

# Gabriele Centi

## CURRICULUM VITAE (Dec. 23)

### PERSONAL INFO

#### Gabriele CENTI



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ww2new.unime.it/catalysis

Sex M | Date of birth 18/10/1955 | Nationality Italian

### ACTUAL POSITION

Full Professor in Industrial Chemistry (CHIM / 04) at the University of Messina

### DEGREE

Degree in Industrial Chemistry (obtained in 1979 at the University of Bologna)

### SHORT SUMMARY

Gabriele Centi is a Full Professor of Industrial Chemistry at the University of Messina, Italy, and President of the European Research Institute of Catalysis (ERIC). The research interests concern the fields of applied heterogeneous catalysis, sustainable energy and chemical processes, production and use of H<sub>2</sub>, biomass conversion and environmental protection.

He was the coordinator of the E.U. Network of Excellence IDECAT and is currently the President of IACS (International Association of Catalysis Societies). In the past also the President of EFCATS (European Federation of Catalysis Societies). He has been the coordinator or PI in over twenty community projects (including the Network of Excellence on Catalysis IDECAT) and many other national and industrial projects. He recently initiated and coordinated an ERC Synergy project on plasma catalysis. He is also a member of the board of SUNERGY, the European initiative on solar fuels, and SUNER-C, the E.U. coordination and support actions to prepare a partnership on substituting fossil fuels.

He has received numerous awards, including the International Fellowship Initiative of the President of the Chinese Academy of Sciences, PIFI, as a Distinguished Scientist, and the Humboldt Research Award. He is involved in various publishing activities. He chaired the editorial board of ChemSusChem until 2019 and is co-editor in chief of the Journal of Energy Chemistry (both elevated to high IF journals) and the Studies in Surface Science and Catalysis series of books, one of the oldest and best-known in catalysis. He has been chairperson of numerous international conferences, including Europacat 2017 in Florence and the 16th International Zeolite Conference, jointly with the 7th International Mesostructured Materials Symposium (Sorrento, Italy, 2010).

He is the author of over 650 scientific publications (Iris Cineca) and 12 books, and he is the editor of over 20 special issues of internationally qualified journals. The current h-index is 96, with about 38,000 citations and over 410 articles with more than 10 citations (Google Scholar, Dec. 2023). In the last (2022) ranking by Stanford University of the top 2% worldwide scientists, he was among the top 10.000 researchers worldwide in all scientific areas and among the first in Sicily.

### RELEVANT ACTIVITIES THEMATIC HYDROGEN AND SOLAR ENERGY

- a member of the hydrogen working group of the Ministry of Research and University for the preparation of an Italian Hydrogen Research Strategy (SIRI)
- keynote speaker invited to the STOA seminar of the European Parliament, "Decarbonising European Industry: Hydrogen and Other Solutions" (March 1, 2021)
- invited introductory chapter on "Applications of hydrogen technology and their role for a sustainable future" for De Gruyter's book "Use of hydrogen for sustainable energy and fuels" (2021)
- coordinator of the project MECCA (Green H<sub>2</sub> from biomethane cracking through an innovative technology based on non-thermal plasma and catalysis with nanocarbons), resulting the first in the ranking list among those presented for the MITE call on Investment 3.5 "Research and development on hydrogen" of the PNRR.
- coordinator of the initiative of INSTM (Consortium InterUniversity on Science and Technology of Materials, the largest University Consortium in Italy) on the INSTM strategic project on the science and technology of materials for hydrogen
- a member of the board of directors of the European SUNERGY initiative on solar fuels and the core group for the preparation of its strategic and research agenda on innovation, with ample space dedicated to the use of hydrogen to reduce CO<sub>2</sub> emissions in industries energy-intensive
- several recent articles on the use of H<sub>2</sub> (power-to-X) and photo (electro) chemical production of green H<sub>2</sub> and H<sub>2</sub> storage chemicals (ammonia, formic acid).

## EDUCATION AND CAREER

|             |   |
|-------------|---|
| 1979        | Degree in Industrial Chemistry at the University of Bologna (prof. F. Trifirò)  |
| 1981        | Fellowship, Experimental Fuel Station (Milan)   |
| 1983-1987   | Researcher (Industrial Chemistry), Univ. Bologna  |
| 1987-1995   | Associate Professor in Chemical Plants (ING-IND / 25), Univ. Of Bologna   |
| 1996-today  | Full Professor (Industrial Chemistry), Univ. Messina  |
| 2008- today | President of the European Research Institute of Catalysis (ERIC aisbl, Brussels - Belgium)  |
| 2019- 2023  | Delegate of the Rector of the Univ. Messina for the Green Deal  |
| 2020- today | PhD Coordinator (International, Industrial) ACCESS "Advanced Catalytic proCesses for using renewable Energy SourceS", Univ. Messina |

## RESEARCH & QUALIFICATION

### CAREER AND ASSIGNMENTS

|            |   |
|------------|---|
| 2023       | <i>Italian Knowledge Leader</i> award for the international research activity and promotion of the international knowledge network.   |
| 2023       | World's Top 2% Scientists ranking (Stanford University, Oct. 2023). In the top 10.000 researchers' rankings to both last year (2022) and the career, the first among those of the University of Messina.                              |
| 2022       | Among the 34 scientists invited by CEFIC (European federation of chemical industries) to celebrate the 50th Years of the Society on May 29, 2022.   |
| 2021       | Recognition as a Distinguished Scientist by the International Fellowship Initiative (PIFI) of the President of the Chinese Academy of Sciences,   |
| 2021       | Humboldt Research Award   |
| 2019-today | Member of the hydrogen working group of the MUR for the preparation of an Italian hydrogen research strategy (SIRI)   |
| 2018-today | Member of the Academy of Sciences Institute of Bologna, Section - Mathematics, Physics, Chemistry and Geology   |
| 2017-today | Honorary Professor of Tianjin University (TJU), China   |
| 2016-today | President of IACS (International Association of Catalysis Societies) (from 2012 to 2016, vice president of IACS)  |
| 2015-today | Chemistry Europe Fellow   |
| 2008-today | President of the European Research Institute on Catalysis, coordinating the activities of 24 European institutions on catalysis.  |
| 2001-2005  | President of the European Federation of Catalysis Societies (EFCATS)  |
| 2015-2019  | Scientific Advisor of the E.U. Cluster of Catalysis   |
| 2018       | Member of the writing team of SAPEA (Science Advice for Policy by European Academies) Evidence Review Report for the European Commission "Novel carbon capture and usage technologies: Research and climate issues"                   |
| 2016       | Coordination of preparing the "Science and Technology Roadmap on Catalysis for Europe. A Path to Create A Sustainable Future" ISBN 979-12-200-1453-3  |
| 2001-2009  | co-Director of the European Laboratory of Surface Science and Catalysis (ELCASS) created in 2001 by CNRS and University of Strasbourg (France), MPG and Fritz-Haber Institute of Berlin (Germany) and University of Messina (Italy)). |
| 2015-2017  | Vice President of the European Federation of Catalysis Societies (EFCATS)   |
| 2016-2019  | Vice-President of the Interuniversity Consortium INSTM (Science and Technology of Materials), Italy (since 2013, also a member of the INSTM Executive Board)  |
| 2009-2012  | Director of Thematic Section 2 - Energy and Environment - of INSTM  |
| 2008-2016  | Director of the INSTM CASPE center (Catalysis for Sustainable Production and Energy)  |
| 2006-2012  | Scientific Director of the Italian Sustainable Chemistry Platform   |
| 2007-2010  | Member of the Mirror Group of the European Technological Platform on Sustainable Chemistry (ETP SusChem)  |
| 2005-2012  | Member of several international panels and boards: CSIC (Spain), ICSC (Krakov, Poland), U.S. DoE, ACENET ERA-NET, ERA-NET CAPITA, ANR (France), Academy of Finland, etc.  |
| 2013       | Member of the GEV panel (Area 3 - Chemical Sciences) for VQR 2004-2010  |
| 2015       | Member of the GEV panel (Area 3 - Chemical Sciences) for VQR 2011-2014  |

|                                  |               |  |
|----------------------------------|---------------|--|
| EDITORIAL ACTIVITIES             | 2004-2010     | Member of the Council of the International Zeolite Association (IZA)   |
|                                  | 2001-2005     | Member of the Council of the Catalysis Group of the Italian Chem. Society (SCI)  |
|                                  | 2016-2021     | Member of the Board of the Division of Industrial Chemistry of SCI   |
|                                  | 2015-today    | Editor-in-chief <i>Journal of Energy Chemistry</i> (Elsevier)  |
|                                  | 2003-today    | Editor in chief of the <i>Studies in Surface Science and Catalysis</i> series of books published by Elsevier Science (Amsterdam) (178 Vol. Published in the series)  |
|                                  | 2020-2023     | ChemSusChem Board Member   |
|                                  | 2007-2019     | Chairman of the editorial board of Wiley-VCH magazine <i>ChemSusChem</i> (Chemistry & Sustainability, Energy & Materials)  |
|                                  | 2011-2018     | Editor of the series of books <i>Green Energy</i> published by De Gruyter (Berlin)   |
|                                  | 2012-2016     | Member of the Advisory Board of Wiley <i>Energy Technology</i> journal,  |
|                                  | 2012-today    | Member of the Advisory Editors Board of the Elsevier <i>Journal of CO<sub>2</sub> Utilization and Chinese Journal of Catalysis</i>   |
|                                  | 2016-today    | Member of the editorial board of Wiley-VCH Batteries & Supercaps and Journal of the Chinese Chemical Society   |
|                                  | 2020-today    | Member of the editorial board of the <i>Journal of Catalysis</i>   |
|                                  | 2009-2017     | Member of the Scientific Committee of the journal Wiley <i>ChemCatChem</i>   |
|                                  | 2003-2018     | Member of the Scientific Committee of the magazine " <i>La Chimica e l'Industria</i> "   |
|                                  | 1992-1996     | Member of the Editorial Committee of the Applied Catalysis journal.  |
|                                  | 1996-2004     | Member of the Editorial Committee of <i>Appl. Catal. B. Env.</i>   |
|                                  | EU ACTIVITIES | 2020-today   |
| 2019-today                       |               | ERC Synergy SCOPE Coordinator "Rapid Surface Modulation Plasma for Process Intensification and Energy Intensification in Small Molecule Conversion"  |
| 2020- today                      |               | Board Member of the SUNERGY Initiative on Solar Fuels and Chemicals for a Circular Economy, to prepare for an E.U. partnership   |
| 2019-2020                        |               | Member of the board of EU-CSA ENERGY-X "Transformative chemistry for a Sustainable Energy Future" to prepare a flagship on fuels and chemical products made with renewable energy  |
| 2015-2019                        |               | Coordinator of the EU TERRA project "New adaptable catalytic reactor methodologies for Process Intensification"  |
| 2015- today                      |               | P.I. in various EU H2020 projects (BIZEOLCAT, OCEAN, PERFORM, RECODE) and EU FP7 projects (HELMETH, Eco <sub>2</sub> CO <sub>2</sub> ) on topics of catalysis and electrocatalysis   |
| 2013-2016                        |               | IAPP Project (Marie Curie Industry-Academia Partnerships and Pathways) BIOFUR "BIOpolymers and BIOfuels from FURan based building blocks"  |
| 2005-2010                        |               | Coordinator of the Network of Excellence IDECAT (Integrated Design of Catalytic Nanomaterials for Sustainable Production) - E.U. (5 years, € 9.5 M, early April 2005)  |
| 2009-2014                        |               | Coordinator of the collaborative project EU NEXT-GTL (budget about 12.5 M €)   |
| 2012-2015                        |               | Coordinator of the CSA eCamm (European Structured Research Area for CAlytic and Magnetic nanoMaterials), contract 290455   |
| 2002-2005                        |               | Coordinator of the E.U. project NEOPS G5RD-CT2002-00678 New eco-efficient oxidation processes based on the synthesis of H <sub>2</sub> O <sub>2</sub> on catalytic membranes   |
| 2002-2005                        |               | Coordinator of the E.U. project NANOSTRAP G3RD-CT2002-00793 "Nanostructured Sulfur Traps for the protection of high-performance NO <sub>x</sub> storage / reduction catalysts"   |
| 1996-today                       |               | Scientific Responsible of Messina (Univ. Or UdR INSTM / ERIC) in various community projects on the development of sustainable industrial processes and technologies for energy and environmental protection: NATAMA, CONCORDE, SMART, SUPER, COCON, STORECAT, DENITROCAT, H <sub>2</sub> O-RECYCAT, NEMCA, ALKYL, WAVES (ERA-NET CAPITA) |
| NAZIONAL PROJECTS<br>(selection) | 2011-2018     | P.I. of Univ. Messina in the projects PON01_01725 (Photovoltaic) and PON02_00355_3391233 (Energy) [MIUR]   |
|                                  | 2014-2015     | Project responsible "Development of a membrane reactor heated by molten salts for the dehydrogenation of propane" (MEME) [MAE]   |
|                                  | 2014-2016     | P.I. of UniME in the project "Innovative processes for the conversion of algal biomass", project "PRIN10 / 11, 2010H7PXLC_006 [MIUR]   |
|                                  | 2016-2018     | UNIME responsible for the "Solar driven chemistry: new materials for photo-  |

- and electrocatalysis" project PRIN2015 / 2015K7FZLH\_004 [MIUR]
- 2019-today National coordinator of the PRIN2017 project "Multielectronic transfer for the conversion of small molecules: an enabling technology for the chemical use of renewable energies (MULTI-e)" project 20179337R7
- 2022-today Coordinator of the project MECCA (MITE research on H<sub>2</sub>) "Green H<sub>2</sub> from bioMethane cracking through an innovative technology based on non-thermal plasma and catalysis with nanoCarbones"
- 2022-today P.I. of the project MIAMI (MISE, Research of system on green electricity) "Innovative Materials for Hybrid Storage Systems"
- 2000-today Various bi- and multilateral cooperation between academia and industry, with industrial partners such as ENI, ERG, Bayer, BASF, ACTA, TOYOTA, etc.

## COLLABORATIONS WITH COMPANIES

## PUBLICATIONS

He is the author of over 650 publications (according to the official database of the IRIS University on Dec. 2023: 483 peer-reviewed publications, 134 book chapters and 27 monographs), of which about half in the last decade and over 500 communications to international conferences, editor of over 20 special issues of international journals, publisher of 12 books including the Elsevier book "Green Chemistry and Sustainable Energy. New Technologies for Novel Business Opportunities", the Wiley book "Green Carbon Dioxide: Advances in CO<sub>2</sub> Utilisation" and The Wiley "Sustainable books Industrial Chemistry - Principles, Tools and Industrial Examples" and "Catalysis for Renewables", author of 5 patents.

Updated publication list available on:

<https://scholar.google.com/citations?user=FlqkRbYAAAAJ&hl=it>

### Selection of five recent publications on conversion of solar energy into chemical energy:

1. Generation of oxide surface patches promoting H-spillover in Ru/(TiOx)MnO catalysts enables CO<sub>2</sub> reduction to CO, H Kang, L Zhu, S Li, S Yu, Y Niu, B Zhang, W Chu, X Liu, S Perathoner, G Centi, Y Liu, *Nature Catalysis* **2023**, 1-11. (IF: 40,71)
2. Understanding the complexity in bridging thermal and electrocatalytic methanation of CO<sub>2</sub>, H Kang, J Ma, S Perathoner, W Chu, G Centi, Y Liu, *Chem Soc Rev* **2023**, 52, 3627-3662. (IF: 46,2)
3. An artificial leaf device built with earth-abundant materials for combined H<sub>2</sub> production and storage as formate with efficiency > 10%, C Ampelli, D Giusi, M Miceli, T Merdzhanova, V Smirnov, U Chime, G centi, S. Perathoner et al., *Energy & Env Science* **2023**, 16 (4), 1644-1661. (IF: 32,5)
4. In situ electrochemical characterisation of CuxO-based gas-diffusion electrodes (GDEs) for CO<sub>2</sub> electrocatalytic reduction in presence and absence of liquid electrolyte and relationship with C<sub>2</sub><sup>+</sup> products formation, D. Giusi, M. Miceli, C. Genovese, G. Centi, Si. Perathoner, Cl. Ampelli, *Appl Catal B: Env* **2022**, 318, 121845. (IF: 24.319)
5. Current density in solar fuel technologies, V Romano, G D'Angelo, S Perathoner, G Centi, *Energy & Environmental Science*, **2021**, 14 (11), 5760-5787. (IF: 38.532)

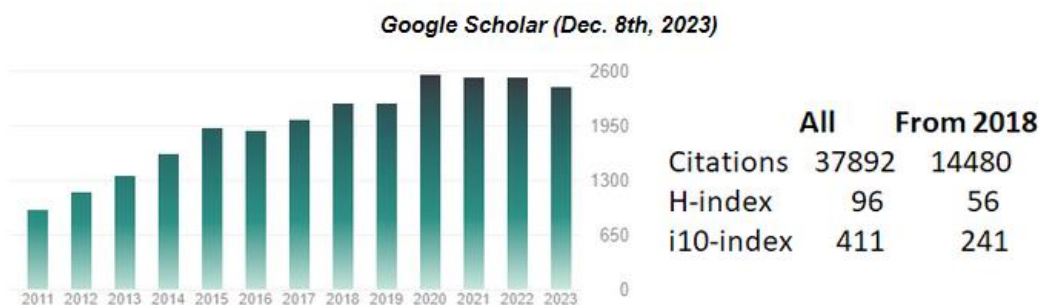
## QUALIFICATION

- In first place in Sicily among the top 2% of researchers, based on the Stanford University-Elsevier study (2022).
- *Top Italian Scientists*: first researcher of industrial chemistry and among the top 10 chemistry researchers operating in Italy (h-index)

## BIBLIOMETRIC DATA

- see bibliometric data on

<http://ww2new.unime.it/catalysis/bibliometric-data.html>



## 2021

- G. Centi, Close the carbon cycle through substitution of fossil fuels, STOA (European Parliament) workshop "Decarbonising European Industry: Hydrogen and Other Solutions", March 1, 2021, online, invited
- G. Centi, Opportunities and needs for catalysis to close the carbon cycle and go beyond the use of fossil fuels, RIPP, SINOPEC (Beijing, PR China) March 3, 2021, Online, plenary
- G. Centi, How a strong E.U. community accelerates electrocatalyst research, Electrocatalysis Summit, April 14, 2021, online, keynote
- G. Centi, Photoelectrocatalysis for the conversion of CO<sub>2</sub> avoiding water oxidation, SUNCOCHEM Webinar, April 28, 2021, online, keynote
- G. Centi, The vision of future sustainable energy & production: opportunities for innovation & business, MSc in Business Administration Univ. Rome "Tor Vergata", May 12, 2021, online, plenary
- G. Centi, Advanced Photoelectrocatalytic Devices for Coupling Bio- and Solar-Refinery, EU Green Week, 4th June 2021, online, keynote
- G. Centi, Bio-based feedstocks to chemical building blocks: design and technical feasibility, Organic electrochemistry: towards a sustainable chemical industry in 2030, June 10, 2021, online, keynote
- G. Centi, Ripensare la produzione chimica per affrontare la sfida dei cambiamenti climatici e della sostenibilità, AIDIC - giornata sulla transizione energetica e ambientale, 23 giugno 2021, keynote
- G. Centi, La filiera dell'idrogeno, Stati Generali Idrogeno, Catania 15 Luglio 2021
- G. Centi, Electrocatalysis: role and prospects to defossilize chemical and energy, plenary production, 1st Malaysia inter-conference on nanotechnology & catalysis MICNC2021 – September 1 2021, online
- G. Centi, Rethinking e-catalysis to address defossilization of chemical and energy production, Young Researchers CIS 202, September 8 2021, online, plenary
- G. Centi, Electrocatalysis: role and prospects to defossilize chemical and energy production, Fundacion Ramon Areces, October 5, 2021, online, plenary
- G. Centi, Electrocatalytic direct nitrogen fixation: perspectives and gaps, Solvay Workshop on "Plasma Technology and Other Green Methods for Nitrogen Fixation", (Brussels, November 15-17, 2021), keynote
- G. Centi, Electrocatalysis: role and prospects to defossilize chemical and energy production, XVth International Symposium on Environment, Catalysis and Process Eng. ECGP'15, 23 - 25 November 2021, online, plenary
- G. Centi, Rethinking e-catalysis to address defossilization of chemical and energy production, Casale-Symposium «Catalysis for the Industrial Renaissance and New Sustainable Processes» November 16, 2021 - online, plenary
- G. Centi, Moderator of Public Session: European Hydrogen Research and Innovation Priorities, Session 2 (Renewable Hydrogen Production, Distribution and Storage), November 30 2021 (Brussels, Belgium).

## 2022

- G. Centi, Outlook for CO<sub>2</sub>-Reduction and Future Scenarios on a European Level, Wilhelm e Else Heraeus 758 Seminar (From Wind and Solar Energy to Chemical Energy Storage: Understanding and Engineering Catalysis under Dynamic Conditions), 10th-13rd Jan. 2022, online, plenary
- G. Centi, Chemistry and catalysis technologies for sustainable development and renewable energy, On-line School of SSCC (national Doctorate on Sustainability and Climate Changes), January 20 2022
- G. Centi, La CO<sub>2</sub> come risorsa, Convegno della Regione Lombardia "Il futuro ispirato alla natura: strategie, materiali, processi e orizzonte della transizione sostenibile", 18 Marzo 2022, Milano, plenary
- G. Centi, Distributed Chemicals And fuels production from CO<sub>2</sub> in photoelectrocatalytic Devices, CEN/TC 386 "Photocatalysis" plenary meeting 21-22 March 2022, online, keynote
- G. Centi, Electrodes synthesis and properties, eCCU3 March 30 2022, online, invited.
- G. Centi, Solar to chemical energy storage: a crucial technology for islands, SOLAR2CHEM X SEAFUEL Symposium, March 30 - April 1 2022, Tenerife, Canary Island (Spain), plenary
- G. Centi, Opportunities for catalytic technologies in an evolving scenario, CASALE Co., Lugano, April 8 2022, invited.
- G. Centi, Expanding the concepts to address the challenge of solar fuels and electrification of the chemical production, Symp. on Materials for emerging energy technologies, IMDEA Energy Institute, May 19th-20th, 2022, plenary
- G. Centi, From thermal to reactive catalysis to move beyond fossil fuels, 19th Nordic Symposium on Catalysis, Espoo (Finland), 6-8th June 2022, plenary
- G. Centi, e-Refineries for solar conversion into chemicals: challenges and opportunities, SUNER-C Roadmap meeting Shaping the future: renewable fuels & chemicals from solar energy, Bruxelles, 14-15 June 2022, keynote
- G. Centi, Catalysis for the net zero emission challenge, 12th International Conference on Environmental

Catalysis (ICEC2022), July 30-August 2, 2022, Osaka, Japan, keynote

- G Centi, Expanding the concepts to address the challenge of solar fuels and electrification of the chemical production, Expanding the concepts to address the challenge of solar fuels and electrification of the chemical production, August 9 2022 (online), plenary
- G. Centi, Plasma-catalysis to address CO<sub>2</sub> utilisation challenge in energy-intensive industries, International Symposium on Plasma Catalysis For CO<sub>2</sub> Recycling, 13th-15th September 2022, Krakow, Poland, plenary
- G. Centi, Plasmonic catalysts at room temperature, 2nd Int Conf. on Unconventional Catal., Reactors and Appl. Sept. 21-23th, 2022 Leamington Spa, U.K., keynote.

## 2023

- G. Centi, An intro to ERC Synergy SCOPE Project, Australian national workshop of plasma and catalysis researchers, April 26, 2023, Adelaide (Australia), invited /online)
- G. Centi, Foster innovation in the production and distribution of green H<sub>2</sub>, 14th European Congress of Chemical Engineering and 7th European Congress of Applied Biotechnology, 17-21 Sept. 2023, Berlin (Germany), invited
- G. Centi, SUNER-C: foster activities between projects in the area of solar fuels, Brussels. 10th Oct. 2023, keynote
- G. Centi, From e-fuels to solar fuels to address the challenge of a carbon-neutral future, 4th EECAT (The 4th Int. Symp. on Catalytic Science and Techn. in Sustainable Energy and Environment), 15-18th Oct. 2023, Beijing, China, plenary
- G. Centi, DECADE project: CO<sub>2</sub> to acetyl acetate, Webinar SUN2CHEM "European strategies and perspectives for converting solar energy into fuels", October 24th, 2023, keynote
- G. Centi, The role of (photo)electrocatalytic devices for a solar-based and circular-carbon economy, IC-MES2023 ALGERIA, 12-14 November 2023, plenary
- G. Centi, Green Hydrogen peroxide, Workshop "Catalysis: yesterday, today and tomorrow", Venice, 8th Nov. 2023, invited

## Awards and recognitions

- |      |  |
|------|--|
| 2009 | Soc. Chim. de France French-Italian. Award for outstanding works in industrial chemistry. and sustainable processes                        |
| 2010 | UOP 2010 Lectureship   |
| 2010 | Finalist of the European Sustainable Chemistry Award 2010 (EuCheMS)  |
| 2013 | MPG 2013 Award "Frontiers in Chemical Energy Science" (Mühlheim an der Ruhr, Germany)  |
| 2014 | LEE HSUN Lecture Series 2014 Award, Inst. by Metal Res., Chinese Acad. Science, Shenyang (China)   |
| 2015 | Catalysis Forum Lectureship (State Key Lab. Of Catalysis, Dalian - China)  |
| 2015 | Kekule Lecture (Univ. Antwerpen)   |
| 2015 | Fellowship award of the European Chemical Societies - ChemPubSoc Europe (F CPSE)   |
| 2016 | Speaker at C5MPT Summit, Univ. Of Alberta (Edmonton, Canada)   |
| 2016 | Chini Memorial Lecture (Italian Chemical Society)  |
| 2017 | Gold Medal S. Cannizzaro of the Italian Chemical Society.  |
| 2021 | Recipient of the International Fellowship Initiative of the President of the Chinese Academy of Sciences (PIFI) as Distinguished Scientist |
| 2021 | Recipient of the Humboldt Research Award   |
| 2023 | Italian Knowledge Leader award for   |

## Visiting professor

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|---------|--|
| 2001    | Università di Oulu (Finlandia)                                     |
| 2003    | Université Louis Pasteur, Strasburgo (Francia)                     |
| 2005    | EPFL (Losanna, Svizzera)   |
| 2016    | Univ. dell'Alberta (Edmonton, Canada), Relator to the Summit C5MPT |
| 2016    | Visiting professor (3 mesi) at Technische Univ. Munchen (Germany)  |
| 2015-17 | Academic Icon (Univ. Malesia, Kuala Lumpur, Malesia)               |
| 2021-22 | Visiting professor to CatLab Helmholtz-Zentrum Berlin (Germany)    |

## Chairperson in conferences and international workshops (selection)

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|------|--|
| 1995 | 1st World Conf. on Env. Catalysis (Pisa, May 1995),  |
| 1999 | 6th Eur. Workshop on Selective Oxidation (Rimini, Sept. 1999)  |
| 2000 | NATO Adv. Res. Workshop on "Catalysis by unique metal ion structures in solid matrices" (Prague, July 2000), |
| 2001 | 3rd Eur. Workshop on Environmental Catalysis (Maiori, May 2001),   |
| 2006 | IDECAT-NRSC Conf. on Catalysis for Renewables (Rolduc, May 2006),  |
| 2007 | Symp. Catalysis for Pollution Control and ISO2007 at Europacat VIII (Turku, Aug. 2007),                      |
| 2010 | IDECAT Conf. on Catalysis - Emerging challenges in catalysis (Porquerolles, May 2010),                       |
| 2010 | Innovation in catalysis for sustainable production & energy (Messina, Sept. 2010),                           |

- 2010 Int. Zeolite and Mesoporous Materials conference (IZC16/IMMS7: Sorrento July 2010)
- 2011 X European Workshop on Selective Oxidation (ISO 2011; Glasgow, Sept. 2011),
- 2011 5th IDECAT/ERIC-JCAT Conference on Catalysis (Bertinoro, Sept. 2011)
- 2014 CIMTEC 2014 - Symposium Advances in Photocatalytic Materials for Energy and Environmental Sustainability, Montecatini 8-13, 2014
- 2015 CRS-3 Catalysis for Renewable Sources: Fuel, Energy, Chemicals (Catania, 6-11 Sept. 2015)
- 2016 CIMTEC 2016, Symposium "New Concepts and Advances in Photocatalytic Materials for Energy and Environmental Applications, Perugia (Italy), June 5-9, 2016
- 2017 Europacat 2017 (Florence, Italy), August 27-31, 2017
- 2019 CIS2019 Chemistry meets Industry and Society, Salerno (Italy), 28-30 August 2019
- 2020 CIMTEC 2020, Symposium "New Concepts and Advances in Photocatalytic Materials for Energy and Environmental Applications, Perugia (Italy), June 15-19, 2020 (suspended due to Covid-19)
- 2022 CIMTEC 2022, 9th Forum on New Materials, Symposium "Advanced Photocatalytic Materials for Energy and Chemistry in Transition and for the Environment", Perugia (Italy), June 27-29th, 2022
- 2025 13<sup>th</sup> ICEC International Conference on Environmental catalysis, Giardini Naxos/Taormina, 2-5 June 2025

**Books (last ten years)**

Member of the Scientific Advisory Board of numerous international conferences (on average > 3-5 per year in the last years)

|  |  |   |                         |
|--|--|---|-------------------------|
| G. Centi,<br>R.A. van Santen                           | <i>Catalysis for Renewables</i>  | Wiley VCH Pub.: Weinheim (Germany) 2007, pp. 448.                                 | ISBN: 978-3-527-31788-2 |
| F. Cavani, G. Centi,<br>S. Perathoner,<br>F. Trifirò   | <i>Sustainable Industrial Chemistry - Principles, Tools and Industrial Examples</i>              | Wiley VCH (Weinheim, Germany), 2009, pp. 621                                      | ISBN: 978-3-527-31552-9 |
| G. Rios,<br>N. Kanellopoulos,<br>G. Centi              | <i>Nanoporous Materials for Energy and the Environment</i>                                       | Pan Stanford Pub Pte (Singapore), 2012, pp. 305                                   | ISBN: 978-9-814-26717-5 |
| M. De Falco,<br>G. Iaquaniello,<br>G. Centi            | <i>CO<sub>2</sub>: A Valuable Source of Carbon</i>   | Springer (Heidelberg, Germany), Series: Green Energy and Techn.2013, XVI, pp. 194 | ISBN 978-1-4471-5119-7  |
| G. Centi,<br>S. Perathoner                             | <i>Green Carbon Dioxide: Advances in CO<sub>2</sub> Utilisation</i>                              | Wiley & Sons, New York (U.S.), 2014, pp 322                                       | ISBN: 978-1-118-59088-1 |
| A. Basile, M. De Falco,<br>G. Centi, G. Iaquaniello    | <i>Membrane Reactor Engineering: Applications for a Green Process Industry</i>                   | Wiley & Sons, New York (U.S.), 2016, pp 350                                       | ISBN: 978-1118-90680-4  |
| A. Basile, G. Centi,<br>M. De Falco,<br>G. Iaquaniello | <i>Green Chemistry and Sustainable Energy. New Technologies for Novel Business Opportunities</i> | Elsevier, Amsterdal (NL) 2019, pp. 576  | ISBN:978-0-444-64337-7  |
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**RESEARCH ACTIVITY**

**Main sector:** Heterogeneous catalysis and catalytic technologies, chemical processes with low environmental impact, development of nanomaterials for applications in the field of treatment and control of gaseous and liquid emissions, catalysis for sustainable processes and energy, development of electrocatalysts for fuel cells and electrochemical devices, nanostructured photocatalysts for water splitting, membranes for the separation of H<sub>2</sub>, chemical energy storage (NH<sub>3</sub>, formic acid), green H<sub>2</sub>

**Other fields:** cleanup technologies (gas and liquid emissions), environmental catalysis, industrial catalytic processes, solid catalysts (mixed oxides and zeolites, in particular containing transition metals, mesoporous materials, nanostructured oxides and carbon), reduction of greenhouse gases, use of solar energy, fuel cells and electrocatalytic (photo) devices

**Systems based on nanotubes and nanostructures.** Based on metal nanoclusters deposited on organised 1D-type carbon or metal oxide nanostructures for applications ranging from electrodes in PEM and PEC devices to photoactive thin films, sensors, advanced microreactors and catalysts for new energy and chemical processes.

**Materials for solar fuels and renewable energy.** Synthesis, characterisation and testing for applications ranging from advanced coatings and photoactive materials to novel catalysts and devices in sustainable chemical and energy processes (biomass conversion, renewable H<sub>2</sub>, solar fuel from CO<sub>2</sub>).

Catalytic membranes. Based on thin films supported by Pd alloy for applications from environmental protection (reduction of nitrates in water) to chemical synthesis (direct H<sub>2</sub>O<sub>2</sub> synthesis) and energy. The recent focus is on new processes based on highly energy-efficient membranes for producing H<sub>2</sub> by steam reforming CH<sub>4</sub> and syngas by partial catalytic oxidation.

Chemo-catalytic processes for lignocellulosic biorefineries. Development of new catalysts for the conversion of lignocellulosic biomass (in particular waste materials) into new platform molecules (furfural) and catalytic upgrading of the latter to biofuels (petrol and diesel) or chemical products.

<http://ww2new.unime.it/catalysis>