycoerythrin from *Arthrospira platensis* by ultrasound-assisted extraction". AISAM2020, 07/09/2020, Padova (Italy). (Poster presentation)
20. A. A. Casazza, E. Spennati, P. Perego. "Estrazione green di componenti ad alto valore aggiunto da *Arthrospira platensis*". Workshop giovani AISAM 2019, 28/10/2019, Firenze (Italy).
21. E. Spennati, A. A. Casazza, A. Converti, P. Perego. "Ultrasound-assisted extraction of proteins from *Arthrospira platensis*". GRICU 2019, Il contributo dell'ingegneria chimica italiana alla sostenibilità globale, 30/06/2019-03/07/2019, Palermo (Italy). (Poster presentation)
22. E. Spennati, A. A. Casazza, A. Converti. "Depuration of winery wastewater by *Chlorella vulgaris* and *Arthrospira platensis* co- culture". GRICU 2019, Il contributo dell'ingegneria chimica italiana alla sostenibilità globale, 30/06/2019-03/07/2019, Palermo (Italy). (Poster presentation)
23. E. Spennati, A. A. Casazza, P. Perego. "Microalgae growth in winery wastewater under dark conditions". Icheap14, International Congress on Chemical and Process Engineering, 2019, 26-29/05/2019 Bologna, (Italy). (Oral presentation)
24. A. A. Casazza, E. Spennati, A. Converti and G. Busca. "Study on the thermal decomposition of plastic residues". Icheap14, International Congress on Chemical and Process Engineering, 2019, 26-29/05/2019 Bologna, (Italy). (Poster communication)

PERSONAL SKILLS

Mother tongue Italian

English	C1
Spanish	B2
German	A1

Professional skills

- Study of nickel-, cobalt-, and iron-based catalysts for conversion reactions of carbon dioxide to chemicals: i) preparation of catalysts; ii) characterization of materials by different techniques; iii) performance of catalysts for carbon dioxide conversion reactions in laboratory-scale plants.
- Study of ZSM-5 zeolite-based catalysts for bio-ethanol-to-chemical conversion reactions: i) catalyst preparation; ii) characterization of materials by different techniques; iii) performance of catalysts for bio-ethanol conversion reactions in laboratory-scale plants.
- Development of catalysts for selective catalytic reduction of nitrogen oxides (SCR-DeNO_x): i) Preparation of zeolite-based catalysts including chabazite (SAPO), ii) characterization of synthesized materials by: XRD, BET and SEM, iii) reactivity study by FT-IR with probe molecules and thermogravimetric analysis (TG-DTA).

- Pyrolysis of biomass or waste materials: i) Thermal and catalytic pyrolysis of biomass or waste materials (plastics), ii) optimization of the pyrolysis process according to the most important process parameters, reaction temperature, reaction time; iii) feedstock characterization by: FT-IR, calorific value, SEM, TG-DTA, moisture, ash, elemental analysis (CHNS-O), iv) characterization of reaction products by: FT-IR and GC-MS, GC.
- Microalgal biomass production: i) development and start-up of innovative photobioreactors for microalgae growth, ii) optimization of key parameters for microalgae growth.
- Purification of wastewater by microalgae: i) Evaluation and identification of main parameters for characterization of pollutant impact of wastewater (COD, TS, TSS, NO₂⁻, NO₃⁻, Cl⁻, F⁻, SO₄²⁻) by thermogravimetric, colorimetric and ion chromatography analyses, ii) optimization of wastewater purification process by microalgae, iii) Development and commissioning of an automated continuous system for wastewater treatment.
- Extraction of high-value components from microalgal biomass: i) lipid extraction and composition evaluation by GC, ii) protein extraction and characterization by 1D SDS-Page, 2D SDS-Page, LC-GC/MS, iii) extraction of antioxidant compounds and characterization of extracts by colorimetric assays (Folin-Ciocalteu, ABTS, DPPH, anthocyanins).

Driving licence A, B

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