Maila Danielis - Curriculum Vitae

PERSONAL INFORMATION AND CONTACTS

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Via del Cotonificio 108 – 33100 Udine (IT)

CURRENT AFFILIATION AND PROFESSIONAL EXPERIENCE

- 10/01/2022 – present: **Fixed-term researcher** (Italian RTD-a position, SC: 09/D3, SSD: ING-IND/27)
  Research project: "CO_2 capture and valorization from exhausts gases and biogas by innovative adsorptive and catalytic processes" part of the Italian PON 2014-2020 Program – Action IV.4 – Innovation.
  Scientific supervisor: Prof. Alessandro Trovarelli. University of Udine, Udine (IT)
- 01/02/2021 – 09/01/2022: **Postdoctoral research fellow**
  Research project: "Eco-friendly catalysts for waste to energy processes", Funded by Fondazione CRUI under "Go for IT" Program. Scientific supervisor: Dr. Sara Colussi. University of Udine, Udine (IT) – Brookhaven National Laboratory, Upton (NY)
- 19/01/2021 – 31/01/2021: Short-term **research collaborator**
  Research project: "Preparation and catalytic evaluation of specific catalytic formulations".
  INSTM, Via Giusti 9 – 50121 Firenze (IT), and University of Udine, Via Palladio 8 – 33100 Udine
- 16/11/2019 – 15/01/2021: **Postdoctoral research fellow**
  Research project: "Development of novel CeO_2-based catalysts for environmental applications".
  University of Udine, Via Palladio 8 – 33100 Udine (IT)
- 1/07/2016 - 31/10/2016: **Junior research fellow**
  Research project: "Preparation of catalytic materials by solvent-free methods and assembling of micro-reactors for methane combustion". University of Udine, Via Palladio 8 – 33100 Udine (IT)
- 11/06/2012 – 22/06/2012: **Assistant teacher** in IGCSE Base mathematics
  Educandato Statale Liceo Uccellis, Via Giovanni da Udine 8 – 33100 Udine (IT)

EDUCATION

- 1/11/2016 – 20/03/2020: **Doctorate** in **Environment and Energy Engineering Science,** *Cum laude*
  Thesis title: "Pd/CeO_2 methane abatement catalysts prepared by solvent-free mechano-chemical synthesis", Supervisor: Prof. Carla de Leitenburg, co-supervisors: Prof. Alessandro Trovarelli, Dr. Sara Colussi. Polytechnic Department, University of Udine, Udine (IT)
- 17/10/2013 – 23/03/2016: **"Laurea Magistrale"** in **Engineering for the Energy and the Environment (classe LM22 Ingegneria Chimica)**
  Thesis title: "A solvent-free approach to Pd-based catalysts for CH_4 combustion"
  Supervisor: Prof. Alessandro Trovarelli, co-supervisor: Dr. Sara Colussi
  110/110, Polytechnic Department, University of Udine, Udine (IT)
- 20/09/2010 – 15/10/2013: **Bachelor's Degree** in **Industrial Engineering (classe L9)**
  Thesis title: "Experimental characterization and numerical modelling of drug delivery infusion catheters"
  Supervisor: Prof. Cristian Marchioli, co-supervisor: Prof. Marina Campolo
  108/110, Polytechnic Department, University of Udine, Udine (IT)

EXPERIENCES ABROAD

08/03/2019 – 30/05/2019: **Junior research associate - Visiting graduate student**
Chemistry Division, Brookhaven National Laboratory, Upton (NY) USA
Activity: *In situ* characterization of samples prepared by dry ball-milling synthesis by use of synchrotron light (Advanced Photon Source at Argonne National Laboratory, Argonne (IL) and National Synchrotron Light Source II at Brookhaven National Laboratory, Upton (NY)) for different methane activation reactions (full oxidation, reduction, dry reforming).

CONFERENCES

Invited Presentations

- **27/07/2022**, *Invited – Joanna Fowler Awardee talk*
  M. Danielis, "Engineering Pd-CeO_2 Methane Conversion Catalysts by Solventless Mechano-chemical Synthesis", Colloquium of the Chemistry Division, Brookhaven National Laboratory (BNL), Upton (NY)
- **21/07/2022**, *Invited talk*
  M. Danielis, "Catalysts for H_2 production: a feasible solution for the energy transition?", Science for a Sustainable Future Panel, NanoValbruna Green Festival, Valbruna (UD), Italy
- **16/01/2018**, *Invited young researcher talk*
  M. Danielis, S. Colussi, C. de Leitenburg, L. Soler, J. Llorca, A. Trovarelli, "Outstanding Methane Oxidation Performance over Pd Embedded Ceria Catalysts". Materials, Characterization and Catalysis workshop. ETH Zürich, Switzerland

Oral Presentations

- **06/10/2022:** M. Danielis, "Cattura e Valorizzazione di CO_2 tramite processi innovativi di adsorbimento e catalisi", La Chimica per la Transizione Ecologica, Trieste, Italy
- **20/09/2022:** M. Danielis, S. Colussi, A. Trovarelli, "Mechanochemistry: a sustainable route to novel metal-supported ceria-based heterogeneous catalysts", 9th World Congress on Particle Technology (WCPT9), Madrid, Spain.
- **12/09/2022:** M. Danielis, S. Colussi, A. Trovarelli, J.D. Jimenez, S.D. Senanayake, J.A. Rodriguez, "Selective reaction pathways for Dry Reforming of Methane on Pd-CeO_2 catalysts prepared by mechanochemical milling", GIC-2022, Riccione, Italy.
- **26/05/2022:** M. Danielis, S. Colussi, J. Llorca, A. Trovarelli, "Effect of low index ceria surfaces on Pd/CeO_2 methane oxidation catalysts", 27th North American Catalysis Society Meeting (NAM27), New York City (NY)
- **15/09/2021:** M. Danielis, A. Mussio, N.J. Divins, J. Llorca, S. Colussi, A. Trovarelli, "Structural Evolution and Enhanced Steam Deactivation Resistance of PtPd/CeO_2 Methane Oxidation Catalysts Prepared by Dry Milling", SCI2021 – XXVII National Congress of the Italian Chemical Society
- **16/06/2021:** M. Danielis, L.E. Betancourt, I. Orozco, J. Llorca, J.A. Rodríguez, S.D. Senanayake, S. Colussi, A. Trovarelli, "Engineering Pd-CeO_2 Methane Conversion Catalysts by Solventless Mechano-Chemical Synthesis", NewTimes - New Trends in Materials Science and Engineering, 1st International Virtual Conference
- **17/06/2020:** M. Danielis, S. Colussi, L.E. Betancourt, S.D. Senanayake, J. Llorca, N.J. Divins, L. Soler, J.A. Rodriguez, A. Trovarelli, "Optimized Dry Mechano-chemical Synthesis of Pd/CeO_2 Catalysts with Enhanced Methane Oxidation Activity", 17th International Congress of Catalysis, San Diego (CA). (canceled due to COVID-19, published abstract)
- **09/11/2018:** M. Danielis, S. Colussi, C. de Leitenburg, J. Llorca, A. Trovarelli, "Outstanding methane oxidation performance over innovative Pd-embedded ceria catalysts prepared by dry methods". Congresso Nazionale SCI – Divisione Friuli Venezia-Giulia "I giovani e la chimica". University of Udine, Italy
- **06/07/2017:** M. Danielis, S. Colussi, C. de Leitenburg, A. Trovarelli, "Pd-based catalysts for methane abatement". ELITECAT 2017, Lyon, Villeurbanne, France (flash presentation)

Poster Presentations

- **16/09/2020:** M. Danielis, S. Colussi, L.E. Betancourt, N.J. Divins, S. D. Senanayake, J. Llorca, J.A. Rodriguez, A. Trovarelli, "Characterization of Pd-PdO/CeO_2 methane oxidation catalysts prepared by dry milling ceria with Pd acetate" 2020 EFCATS Summer School "Engineering Materials for Catalysis", Portorož, Slovenia (E-poster)
- **10/01/2019:** M. Danielis, S. Colussi, C. de Leitenburg, J. Llorca, A. Trovarelli, "Nanoscale palladium-ceria interaction studied on methane combustion catalysts prepared by one step dry milling", Innovative Catalysis and Sustainability - International Winter School, Bardonecchia (TO)
- **30/10/2018:** M. Danielis, S. Colussi, C. de Leitenburg, G. Cavataio, J. Llorca, A. Trovarelli, "Active and stable Pd/CeO_2 catalysts prepared by dry methods for methane abatement applications". CAPoC 11. Brussels, Belgium

- **09/10/2018:** M. Danielis, S. Colussi, C. de Leitenburg, J. Llorca, A. Trovarelli, "Nanoscale Pd-CeO_2 interaction studied on methane combustion catalysts prepared by dry milling", PhD Week of the Environmental and Energy Engineering Science Course, University of Udine, Udine (IT)

Other contributions

- **14/04/2023:** N.J. Divins, A. Braga, M. Armengol-Profitós, L. Pascua-Solé, L. Soler, X. Vendrell, I. Serrano, X. Garcia, I. Lucentini, A. Mussio, M. Danielis, I.J. Villar-Garcia, V. Pérez-Dieste, C. Escudero, S. Colussi, A. Trovarelli, J. Llorca, "Combining synchrotron characterization with transmission electron microscopy measurements for methane activation", InCAEM Workshop - Planes Complementarios on Advanced Materials in Catalonia, ALBA Synchrotron, Barcelona, Spain
- **14/11/2022:** J.D. Jiménez, L.E. Betancourt, M. Danielis, H. Zhang, P. Liu, A. Trovarelli, J.A. Rodriguez, S. Colussi, S.D. Senanayake, "Identification of Highly Selective Surface Pathways for Methane Dry Reforming using Mechano-Chemical Synthesis of Pd-CeO_2", 2022 AIChE Annual Meeting, Phoenix (AZ)
- **25/05/2022:** J.D. Jiménez, M. Danielis, L.E. Betancourt, S. Colussi, A. Trovarelli, J.A. Rodriguez, S. Senanayake, "CO_2 Hydrogenation Activity and Mechanism over Mechano-Chemically Prepared Pd/CeO_2 Catalysts", 27th North American Catalysis Society Meeting (NAM27), New York City (NY)
- **07-10/12/2021:** N.J. Divins, M. Danielis, A. Mussio, S. Colussi, A. Trovarelli, J. Llorca, "Investigation of ball-milled Pd/CeO_2 catalysts under operando methane combustion conditions", APXPS-2021 Workshop, Brookhaven National Laboratory, Upton (NY) (POSTER)
- **07/11/2021:** J.D. Jiménez, M. Danielis, L.E. Betancourt, S. Colussi, A. Trovarelli, J.A. Rodriguez, S.D. Senanayake, "CO_2 Hydrogenation over Mechano-Chemically Prepared Transition Metal-Based Ceria Catalysts", 2021 AIChE Annual Meeting, Boston (MA)
- **15/06/2020:** N.J. Divins, M. Danielis, A. Mussio, S. Colussi, A. Trovarelli, J. Llorca, "Unraveling the chemical state of ball-milled Pd/CeO_2 catalysts under operando methane complete combustion conditions", 17th International Congress of Catalysis, San Diego (CA). (canceled due to COVID-19, published abstract, POSTER)
- **26/08/2019:** L.E. Betancourt, M. Danielis, I. Orozco, S. Colussi, J. Llorca, A. Trovarelli, J.A. Rodríguez, S.D. Senanayake, "Interfacial interactions in Pd-embedded ceria catalyst prepared by a one-step dry ball-milling method for methane activation and dry reforming". ACS Fall National Meeting, San Diego (CA)
- **25/08/2019:** E. Aneggi, A. Mussio, M. Danielis, S. Colussi, N.J. Divins, L. Soler, X. Vendrell, X. Garcia, I. Serrano, J. Llorca, A. Trovarelli, "Nanoscale morphology and improved activity of ceria-based catalysts prepared by mechanical methods". ACS Fall National Meeting, San Diego (CA)
- **01/07/2019:** S. Colussi, M. Danielis, C. de Leitenburg, G. Cavataio, J. Llorca, A. Trovarelli, "Catalizzatori a base di Pd/CeO_2 preparati con macinazione a secco per l'abbattimento delle emissioni di metano dai veicoli alimentati a gas naturale". GRICU congress, Palermo, Italy
- **26/06/2019:** A. Mussio, M. Danielis, S. Colussi, J. Llorca, A. Trovarelli, "Improved activity of ceria-based Pd-Pt bimetallic catalysts obtained by dry milling for methane oxidation in presence of water". 26th North American Meeting, Chicago (IL)
- **26/06/2019:** S. Colussi, M. Danielis, A. Toso, C. de Leitenburg, J. Llorca, L. Soler, A. Trovarelli, "Palladium and ceria as the "magic couple" towards catalytic methane activation", 26th North American Meeting, Chicago (IL) (POSTER)
- **06/09/2018:** M. Danielis, S. Colussi, C. de Leitenburg, J. Llorca, A. Trovarelli**,** "Solvent-free mechanical synthesis of Pd/CeO_2 catalysts for methane abatement". Advanced inorganic materials: green and unconventional synthesis approaches and functional assessment, Padova, Italy
- **04/09/2018:** S. Colussi, M. Danielis, J. Llorca, A. Trovarelli**,** "A comparison between different catalyst preparation routes for CH_4 combustion over Pd/CeO_2 catalysts". 10th International Conference on f-Elements (ICFE-10), Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland
- **26/06/2018:** S. Colussi, M. Danielis, C. de Leitenburg, L. Soler, J. Llorca, A. Trovarelli, "Outstanding Methane Oxidation Performance over Pd Embedded Ceria Catalysts Prepared by Dry Methods". 3rd Fundamentals and applications of cerium dioxide in catalysis, Barcelona, Spain
- **31/08/2017:** A. Toso, M. Danielis, S. Colussi, A. Trovarelli, "Effect of water poisoning on solution combustion synthesized Pd/$Ce_xZr_{1-x}O_2$ catalysts for CH_4 abatement from NGVs". EuropaCat 2017, Florence, Italy

REVIEWER FOR INTERNATIONAL JOURNALS

- Applied Catalysis B: Environmental (2021-) ISSN: 0926-3373
- Catalysts (2022-) EISSN: 2073-4344
- Water (2022-) EISSN: 2073-4441
- Frontiers in Energy Research - Carbon Capture, Storage, and Utilization section (2022-) ISSN: 2296-598X (Review Editor)
- Air (2023-), EISSN: 2813-4168

RESEARCH COLLABORATIONS

- Prof. J.A. Rodriguez, Dr. S.D. Senanayake, Characterization of catalysts for methane and carbon dioxide conversion, Brookhaven National Laboratory, Upton, NY, USA
- Dr. A. Piovano, Characterization of CeO_2-based catalysts by probe molecule chemisorption, INSTM and NIS Center, Department of Chemistry, University of Torino, Italy
- Dr. E. Sartoretti, Dr. F. Salomone, Prof. S. Bensaid, Mechano-chemical synthesis of catalysts for methane oxidation and CO_2 upgrade, Politecnico di Torino, Italy
- Dr. Nuria J. Divins, Prof. J. Llorca, Microscopic and spectroscopic characterization of innovative materials prepared by dry milling, Universitat Politecnica de Catalunya, Barcelona, Spain

PARTECIPATION TO PROJECTS

- 2022-2025: Italian **PON 2014-2020** Program – Action IV.4 – Innovation **Research project**: "CO_2 capture and valorization from exhausts gases and biogas by innovative adsorptive and catalytic processes"
- 2021-2022: "Programma di **valorizzazione dei brevetti** del sistema universitario del Friuli-Venezia Giulia - Unity FVG PoC – **Progetto PoC** per il brevetto: "Catalizzatori a base di Pd/CeO_2 e metodo per la loro preparazione"
- 2021: "Eco-friendly catalysts for waste to energy processes", Funded by **Fondazione CRUI** under **"Go for IT" Program**, collaboration between the University of Udine and the Chemistry Division of Brookhaven National Laboratory (BNL), Upton (NY) USA
- 2020-2021: **Umicore-Uniud project** "Development, synthesis and characterization of novel doped ceria based mixed oxides as PGM carrier materials for lean condition oxidation catalysis"
- 2020: Submission of MSCA-IF-GF proposal in collaboration with Brookhaven National Laboratory (BNL), Upton (NY). Evaluation above threshold but not funded.
- 2014-2018: **Ford Motor Company URP Award** 2014-2195R "Three-way catalyst materials for compressed natural gas vehicles"

AWARDS

- Award for the paper "In-situ investigation of the mechanochemically promoted Pd-Ce interaction under stoichiometric methane oxidation conditions": **back cover** of vol.1, issue 2 of EES Catalysis, 2023
- Award for the paper "Identification of Highly Selective Surface Pathways for Methane Dry Reforming using Mechano-Chemical Synthesis of $Pd-CeO_2$": **cover picture** of vol.12, issue 20 of ACS Catalysis, 2022
- **2021 Joanna Fowler Award** in the Chemical and Biochemical Sciences, awarded by the Chemistry Division at Brookhaven National Laboratory and Brookhaven Women in Science (BWIS)
- Università degli Studi di Udine **PhD Award 2021** – best scientific field doctoral thesis discussed in 2020
- **2021** SCI-GIC sponsored **Mauro Graziani Award** for the best PhD Thesis in Catalysis for the Energy and the Environment
- Member of the **winning team** of the 1st "CIG-Catalisi in Gioco" Catalysis Contest, Reggio Calabria
- Award for the paper "Structural Evolution of Bimetallic $PtPd/CeO_2$ Methane Oxidation Catalysts Prepared by Dry Milling": **Cover picture** of vol.13, Issue 27 of "ACS Applied Materials & Interfaces", year 2021
- **Best Oral Contribution** of the Energy Session at the New-Times 1st International Virtual Conference

- Award for the paper "The effect of milling parameters on the mechanochemical synthesis of Pd-CeO_2 methane oxidation catalysts": **Back Cover Picture** of vol. 9, Issue 16 of "Catalysis Science and Technology", year 2019
- **EEES Award** for the **best poster** of the PhD Week of the Environmental and Energy Engineering Science Course (XXXII cycle)

GRANTS AND FELLOWSHIPS

- 14-16/06/2023: **SCI** sponsored **fee grant** for young researchers for the participation to the GIC-2023 XXIII National Congress on Catalysis, Genoa, Italy
- 11-14/09/2022: **SCI** sponsored **fee grant** for young researchers for the participation to the GIC-2022 XXII National Congress on Catalysis, Riccione, Italy
- 14-23/09/2021: **SCI**-Industrial Chemistry Division sponsored **fee grant** for young researchers for the participation to the XXVII National SCI Congress (virtual)
- 07-11/01/2019: **SCI-GIC** sponsored **fee grant** for the participation at the International Advanced School "ICS2019" in Bardonecchia (TO), Italy
- 1/11/2016-31/10/2019: Fully funded **PhD Scholarship, European Social Fund**. 2014/2020 Program for the Autonomous Region Friuli Venezia Giulia

TEACHING AND SUPERVISION

- **2017 - ongoing:** Supervision and support to undergraduate, master, and graduate students in their experimental laboratory activities
- **AA 2022/23:** Practical lessons within the course "Fondamenti dei processi di trattamento degli inquinanti dell'aria". SSD: ING-IND/27.
- **AA 2021/22, 2022/23:** Practical lessons within the course "Processi di separazione". SSD: ING-IND/27.
- **13-17/06/2022, 13-16/02/2023:** Laboratory experience for high school students (PCTO) "Laboratorio di Ingegneria Industriale per la Sostenibilità Ambientale - Aria, acqua, processi sostenibili e circolarità dei materiali". SSD: ING-IND/27.
- **18/10/2022:** Co-supervisor of the master thesis: "Effetto della macinazione a secco sulle proprietà di polveri di ossido di cerio per applicazioni ambientali" by Matteo Zampol. University of Udine (LM-31, SSD: ING-IND/27)
- **AA 2020/21:** Seminar "Biogas upgrading and CO_2 capture", part of "Ingegneria sanitaria ambientale" course, SSD: ICAR/O3
- **22/03/2019:** Co-supervisor of the master thesis: "Methane oxidation bimetallic catalysts prepared by dry methods: the precursor effect" by Chiara Pascoli. University of Udine (LM-22, SSD: ING-IND/27)
- **21/10/17 - 18/01/2018:** Lab experience for master students "Catalytic combustion of methane", part of the "Ingegneria dell'Ambiente e l'Energia" course, AA 2017/18. SSD: ING-IND/27.

MEMBERSHIPS AND SERVICE

- 01/01/2019 – present: Junior **member** of the **Società Chimica Italiana** (Italian Chemical Society, **SCI)**, affiliated to the Industrial Chemistry Division and the Interdivisional Group of Catalysis (**GIC**)
- 16-17/10/2021: **External Jury member** for the Galileo Award – **Scientific Outreach Literary Award** (XV edition) organized by Goodnet and ItalyPost Scientific Associations, Padua (IT)
- 08/10/2021: Participation as **spokesperson** of the Università di Udine at the "Barcolana Job" festival, organized by the Regione Friuli-Venezia Giulia, as speaker in the panel "Dopo il diploma: le competenze del futuro? Viaggio attraverso i percorsi STEM"
- 01/10/2020 – 31/12/2021: **Students tutor** for the bachelor's degree course "Industrial Engineering for Environmental Sustainability", University of Udine
- 27/02/2018 – 31/10/2019: **PhD students' representative** of the Environmental and Energy Engineering Science course, University of Udine

PARTICIPATION IN ADVANCED COURSES, SCHOOLS, AND WORKSHOPS

- 27-30/07/2021: Catalysis Contest "Catalisi in Gioco CIG-2021", Reggio Calabria, Italy
- 15-19/09/2020: 2020 Summer School of the European Federation of Catalysis Societies (EFCATS), Portorož-Portorose, Slovenia
- 25/06/2019: Patent exposition event "TechshareDay 2019", Politecnico di Torino, Torino, Italy
- 17/01/2019: Study visit AV01-2019 "Patent Information – basic level", European Patent Office (EPO), Münich, Germany
- 07-11/01/2019: International Advanced School "Innovative Catalysis and Sustainability: scientific and socio-economic aspects" (ICS2019), Bardonecchia (TO), Italy (5 ECTS credits)
- 04 - 08/06/2018: International APT Course "Advanced After-treatment Technologies for Automotive Applications", International Centre for Mechanical Sciences (CISM), Udine, Italy
- 26/03/2018: Springer seminar "Author seminar – How to publish a scientific work", University of Udine, Udine, Italy
- 03-07/07/2017: Catalysis School "ELITECAT2017", Université Claude Bernard LYON 1, Lyon, France
- 10/05/2016: 3rd Ljubljana-Udine Catalysis Colloquium, National Institute of Chemistry, Ljubljana, Slovenia

PROFESSIONAL ABILITATIONS

- National professional qualification for **high school teaching** (24CFU), awarded in year 2020
- National professional qualification as **Industrial Engineer**, awarded in year 2016

LANGUAGES AND CERTIFICATIONS

- Italian, mother tongue
- English, advanced knowledge, written and oral (CAE grade B, 11/08/2009)
- German, good knowledge, written and oral (Deutsches Sprachdiplom, 03/2010)
- Spanish, basic knowledge