

Jenny G. Vitillo, Ph.D.

Curriculum vitae

Personal Information

Name: Jenny G. Vitillo
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Education

2005 **Ph.D. in Materials Science and Technology**, University of Turin, Italy.
Academic discipline: Materials for *hydrogen storage*. Thesis Title: “A theoretical and experimental study of molecular interactions involved in hydrogen storage in porous materials”. Scientific Supervisor: Prof. [G. Ricchiardi](#).
2002 **M.S. in Materials Science** with 110/110 cum laude, mention and dignity of publication, University of Turin, Italy.
Academic discipline: *Heterogeneous catalysis*. Thesis Title: “Quantum mechanical modelization of Cr(II) sites on silica active in the ethylene polymerization”. Scientific Supervisor: Prof. [C. Lamberti](#).

Current and past positions

2018-today Assistant professor (RTDB), University of Insubria, Como, Italy.
2017-2018 Postdoctoral fellowship, Department of Chemistry, University of Minnesota, MN.
2014 National Habilitation to the rank of associate professor (ASN2016, sectors 03/B1 and 03/A2)
2016-2017 Postdoctoral fellowship, Department of Chemistry, University of Turin, Italy
2015 Visiting Scholar, UC Berkeley, CA (MOFs synthesis, prof. J.R. Long).
2014 National Habilitation to the rank of associate professor (ASN2012, sector 03/B2)
2013-2016 Postdoctoral fellowship, Department of Science and High Technology, University of Insubria, Como, Italy. Fund for investment in basic research (Impact project, [FIRB 2012](#)).
2005-2013 Postdoctoral fellowship, Department of Chemistry, University of Turin, Italy.

Expertise and knowledge

In the last 15 years, Jenny G. Vitillo has become an expert in energetic and environmental relevant challenges, in particular hydrogen storage, light harvesting, and carbon dioxide capture, utilization and storage (CCUS). She has exploited almost all the characterization techniques that are relevant in Materials Science both on the computational (quantum mechanics – DFT and multireference wave function methods – and molecular mechanics) and experimental (volumetry, gravimetry, microcalorimetry, scanning electron microscopy, differential scanning calorimetry, thermogravimetry, mass spectroscopy, IR, UV-visible and photoluminescence spectroscopies) points of view, focusing on investigating materials for catalysis, energy (storage and delivery) and gas storage and separation. Recently, she has enlarged her skills in materials synthesis in particular of metal organic frameworks (MOFs) easily transferrable to high-throughput methods and to inorganic compound synthesis.

Publication record

From Web of Science (July 2019): **84** publications in peer-reviewed journals (20 as first author and 17 as corresponding author); **2** book chapter; **3044** ISI-citations (without self-citations); *h-index* = **28**.

About 125 contributions to national and international congresses. Participation to 57 national and international congresses. JGV has provided **22** oral communications, 16 in international (1 invited presentation, 2 invited key-note lectures) and 6 in national congresses. Chairman in three international congresses. Member of the Organizing Committees of an international workshop, of ET14 symposium on CCUS for the 2018 MRS Fall Meeting and Exhibit and of the panel “Materials Needs for Energy Sustainability by 2050” for the 2018 MRS Fall Meeting and Exhibit. Organizer of the “Global Women Breakfast” for IUPAC100 in Como (2019, February 12th). Guest editor for the special issue of Chem. Rev. “Carbon Capture and Separation” (2017) and a special issue of MRS Adv (2018). Member of the Editorial Board for DOE EFRC newsletter in 2017-2018. Associate editor of “Frontiers in Energy Research”, for the section “Carbon Capture, Storage, and Utilization”.

Funding ID (Participated in or leader of the following recent research projects)

DOE funding

2017 Inorganometallic Catalyst Design Center (ICDC, Energy Frontier Research Center, US DOE funds). Scientific Coordinator. Funding to the Minnesota unit: 12 M\$

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2017 Nanoporous Materials Genome Center (NMGC, Materials Genome Initiative, US DOE funds). Participant.

Recent EU funding

- 2013-2016 VII EU-Framework Program: “Advanced Materials and Electric Swing Adsorption Process for CO₂ Capture”, Project ID: 608534 – Advanced (MATESA). Participant. Funding to the Turin unit: 354 k€
- 2013-2016 European COST programme, COST Action MP1202: HINT (Rational design of hybrid organic-inorganic interfaces: the next step towards advanced functional materials). Participant.
- 2012-2014 FCH JU platform (Fuel Cells and Hydrogen Joint Undertaking) entitled “Novel H₂ storage materials for stationary and portable applications” (Bor4Store). Participant. Funding to the Turin unit: 242 k€
- 2012 Proposal CH3566 at ESRF, Grenoble (France), “Investigation of the photo-chromic chemical behaviour of Ti-based metal-organic (MOF) and organic-inorganic compounds by means of hard photon-in photon-out spectroscopy”. As the overall cost of 1 h measurement at synchrotron sources is evaluated between 1 and 2 k€/h, the 72 h experiment corresponds to a funding of the research roughly evaluated between 72 and 144 k€. Coordinator.
- 2009-2013 NMP-2008-2.4-1: Inorganic-Organic Hybrid Materials. “Nanoporous Metal-Organic Frameworks for production” (NANOMOF). Participant. Funding to the Turin unit: 259 k€
- 2012-2015 VII EU-Framework Program, FCH JU platform (Fuel Cells and Hydrogen Joint Undertaking), “Fuel Cell Coupled Solid State Hydrogen Storage Tank” (SSH2S). Participant. Funding to the Turin unit: 430 k€
- 2006-2009 NMP-4: “Functional Metal Organic Framework as Heterogeneous Catalysts” (MOFCAT). Participant. Funding to the Turin unit: 377 k€
- 2005-2010 NMP3-CT-2005: “Integrated Design of Catalytic Nanomaterials for a Sustainable Production” (IDECAT). Participant. Funding to the Turin unit: 100 k€

Recent national and regional funding

- 2013-2016 FIRB 2012 – PROGRAMMA “FUTURO IN RICERCA” “ImPACT: Impose Pressure And Change Technology – Nanostructured systems confined in zeolitic supports”. Unit Coordinator. Funding to the University of Insubria unit: 307 k€. **Systems developed and studied: dyes encapsulated in porous substrates for light harvesting.**
- 2012-2015 PRIN 2010-2011 “Mechanisms of CO₂ activation for the design of new materials for energy and resource efficiency”. Participant. Funding to the Turin unit: 140 k€.

Major collaborations

L. Gagliardi, C. Lu, C. Cramer, A. Bhan (University of Minnesota) [*C-H bond activation, QM methods for catalysis*]

E. Fois, G. Tabacchi (University of Insubria, Como, Italy) [*light harvesting*]

S. Bordiga, M. Baricco, R. Gobetto, B. Civalieri, M. Chierotti [*CO₂ capture, MOFs synthesis, hydrogen storage, complex hydrides*], G. Martra, R. Arletti [*light harvesting*], F. Bonino [*MOFs and CO₂ storage*], (University of Turin, Italy)

J.R. Long (UC Berkeley, CA) [*MOFs and CO₂ separation*]

G. Vezzali (University of Modena and Reggio Emilia, Italy) [*light harvesting*]

K. P. Lillerud, U. Olsbye (Department of Chemistry, University of Oslo, Norway) [*MOFs characterization*];

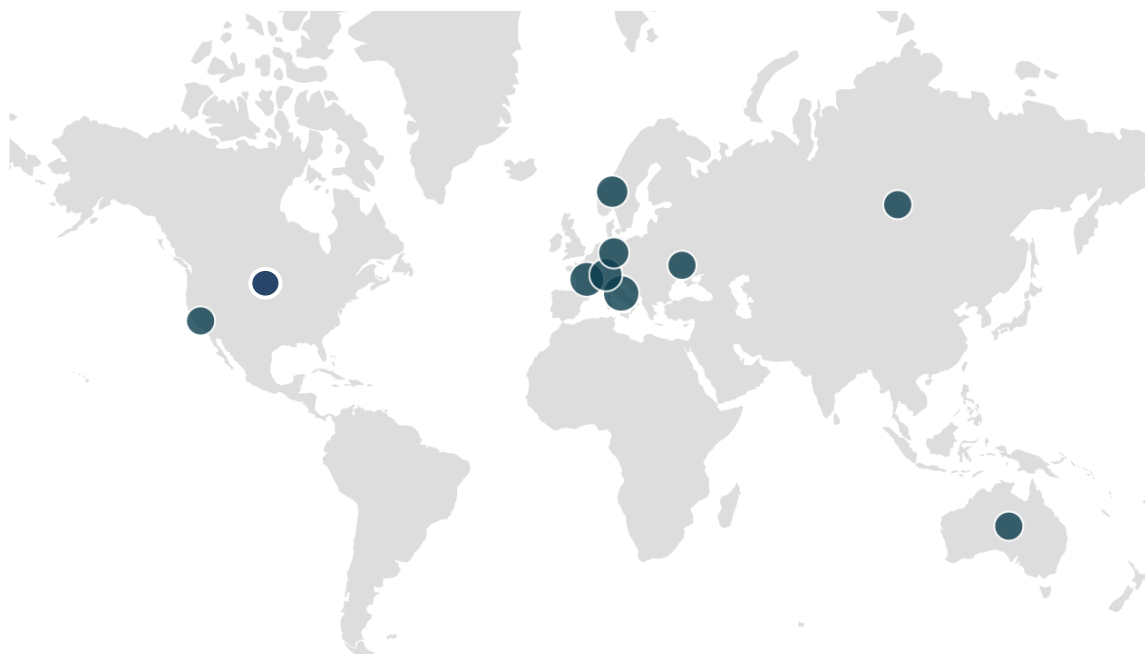
J. Jagiello (Micromeritics, Norcross, GA) [*NLDFT development*]

P. Moretto (JRC, Petten, Netherland) [*complex hydrides*]

R. Blom, C. Grande, G. Mondino (SINTEF Oslo, Norway) [*CO₂ capture*]

This map shows the world distribution of co-authors in JGV publications.

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Reviewer activity

- 2016 Member of the Review Panel of the 2016 Global Conference on Polymer and Composite Materials (PCM2016, May 20-23, 2016, Hangzhou, China).
- 2015 Project reviewer for the Swiss National Science Foundation (SNSF).
- 2006-present Reviewer for the following high impact factor journals: “Chem. Soc. Rev.”, “ACS Appl. Mater. Inter.”, “ChemSusChem”, “Inorganic Chemistry”, “Journal of Catalysis”, “Journal of Physical Chemistry C”, “International Journal of Hydrogen Energy”, “Physical Chemistry Chemical Physics”, “International Journal of Applied Ceramic Technology”, “Journal of Alloys and Compounds”, “Industrial & Engineering Chemistry Research”, “Molecules”, “Frontiers in Energy Research”, “Green Processing and Synthesis” and “Computational and Theoretical Chemistry”.

She is also project reviewer for the EU COST Association, the German Academic Exchange Service (DAAD), the Poland National Science Center, and the Swiss National Science Foundation (SNSF).

Supervision of graduate students and postdoctoral fellows

- 2013-2016 Co-supervisor of 1 PhD student at the University of Turin, Italy (employed in R&D in Luxottica)
- 2005-2017 Main supervisor of 5 master students at the University of Turin. Of these, 1 continued as PhD student at University of Turin, 1 is a researcher at Argotec, Turin (PP), 1 is employed by industry (Prototipo Technologies Srl, PP). Tutor for undergraduate and graduate students and Post Doc researchers in the activities connected to MOF synthesis, volumetry, IR and UV spectroscopy and gravimetry.

Present teaching activities

- 2018-today Molecular Spectroscopy (master in Chemistry, Industrial Chemistry and Physics), University of Insubria, Italy.
- 2016 Volumetry module, Materials for Energy Laboratory (bachelor in Materials Science and Technology), University of Turin, Italy.
- 2015 Volumetry module, Materials for Energy Laboratory (bachelor in Materials Science and Technology), University of Turin, Italy.
- 2011 Introduction to volumetry module, Physical Chemistry (master in Materials Science and Mamaself master), University of Turin, Italy.
- 2010 Spectroscopy module, Spectroscopic methods and Microscopies (bachelor in Materials Science), University of Turin, Italy.
- 2009-2014 Tutor for the Stage in a University Laboratory (vocational guidance in the High Schools for the Materials Science), University of Turin, Italy.

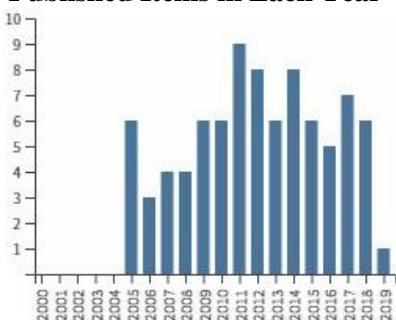
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2009	Theoretical lab module, Chemical bond and Spectroscopy (bachelor in Industrial Chemistry), University of Turin, Italy.
2007-2010	Physical chemistry laboratory (bachelor in Materials Science, lab assistant), University of Turin, Italy.
2007	Computer science for the chemistry (bachelor in Advanced Chemical Methodologies, lab assistant), University of Turin, Italy.
2007	General chemistry laboratory (bachelor in Industrial Chemistry, lab assistant), University of Turin, Italy.
2006-2007	Basics of materials science (vocational guidance in the High Schools for the Materials Science), University of Turin, Italy.

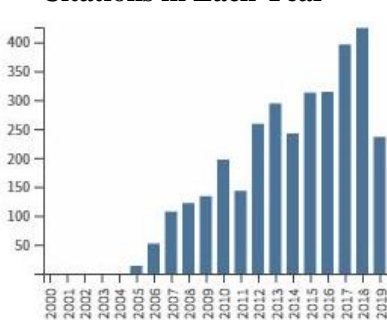
TRACK-RECORD

In the period 2005-2019, Jenny G. Vitillo has published 82 papers in international peer-reviewed journals. Among top journals of different disciplines: **(a) Chemistry:** *Chem. Rev.* (1), *J. Am. Chem. Soc.* (2), *ACS Catal* (1), *ChemSusChem* (3), *Chem. Comm.* (1), *Mater. Chem. Front.* (1), *Appl. Catal. B: Environm.* (1), *J. Phys. Chem. C* (14), *Langmuir* (1), *Phys. Chem. Chem. Phys.* (14), *Dalton Trans.* (4), *J. Phys. Chem. B* (1), *J. Phys. Chem. A* (2), *Energies* (1); **(b) Catalysis:** *Catal. Today* (2); **(c) Materials Science:** *Adv. Mater.* (1), *Chem. Mater.* (7), *J. Mater. Chem. A* (1), *Inorg. Chem.* (1), *RSC Adv.* (2), *ACS Appl. Mater. Interfaces* (2), *Macromolecules*, *Int. J. Hydrogen En.* (4), *Carbon* (1), *J. Alloy. Compd.* (2); **(d) Earth Science:** *Eur. J. Mineral.* (1), *Appl. Geochem.* (1).

Published Items in Each Year



Citations in Each Year



Results found	85
Sum of the times cited	3,247
without self-citations	3,044
Average citations per item	38.2
h-index	28

Representative publications of the scientific production

Citation numbers are from the Web of Science (without self-citations):

Refs. [1-3] and [8] represent examples of studies on hydrogen storage in microporous materials and in complex hydrides, respectively. Ref. [1] is a pure theoretical article, clearly demonstrating the inadequacy of zeolites (since then a material class often indicated as possible candidate for this purpose) as H₂ storage materials for the automotive sector. Refs. [2,3] are two among the most cited articles in this field showing a combined theoretical, volumetric and spectroscopic approach to the study of hydrogen interaction with materials. Ref. [8] shows the same hybrid approach to the study of the dehydrogenation of a complex hydride, γ -Mg(BH₄)₂, reporting significant advances in the understanding of this process. Refs. [4] and [5] report examples of theoretical and experimental studies, respectively, on materials for CO₂ separation and storage. Ref. [8] is an invited review on the CO₂ adsorption, separation, recycling and storage, testifying the international recognized leadership in this field. Ref. [6] reports on a relevant example of dye molecules self-assembled in microporous materials for light harvesting. Ref. [9] uses an experimental multi-technique approach to determine and characterize the CCS performances of UTSA-16. Ref. [10] is a study employing DFT and multireference wave function based methods to tackle the difficult task of the modeling a high spin Fe-based catalyst for the C-H bond activation of methane to methanol and ethane to ethanol.

1. J. G. Vitillo, G. Ricchiardi, G. Spoto, and A. Zecchina, "Theoretical maximal storage of hydrogen in zeolitic frameworks", *PCCP*, **7**, 3948 (2005). **Times cited: 65.**
2. A. Zecchina, S. Bordiga, J. G. Vitillo, G. Ricchiardi, C. Lamberti, G. Spoto, M. Bjørngen and K.P. Lillerud, "Liquid Hydrogen in Protonic Chabazite", *J. Am. Chem. Soc.*, **127**, 6361 (2005). **Times cited: 159.**
3. J. G. Vitillo, L. Regli, S. Chavan, G. Ricchiardi, G. Spoto, P. D. C. Dietzel, S. Bordiga, and A. Zecchina, "Role of exposed metal sites in hydrogen storage in MOFs", *J. Am. Chem. Soc.* **130**, 8386 (2008). **Times cited: 254.**
4. J. G. Vitillo, M. Savonnet, G. Ricchiardi and S. Bordiga, "Tailoring MOFs for CO₂ capture: the amino-effect", *Chem. Sus. Chem.*, **4**, 1281 (2011). **Times cited: 31.**

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5. J. Ethiraj, E. Albanese, B. Civalleri, J. G. Vitillo, F. Bonino, S. Chavan, G. C. Shearer, K. Petter Lillerud, S. Bordiga, "CO₂ Adsorption in Amine Functionalized Mixed Ligand Metal-organic Frameworks of UiO-66 topology", *Chem. Sus. Chem.*, **7**, 3382-3388 (2014). **Times cited: 16.**
6. L. Gigli, R. Arletti, G. Tabacchi, E. Fois, J.G. Vitillo, G. Martra, G. Agostini, S. Quartieri, G. Vezzalini, "Close-Packed Dye Molecules in Zeolite Channels Self Assemble into Supramolecular Nanoladders", *J. Phys. Chem. C* 2014-033564 (2014). **Times cited: 13.**
7. J. G. Vitillo, "Magnesium-based systems for carbon dioxide capture, storage and recycling: from leaves to synthetic nanostructured materials", *RSC Adv.*, **5**, 36192 - 36239 (2015). **Times cited: 12.**
8. J. G. Vitillo, S. Bordiga, M. Baricco, "Spectroscopic and structural characterization of thermal decomposition of γ -Mg(BH₄)₂: dynamic vacuum vs. H₂ atmosphere", *J. Phys. Chem. C*, **119**, 25340–25351 (2015). **Times cited: 5.**
9. A. Masala†, J. G. Vitillo†, G. Mondino, C. A. Grande, R. Blom, M. Manzoli, M. Marshall and S. Bordiga, "CO₂ capture in dry and wet conditions in UTSA-16 metal organic framework", *ACS Appl. Mater. Interfaces*, **9**, 455–463 (2017). **Times cited: 5.**
10. J. G. Vitillo, A. Bhan, C. J. Cramer, C. C. Lu, L. Gagliardi, "Quantum Chemical Characterization of Structural Single Fe(II) Sites in MIL-Type Metal–Organic Frameworks for the Oxidation of Methane to Methanol and Ethane to Ethanol.", *ACS Catal.*, **9**, 2870-2879 (2019).

Invited presentations to peer-reviewed, internationally established conferences

- 2014 "Carbon dioxide capture and recycling in microporous materials" (keynote), J. G. Vitillo, J. Ethiraj, F. Giordanino, V. Crocellà, G. Ricchiardi, E. Groppo, M. Baricco, F. Bonino, S. Chavan, S. Bordiga, "Advanced Functional Materials", Nessebar, Bulgaria (September 3-6, 2014).
- 2013 "Design of hydrogen storage materials: A multitechnical approach" (keynote), J. G. Vitillo, "Materials for Clean Energy and Optics workshop", Pravets, Bulgaria (April 4-7, 2013).
- 2010 "Tailoring MOFs for CO₂ storage: the amino-effect", J. G. Vitillo, S. Chavan, B. Seyyedi, F. Bonino, D. Farrusseng, S. Bordiga, "Computational Carbon Capture" workshop, Lausanne, Switzerland CECAM-HQ-EPFL (July 26-28, 2010).

Languages

Italian (Mother tongue), English (Professional working proficiency), French (Limited working proficiency).

References

Prof. Silvia Bordiga (Università di Torino, Italy, silvia.bordiga@unito.it), Prof. Laura Gagliardi (University of Minnesota, MN, gagliard@umn.edu), Prof. Marcello Baricco (University of Torino, Italy, marcello.baricco@unito.it), Prof. Jeffrey R. Long (UC Berkeley, CA, jrlong@berkeley.edu).