



CURRICULUM VITAE ET STUDIORUM

July 2018

Stefania Specchia, (Italian citizenship), graduated in Chemical Engineering (M.S.) in 1995 (Catalytically modified fly-ash filters for NO_x reduction with ammonia,) at the Politecnico di Torino with 110/110.

She is currently *Associate Professor* of Chemical Plants Design at the *Politecnico di Torino*, Department of Applied Science and Technology, Institute of Chemical Engineering (from 03/01/2011), *Adjunct Professor* at the *China Jiliang University* (Hangzhou, Zhejiang, China), College of Materials Science and Engineering (from 05/11/2012), *Adjunct Researcher* at the *Consiglio Nazionale delle Ricerche, Istituto di Tecnologie Avanzate "Nicola Giordano"* (CNR-ITAE, from 03/11/2014), and *Adjunct Professor* at the *Shanghai University* (China), Institute of Sustainable Energy (from 12/05/2017).

She was Assistant Professor of Chemical Plants Design at Politecnico di Torino, 1st Faculty of Engineering, Department of Materials Science and Chemical Engineering (from 01/10/2002 to 31/12/2010).

On January 17, 2014, she obtained the national scientific qualification as full professor on chemical plants and industrial processes according to the article n. 16 of the Italian law n. 240/2010 (Abilitazione Scientifica Nazionale sessione 2012, settore scientifico "09/D3 – I fascia");

<https://abilitazione.cineca.it/ministero.php/public/esitoAbilitati/settore/09%252FD3/fascia/1>

She speaks English, French, and German (dealing with Spanish as well).

Board Committees

- October 2013 – October 2014: member of the technical-scientific Committee of the project SMARTHOSPITAL for the organization, management and energetic valorisation of infective risk medical wastes for the San Luigi Gonzaga Hospital (Orbassano, Torino, Italy).
- Since 2012: active member of the Board Committee of the IAOEES, Technical Division of Fuel Cells (*International Academy of Electrochemical Energy Science*): <http://www.iaoees.org/boardfuelcells.php>.
- Since May 2018: Expert member of the Scientific Board of IFP-Energies Nouvelles (France)

Peer-reviewing activities

- Peer-reviewer for the following international journals on catalysis, chemical engineering and electrochemistry: *Journal of Catalysis*; *Applied Catalysis B: Environmental*; *Applied Catalysis A: General*; *Catalysis Letters*; *Catalysis Today*; *Catalysis Communications*; *Reaction Kinetics, Mechanisms and Catalysis*; *Journal of Molecular Catalysis A: Chemical*; *Chemical Society Reviews*; *Catalysts*; *Industrial Engineering & Chemistry Research*; *Chemical Engineering Journal*; *Chemical Engineering Science*; *The Canadian Journal of Chemical Engineering*; *Chemie Ingenieur Technik*; *Chemical Engineering & Technology*; *Physical Chemistry Chemical Physics*; *Combustion and Flame*; *Journal of Power Sources*; *International Journal of Hydrogen Energy*; *Energy & Fuels*; *Energy Conversion and Management*; *Fuel*; *Fuel Processing Technology*; *Fuel Cells*; *Carbon*; *Electrochimica Acta*; *Journal of Applied Electrochemistry*; *Electrocatalysis*; *Ionics*; *Applied Energy*; *AIChE Journal*; *The Journal of Physical Chemistry C*; *Renewable Energy*; *Fuel*; *Nature Communications*; *Greenhouse Gases: Science & Technology*; *ACS Catalysis*; *Materials Chemistry and Physics*; *Brazilian Journal of Chemical*



Engineering; New Journal of Chemistry; Chemical Reviews; IEEE Transactions on Industrial Electronics; ChemCatChem; International Journal of Heat and Mass Transfer; Journal of the American Ceramic Society; Catalysis Communications; Journal of Natural Gas Science and Engineering; Physica A: Statistical Mechanics and Its Applications; Comptes Rendus Chimie; Canadian Journal of Chemistry; Journal of Materials Chemistry A; ChemElectroChem; Journal of Water Process Engineering; ACS Applied Materials & Interfaces; Materials Chemistry Frontiers; Journal of Electrochemical Energy Conversion and Storage; Current Opinion in Electrochemistry; Electrochemical Energy Reviews.

- Peer-reviewer for the following national and international research programs: *The Research Council of Norway*, Call 2011; *Slovenian Research Agency*, National Research Projects Call 2011/12; *Lithuanian Research Council*, National Research Programmes Call 2012; *Ministero dell'Istruzione dell'Università e della Ricerca (Italy)*, PRIN Bando 2012; FIRB Bando 2013; *Agence Nationale de la Recherche (France)*, Programme SEED, Edition 2013; *Chilean National Commission for Science and Technology (CONICYT)*, National Fund for Scientific and Technological Development program FONDECYT, call 2014; *ACS Petroleum Research Fund (USA)*, 2014 and 2015 funding programs *Netherlands Organisation for Scientific Research (Netherlands)*, ECHO granting 2015; *Agence Nationale de la Recherche (France)*, Plan d'Action 2017 "Stimuler le renouveau industriel"; *Polish National Science Center (Poland)*: Physical Sciences and Engineering, Edition 2016-2017. *Natural Sciences and Engineering Research Council of Canada (Canada)*: Collaborative Research and Development Grant funding opportunity, 2017. *Research Foundation Flanders (Belgium)*: doctoral fellowships strategic basic research 2017. *Natural Sciences and Engineering Research Council of Canada (Canada)*: Collaborative Research and Development Grant funding opportunity, 2018.
- Member of the international scientific board for the technical evaluation of *IFP-Energies Nouvelles (Solaize, France)*: Process Design and Modeling Division and Process Experimentation Division (June 2014); Process Design and Modeling Division (March 2018).

Managing activities for organization of congresses

1. *May 2012 – October 2013*: Vice-president of the Scientific Committee of the "XIV^e Congrès de la Société Française de Génie des Procédés - SFGP 2013: Les sciences du Génie des procédés pour une industrie durable", Lyon (France), 8-10/10/2013; <http://sfgp2013.congres-sfqp.eu/comites.html>
2. *June 2012 – July 2013*: member of the Scientific Committee of the "International Conference on Electrochemical Materials and Technologies for Clean Sustainable Energy", Guangzhou (P.R. China), 5-9/07/2013; <http://www.fuelcellscn.com>
3. *April 2013 – April 2014*: member of the Scientific Committee of the "9^{ème} Congrès Francophone de Génie des Procédés - CFGP 2014", Agadir (Morocco), 28-30/04/2014; http://cfgp2014.ensa-agadir.ac.ma/?page_id=29
4. *December 2013 – September 2014*: member of the Scientific Committee of the "International Symposium on Air & Water Pollution Abatement Catalysis AWPAC-2014", Krakow (Poland), 1-5/09/2014; <http://www.ik-pan.krakow.pl/Scientific-Committee.669.0.html>
5. *January 2014 – December 2014*: member of the International Advisory Board of the "Euro-Mediterranean Hydrogen Technologies Conference EmHyTeC-2014", Taormina (Italy), 9-12/12/2014; <http://www.itae.cnr.it/emhytec2014/organization.html>
6. *May 2014 – November 2014*: member of the International Scientific Advisory Committee of the "Second International Conference on Electrochemical Energy Science and Technology EEST-2014", Shanghai (P.R. China), 31/10-4/11/2014; <http://iaoees.org/events/EEST2014/committees.html>
7. *November 2014 – August 2015*: member of the International Scientific Committee of the "International Conference on Electrochemical Energy Science and Technology EEST-2015", Vancouver (B.C., Canada), 16-22/08/2015; <http://iaoees.org/events/EEST2015/committees.html>



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8. *January 2015 – July 2015*: member of the International Scientific Committee of the "V Iberian Symposium on Hydrogen, Fuel Cells and Advanced batteries HYCELTEC-2015", Tenerife (Spain), 5-8/07/2015; <http://www.hyceltec2015.ull.es/index.php/symposium-committees/scientific-committee>
9. *August 2015– August 2016*: member of the International Scientific Committee of the "International Conference on Electrochemical Energy Science and Technology EEST-2015", Kunming (P.R. China), 16-22/08/2016; <http://iaoees.org/events/EEST2016/committees.html>
10. *July 2015 – June 2017*: member of the International Scientific Committee of the "VI Iberian Symposium on Hydrogen, Fuel Cells and Advanced batteries HYCELTEC-2017", Porto (Portugal), 19-23/06/2017; <http://events.mercatura.pt/HYCELTEC2017/?pag=committees>
11. *September 2015 – June 2016*: member of the International Scientific Committee of the "5th International Congress on Green Process Engineering GPE 2016", Mont Tremblant (Quebec, Canada), 19-24/06/2016; <http://www.engconf.org/conferences/civil-and-environmental-engineering/green-process-engineering/#header1>
12. *September 2015 – May 2016*: member of the International Scientific Committee of the "International Green Energy Conference & Euro-Mediterranean Hydrogen Technologies Conference InGEC & EmHyTeC-2016", Tunis (Tunisie), 9-12/05/2016; <http://www.etrera.eu/emhytec2016/SciComm.html>
13. *September 2016 – June 2017*: member of the International Scientific Committee of the "Hydrogen POver - Theoretical and Engineering Solutions - International Symposium HYPOTHESIS", Siracusa (Italy), 28-30/06/2017; http://www.hypothesis.ws/website/HYPOTHESIS_XII/Committees.html
14. *December 2016 – now*: member of the International Advisory Board of the "22nd World Hydrogen energy Conference WHEC 2018", Rio de Janeiro (Brazil), 17-22/07/2018; https://www.whec2018.com/main_frontend.php?mask=19
15. *June 2017 – now*: member of the International Scientific Committee of the "VII Iberian Symposium on Hydrogen, Fuel Cells and Advanced batteries HYCELTEC-2019", Barcelona (Spain), to be decided

Editorial boards

- *Since March 2015*: active member of the Editorial committee of the international peer-reviewed journal "Oil & Gas Science & Technology" of IFP Energies Nouvelles (Rueil Malmaison, France); <http://ogst.ifpenergiesnouvelles.fr/about-the-journal/editorial-committee>
- *Since May 2017*: associate editor-in-chief of the E²R *Electrochemical Energy Reviews*, a new journal from Springer; <http://www.springer.com/chemistry/electrochemistry/journal/41918?detailsPage=editorialBoard>
- *Since March 2018*: guest editor of the special issue "On Complexity in Energy Production and Harvesting: Modeling, Dynamical Analysis, and Control in Engineering, Technology, and Science" for the journal Complexity (Wiley Hindawi), <https://www.hindawi.com/journals/complexity/si/486142/cfp/>

Teaching activities @ the Politecnico di Torino

She is currently lecturer of the following courses:

- *Design of Multiphase Apparatuses* (80 hrs, M.S. for Chemical and Sustainable Processes Engineering), course in Italian language from 2015/2016 to 2016/2017; in English language from 2017/2018).
- *Chemical and Electrochemical Reactors – Module of Electrochemical Reactors* (30 hrs, M.S. for Chemical and Sustainable Processes Engineering, course in Italian language), from 2013/2014.

She was lecturer of the following courses:



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- *Textile Technology – Module of Process Control* (20 hrs, M.S. for Textile Engineering, course in English language), from 2012/2013 to 2014/2015.
- *Chemical Plants* (80 hrs, M.S. for Chemical and Sustainable Processes Engineering, course in Italian language), 2014/2015.
- *Introduction to Industrial Quality Management* (56 hrs, B.S. for all Engineering courses), from 2010/2011 to 2013/2014 course in English language; from 2002/2003 to 2009/2010 course in Italian language.
- *General Services and Safety in Industrial Factories* (56 hrs, B.S. for Textile Engineering, Biella campus, in English language), from 2009/2010 to 2011/2012 course in English language; from 2004/2005 to 2007/2008 course in Italian language.
- *Hydrogen Technologies and Fuel Cells – Module of Hydrogen Production* (6 hrs, Ph.D. course, in English language), from 2010/2011 to 2011/2012.

She provided practical assistance for calculations and lab experiences for the following courses:

- *Experimental Chemistry for Engineering*, from 2012/2013 to 2013/2014.
- *Industrial and Environmental Catalysis*, from 2002/2003 to 2009/2010.
- *Chemical Plants and Multiphase Apparatuses*, from 2002/2003 to 2011/2012.

Teaching activities abroad

- On *May 2017* she was lecturer of the course “Transportation: fast & future, cars powered by hydrogen?” (2 hours) for undergraduate students at the BEST Spring Course 2017 – hosted by the *Board of European Students of Technology*, section of Torino (Italy).
- On *August 2015* she was Visiting Professor at *The University of British Columbia*, Department of Chemical and Biological Engineering, Vancouver (BC, Canada), working with Prof. David P. Wilkinson on low-temperature fuel cells and hydrogen production.
- On *July 2015* she was lecturer of the course “Fuel Cells: fundamental aspects and new research insights” (10 hours) for Ph.D. students at the Facultad de Quimica, *Universidad de La Laguna*, (Spain), hosted by Prof. E.M. Pastor Tejera, within the Teaching Staff Mobility program *Erasmus+*.
- On *June 2013* she was lecturer of the course “Microstructured catalytic reactors for process intensification” (2 hours) for graduate students at the SECAT 2013 – Escuela de Verano, 2nd Italian-Spanish school on structured catalysts for Ph.D. students, hosted by Prof. J.A. Odriozola, Facultad de Quimica, *Universidad de Sevilla*, (Spain).
- On *May 2013* she was lecturer of the course “Medical wastes: smart collection, sterilization and energetic valorisation” (2 hours) for undergraduate students at the BEST Spring Course 2013 – the BEST Spring Course 2017 – hosted by the *Board of European Students of Technology*, section of Torino (Italy).
- On *November 2012* she was lecturer of the course “Fuel Cells: fundamental aspects and applications” (6 hours) and “Solution Combustion Synthesis: theory and applications” (6 hours) for ungraduate students at the *China Jiliang University*, College of Materials Science and Engineering, Hangzhou (Zhejiang, P.R. China), hosted by Prof. Y. Huang.
- On *December 2011* she was lecturer of the course “Fuel Cells: fundamental aspects and applications” (9 hours) for graduate students at the *Ural Federal University*, Department of Chemistry, Ekaterinburg (Russia), hosted by Prof. V. Cherepanov.
- On *August 2011* she was Visiting Professor at the *Universidade Estadual de Maringá*, Departments of Physics and Chemical Engineering, Maringá (PR, Brazil), working with Proff. L.M. Baesso and E. Kaminski Lenzi on diffusion in porous catalysts; in this period she was lecturer of the course “Fuel Cells – Theory & Practice” (12 hours) for graduate students.



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- On *March 2007* she was lecturer of the course “Fuel Cells: fundamental aspects and process engineering” (8 hours) for graduate students at the *Cà Foscari University*, Department of Environment Engineering, Venice (Italy), in cooperation with Prof. L. Szpyrkowicz. In the same period, she was tutoring the Master course “Play with Energy” for high-school students, promoted by ENEL.
- On *July-September 2006* she was Visiting Professor at *The University of Western Ontario*, Department of Chemical and Biochemical Engineering, London (ON) Canada, working with Prof. D. Karamanev on bio fuel cells; in this period she was lecturer of the course “Selected Topics in Chemical Engineering: Aspects of Hydrogen Economy” (36 hours) for graduate students.

Research activities @ the Politecnico di Torino

On 2002 she approached the group *CRE³* (Catalytic Reaction Engineering for Energy and Environment) in the Department of Materials Science and Chemical Engineering, Politecnico di Torino, taking care of the “Energy” sector of the group. On 2013 she founded the new *Gre.En² Group* (Green Energy Engineering Group), which currently is part of the *ChENERGY* (Chemistry and Energy Technologies) research group of the Department of Applied Science & Technology.

From the beginning of her career, she tutored or co-tutored the research activities of:

- 32 undergraduate students (B.D. Chemical Engineering, B.D. Textile Engineering).
- 41 undergraduate students (M.D. Chemical and Sustainable Processes Engineering and M.D. Energetics).
- 29 undergraduate Erasmus students (M.D. Chemical Engineering from Spain, United Kingdom, and Poland; M.D. Materials Science from Canada and South Africa).
- 16 graduate research fellows (M.D. Chemical Engineering).
- 22 Ph.D. students (Ph.D. Chemical Engineering).
- 8 Ph.D. Erasmus/international students (Ph.D. Chemical Engineering and Materials Science from Spain, Slovenia, The Netherlands, Canada, Iran, Poland, Germany).
- 7 post-doc (Ph.D. Chemical Engineering).
- 1 international post-doc (Ph.D. Chemical Engineering from Brazil).
- 1 international visiting professor (Assistant Professor in Chemistry from Jagiellonian University in Krakow, Poland).

She is currently tutoring the research activities of 2 undergraduate students, 2 Ph.D. students, and 1 post-doc fellow. She is author of **119 publications** on peer-reviewed international journal, **8 chapters of books**, and **2 patents** on catalytic combustion, hydrogen production processes, fuel cells systems, with an **Hirsh index (Hi) equal to 32** (2480 citations on 132 publications, www.scopus.com, ORCID#0000-0003-3882-3240, July 2018).

Her scientific activity is mainly focused on four topics:

1. Catalytic combustion of light hydrocarbons (fiber premixed catalytic burners for natural gas combustion; micro-monoliths for catalytic combustion of methane, propane, hydrogen and their mixtures).
2. Hydrogen production:
 - 2.1 short-contact-time catalytic reactors for syngas production via partial oxidation and steam/oxidative reformers;
 - 2.2 catalytic reactors for syngas clean-up (WGS, CO-PROX, CO-SMET);
 - 2.3 design and modeling of fuel processors for hydrogen production starting from hydrocarbon fuels.
3. Low-temperature fuel cells (PEMFCs and DMFCs):



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- 3.1 design and characterization of electrocatalysts for oxygen reduction reaction (ORR), hydrogen oxidation reaction (HOR), and methanol oxidation reaction (MOR);
- 3.2 multiphysic modeling of PEMFCs and DMFCs.
4. Energetic valorization of wastes.

Projects management

The research activities were and are mainly correlated to projects funded by the European Union (FP6 and FP7/FCH-JT programs), the Italian Government (Ministry of Education, University and Research), the Regione Piemonte, private industries. She is/was involved in the research within the following projects, as scientist in charge of the Politecnico di Torino research unit, with an overall budget of more than **1,369 k€**:

1. International project ERANETMED *SOL-CARE* (Solar assisted catalytic reforming: a hybrid process to transform municipal waste into energy, ref. ERANETMED_ENERG-11-065); from 04/2016 to 03/2019 (active); available funding: 137,681 €.
2. National project PRIN *NAMED-PEM* (Advanced nanocomposite membranes and innovative electrocatalysts for long-lasting PEMFCs, Ref. n. 2010CYTAWAW) PRIN 2010-2011; from 02/2013 to 01/2016; available funding: 98,531 €.
3. Bilateral exchange Italy-Poland *CANALETTO* Programme with Jagellonian University, Krakow (Nanostructured oxide materials for oxidation processes: synthesis, properties and catalytic activity, ref. n. M00478), from 01/2013 to 12/2015 (active). Budget: full reimbursement of travels' costs and living expenses to Poland for short and long stays.
4. EU project *DURAMET* (Improved durability and cost-effective components for new generation solid polymer electrolyte Direct Methanol Fuel Cells, ref. n. 278054) from FP7/FCH-JT call, from 12/2011 to 11/2014 (completed), budget: 185.022 €.
5. National project *PIACE* (Intelligent, integrated and adaptative platform for microcogeneration at high efficiency for residential uses, ref. n. EE01_00032) from Industria_2015 call, from 01/2010 to 12/2014 (completed), budget: 93.347 €.
6. Private research contract with industry *RIELLO* Burners S.p.A. (Development of suitable methane combustion catalysts for premixed metallic burners), from 04/2006 to 03/2007 (completed), budget: 95.000 €.
7. National project *INDESIT* (Study, design and development of a new series of domestic appliances featuring new innovative technologies targeted to a significant reduction of energy consumption and environmental impact, ref. n. EE01_00015) from Industria_2015 call (Ministry of Industry and Economic Development); from 01/2010 to 12/2014; available funding: 120,000 €. Principal investigator of the Task 3.4 (Catalytic combustors for cooking devices) within the Work-package 3 (Innovative technologies for the preparation and storage of food).
8. EU project *BURNERCAT* (Catalytic, environmental-friendly, fuel flexible and cost effective burner for domestic boiler, ref. n. COOP-CT-2005-016937), FP6-2003-SME-1, from 11/2005 to 01/2008 (completed), budget: 234.720 €.
9. Regional project *MICROCELL* (Methanol and ethanol micro fuel cells development for portable application, ref. nr. B.U.45 06/11/2003), from 11/2005 to 01/2008 (completed); role of project coordinator, budget: 404.729 €.

She performed active research within the following projects:

- Private research contract with company FOTORECUPERI (Sterilization treatment of medical wastes and their energetic valorization); from 02/2010 to 12/2013.
- EU project MARS-EV (Materials for ageing resistant high-energy Li-ion energy storage for the electric vehicle, Ref. FP7-2013-GC-MATERIALS_609201), from 10/2013 to 09/2016.



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- EU project MC-WAP (Molten-carbonate fuel cells for waterborne applications); 2005-2010.
- EU project MOREPOWER (Compact direct methanol fuel cells for portable applications); 2004-2007.
- EU project FLEXHEAT (Flexible premixed burners for low-cost domestic heating systems); 2004-2007.
- EU project HYTRAN (Hydrogen and fuel cell technologies for road transport); 2004-2008.
- EU project BIOFEAT (Biodiesel fuel processor for a fuel cell auxiliary power unit for a vehicle); 2003-2006; role of project coordinator together with Prof. Saracco.
- EU project CATNAT (Cost-effective and durable nanostructured Pd catalysts for natural gas vehicle and premixed burner applications); 2002-2004.
- EU project MINIREF (Miniaturized gasoline fuel processor for fuel cell vehicle applications); 2002-2004.
- National project PRIN 2006 (Ultra-compact structured catalyst based on microchannels for power generation); 2007-2009.
- National project FISR 2005 (Development of hydrogen micro-combustors for direct power production), 2005-2008.
- National project PRIN 2004 (Development of a structured reactor with integrated heat exchange for the CO preferential oxidation); 2004-2006.
- National project FISR 2004 (Development of innovative catalysts for hydrogen production and purification for fuel cells); 2004-2006.
- National project PRIN 2001 (Development of perovskite catalysts for methane combustion), 2002-2003.
- Regional project CA(R)VOUR (Network of companies and R&D centers for the automotive platform in Piemonte), 2013-2015.
- Regional project DRAPO' (Integrated auxiliary systems at high efficiency for energy recovery and consumption reduction of vehicles), 2013-2015.
- Regional project TESMAHYPRO (Technological system layout for medical wastes management and their energetic valorization via hydrogen production), 2013-2015.
- Regional project MICRO-CHP (Development of a natural gas micro-CHP unit for residential applications); 2005-2009.
- Regional project CELCO-YACHT (Development of a diesel APU for a Yacht); 2005-2008.

Previous activities

Experiences in different industrial fields:

- *From 01/12/1999 to 30/04/2002*: researcher in the R&D department of a burner manufacturer company, *Infragas S.p.A.* (Caselle Torinese, Italy), jointly some EU project, with special role in the coordination of one of them (CATADRY, "Development of Catalytic Burners and of specifically adapted tunnels for the drying of lacquers and of stains"; HIMOCAT, "High-modulation, high-efficiency and low emission boilers for household application based on pre-mixed catalytic burner"; MINIREF, "Miniaturised gasoline fuel processor for fuel cell vehicle applications").
- *From 01/12/1996 to 30/11/1999*: responsible of the quality system management in *Messer Italia S.p.A.*, (Collegno, Italy) a German gas filling company.
- *From 01/06/1996 to 31/10/1996*: researcher in the R&D department of a foodstuff industry, *Allione Industria Alimentare S.p.A.* (Tarantasca, Italy), working on crio-milling and lyophilization process of aromatic herbs.



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- From 01/01/1996 to 31/05/1996: stage @ *Ecosicura s.a.s.* (Torino); risk analysis and fire prevention assessment according to Italian D.L. 626/94.
- From 01/06/1995 to 31/08/1995: stage @ *Clariant AG* (ex Sandoz Produkte AG, Basel, Switzerland); research activities on "Influence of particle size distribution on dispersion stability for different polyester fibres dyestuffs".

PUBLICATIONS on peer-reviewed international journals:

1. Saracco G., Specchia S., Specchia V. Catalytically-modified fly-ash filters for NO_x reduction with NH₃. *Chem. Eng. Sci.* 51/24 **1996** 5289-5297, doi: 10.1016/S0009-2509(96)00373-9
2. Ugues D., Specchia S., Saracco G. Optimal micro-structural design of a catalytic premixed FeCrAlloy fibre burner for methane combustion. *Ind. Eng. Chem. Res.* 43/9 **2004** 1990-1998, doi: 10.1021/ie034202q
3. Specchia S., Civera A., Saracco G. In-situ combustion synthesis of perovskite catalysts for efficient and clean methane pre-mixed metal burners. *Chem. Eng. Sci.* 59/22-23 **2004** 5091-5098, doi:10.1016/j.ces.2004.08.028
4. Civera A., Negro G., Specchia S., Saracco G., Specchia V. Optimal compositional and structural design of a LaMnO₃/ZrO₂/Pd-based catalyst for methane combustion., *Catal. Today* 100/3-4 **2005** 275-281, doi:10.1016/j.cattod.2004.09.062
5. Specchia S., Tillemans F.W.A., van den Oosterkamp P.F., Saracco G. Conceptual design and selection of a biodiesel fuel processor for a vehicle fuel cell APU. *J. Power Sources* 145/2 **2005** 683-690, doi:10.1016/j.jpowsour.2004.12.076
6. Specchia S., Icardi U.A., Specchia V., Saracco G. Compact direct methanol fuel cells for portable applications: a modeling study. *Int. J. Chem Eng. Reactor* 3 **2005** A24
7. Sgroi M., Bollito G., Saracco G., Specchia S. Biodiesel fuel processor for a fuel cell auxiliary power unit: study of the feed system. *J. Power Sources* 149 **2005** 8-14, doi: 10.1016/j.jpowsour.2004.12.059
8. Petrachi G.A., Negro G., Specchia S., Saracco G., Maffettone P.L., Specchia V. Combining catalytic combustion and steam reforming in an innovative multifunctional reactor for on-board hydrogen production from middle distillates. *Ind. Eng. Chem. Res.* 44/25 **2005** 9422-9430; doi: 10.1021/ie050215n
9. Cutillo A., Specchia S., Antonini M., Saracco G., Specchia V. Diesel fuel processor for PEM fuel cells: two possible alternatives (ATR vs. SR). *J. Power Sources* 154/2 **2006** 379-385; doi: 10.1016/j.jpowsour.2005.10.065
10. Szpyrkowicz L., Daniele S., Radaelli M., Specchia S. Removal of NO₃⁻ from water by electrocatalytic reduction. *Appl. Catal. B: Environ.* 66/1-2 **2006** 41-51; doi: 10.1016/j.apcatb.2006.02.020
11. Specchia S., Cutillo A., Saracco G., Specchia V. Concept study on ATR and SR fuel processors for liquid hydrocarbons. *Ind. Eng. Chem. Res.* 45/15 **2006** 5298-5307, doi: 10.1021/ie050709k
12. Specchia S., Civera A., Saracco G., Specchia V. Palladium/perovskite/zirconia catalytic premixed fiber burners for efficient and clean natural gas combustion. *Catal. Today* 117/4 **2006** 427-432, doi: 10.1016/j.cattod.2006.06.041
13. Specchia S., Negro G., Saracco G., Specchia V. Fuel processor based on syngas production via short-contact-time catalytic-partial-oxidation reactors. *Appl. Catal. B: Environ.* 70/1-4 **2007** 525-531, doi: 10.1016/j.apcatb.2005.10.030



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14. Specchia S., Galletti C., Fiorot S., Saracco G., Specchia V. CO preferential oxidation over Rh-supported catalyst in H₂-rich gas for fuel cell applications. *ECS Transactions* 5/1 **2007** 677-685, doi: 10.1149/1.2729049
15. Galletti C., Fiorot S., Specchia S., Saracco G., Specchia V. Activity of rhodium-based catalysts for CO preferential oxidation in H₂-rich gases. *Topics Catal.* 145/1-4 **2007** 15-19, doi: 10.1007/s11244-007-0233-8
16. Galletti C., Fiorot S., Specchia S., Saracco G., Specchia V. Catalytic performance of Au-TiO₂ catalysts prepared by deposition-precipitation for CO preferential oxidation in H₂-rich gases. *Chem. Eng. J.* 134/1-3 **2007** 45-50; doi: 10.1016/j.cej.2007.03.055
17. Specchia S., Ahumada Iribarra M.A., Palmisano P., Saracco G., Specchia V. Ageing of premixed metal fiber burners for natural gas combustion catalyzed with Pd/LaMnO₃/ZrO₂. *Ind. Eng. Chem. Res.* 46/21 **2007** 6666-6673; doi: 10.1021/ie061665y
18. Specchia S., Fontana G.J.R., Saracco G., Specchia V. Performance of an integrated SR fuel processor fed with hydrocarbon fuels. *Preprints Am. Chem. Soc., Div. Fuel Chem.*, 52-2 **2007** 347-348, ISSN: 0569-3772
19. Sgroi M., Bollito G., Innocenti G., Saracco G., Specchia S., Icardi U.A. Study of an electrochemical alcohol concentration sensor: optimization of the anode structure. *ASME J. Fuel Cell Sci. Techn.* 4/3 **2007** 345-349; doi: 10.1115/1.2756558
20. Galletti C., Specchia S., Saracco G., Specchia V. CO methanation as alternative refinement process for CO abatement in H₂-rich gas for PEM applications. *Int. J. Chem. Reaction Eng.* 5 **2007** A110
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112. Kostuch A., Gryboś J., Indyka P., Osmieri L., Specchia S.*, Sojka Z., Kruczała K.*, Morphology and Dispersion of Nanostructured Manganese-Cobalt Spinel on Various Carbon Supports: the Effect on the Oxygen Reduction Reaction in Alkaline Media, *Catal. Sci. & Tech.*, 8/2 (2018) 642-655, doi: 10.1039/C7CY02228J
113. Osmieri L.*, Escudero-Cid R., Armandi M., Ocón P., Monteverde Videla A.H.A., Specchia S.*, Effects of using two transition metals in the synthesis of non-noble electrocatalysts for oxygen reduction reaction. *Electrochimica Acta* 266 (2018) 220-232, doi: /10.1016/j.electacta.2018.02.036
114. Vita A.*, Italiano C., Ashraf M.A., Pino L., Specchia S., Syngas production by steam and oxy-steam reforming of biogas on monolith-supported CeO₂-based catalysts. *Int. J. Hydrogen Energy* 46/26 (2018) 11731-11744, doi: 0.1016/j.ijhydene.2017.11.140, available online 14/12/2017
115. Italiano C., Luchters N.T.J., Pino L., Fletcher J.V., Specchia S., Fletcher J.C.Q., Vita A., High specific surface area supports for highly active Rh catalysts: Syngas production from methane at high space velocity. *Int. J. Hydrogen Energy* 43/26 (2018) 11755-11765, doi: 10.1016/j.ijhydene.2018.01.136, available online 15/02/2018
116. Ashraf M.A.*, Sanz O., Montes M., Specchia S.*, Insights into effect of catalyst loading on methane steam reforming and controlling regime for metallic catalytic monoliths. *Int. J. Hydrogen Energy* 43/26 (2018) 11778-11792, doi: 10.1016/j.ijhydene.2018.04.126, available online 30/05/2018
117. Osmieri L.*, Zafferoni C., Wang L.Q., Monteverde Videla A.H.A., Lavacchi A., Specchia S.*, Polypyrrole-derived Fe-Co-N-C catalyst for oxygen reduction reaction: performance in alkaline hydrogen and ethanol fuel cells, *ChemElectroChem* 5 (2018) 1954-1965, doi: 10.1002/celec.201800420, available online 12/04/2018
118. Osmieri L., Pezzolato L., Specchia S.*, Recent trends on PGM-free catalysts for the oxygen reduction reaction in anion exchange membrane fuel cells, *Current Opinion in Electrochemistry*, in press (2018), doi: 10.1016/j.coelec.2018.05.011, available online 19/05/2018



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119. Alipour Moghadam Esfahani R., Ebralizde I., Specchia S., Easton E.B.*, A fuel cell catalyst support based on doped titanium suboxides with enhanced conductivity, durability and fuel cell performance, *J. Materials Chemistry A*, in press (**2018**), doi: 10.1039/C8TA02470G, available online 29/06/2018
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BOOK CHAPTERS:

1. Fino D., Specchia S., Saracco G., Specchia V. Catalytic filters for flue gas cleaning. Chapter 16 in *Structured Catalysts and Reactors*, 2nd edition, Cybulski A. and Moulijn J.A. Eds., Taylor & Francis Group, Boca Raton, FL, USA, **2006**, pp. 551-578; ISBN: 0-8247-2343-0
 2. Specchia S., Fino D., Saracco G., Specchia V. Inorganic membrane reactors. Chapter 18 in *Structured Catalysts and Reactors*, 2nd edition, Cybulski A. and Moulijn J.A. Eds., Taylor & Francis Group, Boca Raton, FL, USA, **2006**, pp. 615-661; ISBN: 0-8247-2343-0
 3. Specchia S., Saracco G. Clean and efficient catalytic combustion of natural gas. Chapter 13 in *Technological applications in wastewater engineering*. Editors Dr S.N. Kaul, Dr. L. Szpyrkowicz, Dr A. Gautam, Daya Publishing House, Delhi (India), **2009**; pp. 144-154, ISBN: 81-7035-553-2; 978-81-7035-553-3
 4. Specchia S., Finocchio E., Busca G., Specchia V. Combustion synthesis. Chapter 17 in Volume 5 “New Technologies” of *Handbook of Combustion*, M. Lackner, F. Winter, and A.K. Agarwal Eds., Wiley-VCH Verlag GmbH & Co., Weinheim (Germany), **2010**, pp. 439-472, ISBN 978-3-527-32449-1.
 5. Specchia S., Francia C., Spinelli P. Polymer Electrolyte Membrane Fuel Cells. Chapter 13 in *Electrochemical Technologies for Energy Storage and Conversion*, R.-S. Liu, L. Zhang, X. Sun, H. Liu, and J. Zhang Eds., Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, **2011**, pp. 599-668, ISBN: 978-3-527-328679
 6. Specchia S., Vella L.D., Montini P., Fornasiero P. Syngas production by short contact time catalytic partial oxidation of methane. Chapter 4 in *Hydrogen Production: Prospects and Processes*, D.R. Honnery and P. Moriarty Eds., Nova Science Publishers Inc., Hauppauge, NY, USA, **2012**, pp. 95-139, ISBN: 978-1-62100-246-8
 7. Monteverde Videla A.H.A., Osmieri L., Specchia S. Non-noble metal (NNM) catalysts for Fuel Cells: tuning the activity by a rational step by step single variable evolution. Chapter 3 in: *Electrochemistry of N4 Macrocyclic Metal Complexes, Volume 1: Energy*, F. Bedioui, J.H. Zagal Eds., Springer International Publishing AG, Switzerland, **2016**, pp. 69–101, DOI: 10.100/978-3-319-31172-2_3; ISBN 978-3-319-31170-8
 8. Coralli A., Sarruf B., V. de Miranda P.E., Osmieri L., Specchia S., Minh N.Q, (2018) “Fuel Cells”, Chapter 2, in: *Science and Engineering of Hydrogen-Based Energy Technologies*, 1st Edition, Ed. P.E. Valadao de Miranda (Ed.), Elsevier Inc. **2018**, pp. 39-122, DOI: 10.1016/B978-0-12-814251-6.00002-2; ISBN: 9780128142516
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PATENTS:

1. D'Arrigo G., Specchia S., Icardi U.A., Spinella C.R., Rimini E., Saracco G. “Sistema a microcelle a combustibile e relativo metodo di fabbricazione”. MI2009A001270, **2009**.
 2. D'Arrigo G., Specchia S., Icardi U.A., Spinella C.R., Rimini E., Saracco G. “Micro fuel cell system and corresponding manufacturing method”. US 2012/0122015 A1, **2012**.
-

CONGRESSES PARTICIPATIONS:



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She has 193 abstracts or proceedings presented at various national and international conferences within the *Gre.En² Group*. She personally attended 68 congresses (9 national and 59 international) for oral/poster presentations (19 keynote lectures, 44 oral, 23 poster):

ORAL/POSTER presentations:

1. Combustion and the Environment, 24th event of the Italian Section of the Combustion Institute, S. Margherita Ligure (Italy), **2001**, September 16-19:
Specchia S., Fassio D., De Pieri E., Saracco G. Catalytic VOCs abatement in domestic appliances (oral presentation).
2. Energy and the Environment 2003, Halkidiki (Greece), **2003**, May 14-16:
Bizzi M., Specchia S., Saracco G., Specchia V. Short contact time reactors for the production of hydrogen from methane (oral presentation).
3. 6th Italian Conference on Chemical and Process Engineering ICheaP-6, Pisa (Italy), **2003**, June 8-11:
Bizzi M., Specchia S., Saracco G. Flashback in premixed metal fibre burners and related control issues (oral presentation).
4. 4th European Congress of Chemical Engineering ECCE-4, Granada (Spain), **2003**, September 21-25:
Specchia S., Bizzi M., Saracco G., Specchia V. Effects of the mat structure on the performance of methane premixed burners (poster presentation).
5. IdrogenoExpo, Bologna (Italy), **2004**, February 4-7:
Specchia S., Saracco G. Produzione di idrogeno da combustibili fossili per celle a combustibile in impieghi stazionari e mobili - ricerca presso PoliTo (oral presentation).
Specchia S., Mutri L., Bertini S., Saracco G. EU project BIOFEAT: Biodiesel fuel processor for a fuel cell auxiliary power unit for a vehicle (poster presentation).
6. 9th Electrochemical Talks, Neu-Ulm (Germany), **2004**, May 17-18:
Cuttillo A., Specchia S., Antonini M., Saracco G., Specchia V. Diesel Fuel Processor for PEM Fuel Cells: two possible alternatives (ATR/SR) (poster presentation).
7. 18th International Symposium on Chemical Reaction Engineering, ISCRE 18, Chicago (IL, USA), **2004**, June 6-9:
Specchia S., Civera A., Saracco G. In-situ combustion synthesis of perovskite catalysts for efficient and clean methane pre-mixed metal burners (oral presentation).
8. Terzo Incontro Regionale H₂It, Torino (Italy), **2004**, June 15:
Specchia S., Saracco G. Progetti europei sull'idrogeno: ricerca presso il Politecnico di Torino, Dip. Scienza dei Materiali ed Ing. Chimica (oral presentation).
9. GRICU 2004 Congress, Porto d'Ischia (NA, Italy), **2004**, September 12-15:
Specchia S., Cuttillo A., Saracco G. Selection of a biodiesel fuel processor for a vehicle fuel cell APU (oral presentation)
10. Fuel Cells Science and Technology Conference 2004, Munich (Germany), **2004**, October 6-7:
Specchia S., Tillemans F.W.A., van den Oosterkamp P.F., Saracco G. Conceptual design and selection of a biodiesel fuel processor for a vehicle fuel cell APU (poster presentation).
11. 1st World Congress of Young Scientist on Hydrogen, HySyDays, Torino (Italy), **2005**, May 18-20:
Specchia S., Saracco G. Hydrogen from biodiesel: a fuel processor for a vehicle fuel cell auxiliary power unit (oral presentation).



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12. Chemical Reaction Engineering X: Innovation in Chemical Reactor Engineering CRE-X, Zacatecas (Mexico), **2005**, August 28 – September 02:
Specchia S., Icardi U.A., Specchia V., Saracco G. Compact direct methanol fuel cells for portable applications: a modeling study (oral presentation).
13. 6th International Workshop on Catalytic Combustion IWCC-6, Ischia (NA, Italy), **2005**, September 11-14:
Civera A., Specchia S., Saracco G., Specchia V. Palladium/perovskite/zirconia catalytic premixed fiber burners for efficient and clean natural gas combustion (oral presentation).
14. 9th Grove Fuel cells Symposium, London (United Kingdom), **2005**, October 4-6:
Specchia S., Tillemans F.W.A., Sgroi M., Bollito G., Kraaij G.J., Saracco G. Detailed and process design of a biodiesel fuel processor for a vehicle fuel cell APU (poster presentation).
15. Indo-Italian Workshop on Indo-Italian Brain Storming Workshop On Technology Transfer For Industrial Application of Novel Methods and Materials for Environmental Problems, Pune (India), **2005**, December 5-6:
Specchia S., Saracco G. Clean and efficient catalytic combustion of methane (oral presentation).
16. 12th Nordic Symposium on Catalysis, Trondheim (Norway), **2006**, May 28-30:
Galletti C., Fiorot S., Specchia S., Saracco G., Specchia V. Activity of rhodium-based catalysts for CO preferential oxidation in H₂-rich gases (poster presentation).
17. First Mediterranean Congress on Chemical Engineering for Environment 1st MCCEE, Venezia (Italy), **2006**, October 4-6:
Ahumada Iribarra M.A., Specchia S., Saracco G., Specchia V. Combustion of natural gas on premixed metal fibre burners catalysed with Palladium/Perovskite/Zirconia (oral presentation).
18. 22nd International Battery, Hybrid and Fuel Cell Electric Vehicle Conference and Exhibition EVS-22, Yokohama (Japan), **2006**, October 23-28:
Specchia S., Saracco G., Tillemans, F.W.A., Kraaij G.J., Sgroi M., Bollito G. BIOFEAT: biodiesel fuel processor for an A.P.U. (poster session)
19. 30th Fuel Cell Seminar 2006, Honolulu (HA, USA), **2006**, November 13-17:
Specchia S., Saracco G., D'Arrigo G.F., Spinella C., Sgroi M., Bollito G. Micro DMFC for portable applications realised with MEMS technologies (poster session).
20. NIS Colloquium "Nanostructured Materials for H₂ Production and Purification", Torino (Italy), **2007**, March 9:
Specchia S., Specchia V. Catalytic materials for H₂ gas purification: from powdered to micro-structured catalysts (oral presentation).
21. 3rd European Combustion Meeting ECM2007, Chania, Crete (Greece), **2007**, April 13-17:
Reynier E., Specchia S., Saracco G., Specchia V. Syngas production via short contact time catalytic partial oxidation reactors based on Rh catalysts (poster session).
22. IHEC'07 2nd International Hydrogen Energy Congress and Exhibition, Istanbul (Turkey), **2007**, July 13-15:
Fontana G.J.R., Specchia S., Saracco G., Specchia V. Modelling of an APU system based on MC-FC (oral presentation).
23. ACS 234th National Meeting and Exposition, Boston (MA, USA), **2007**, August 19-23:
Specchia S., Fontana G.J.R., Saracco G., Specchia V. Performance of an integrated SR fuel processor fed with hydrocarbon fuels (oral presentation).
24. 31st Fuel Cell Seminar 2007, San Antonio (TX, USA), **2007**, October 15-19:



- Galletti C., Specchia S., Saracco G., Specchia V. CO methanation as a clean-up final step for reformat hydrogen rich gases (poster session).
25. International Symposium on "Catalysis for Clean Energy and Sustainable Chemistry CCESC Madrid (Spain), **2008**, June 17-20:
Specchia S., Finocchio E., Busca G., Saracco G. Effect of S-compounds on Pd over LaMnO₃·2ZrO₂ and CeO₂·2ZrO₂ catalysts for natural gas combustion (oral presentation);
 Villoria J.A., Álvarez-Galván M.C., Navarro R.M., Palmisano P., Specchia S., Specchia V., Rosa F., Fierro J.L.G. LaCoO₃ perovskite as precursor of catalysts for hydrogen production by diesel oxidative reforming: influence of the synthesis method (poster session);
26. Pre-ICC14 Symposium, Kyoto (Japan), **2008**, July 8-12:
Specchia S., Vella L.D., Burelli S., Saracco G., Specchia V. CH₄/H₂/air mixtures combustion in catalytic microreactors (oral presentation);
 Galletti C., Bernardi C., Specchia S., Saracco G., Specchia V. Gold-supported catalysts for WGS reaction (poster session).
27. 14th International Congress on Catalysis, 14-ICC, Seoul (Korea), **2008**, July 13-18:
Specchia S., Palmisano P., Saracco G., Finocchio E., Busca G. On the ageing mechanisms of Pd/CeO₂·2ZrO₂ catalyst for CH₄ combustion (poster session);
 Galletti C., Specchia S., Saracco G., Specchia V. Ru-based catalysts for CO methanation (poster session).
28. 20th International Symposium on Chemical Reaction Engineering ISCRE 20, Kyoto (Japan), **2008**, September 7-10:
Specchia S., Palmisano P., Finocchio E., Busca G., Saracco G. Ageing mechanisms on PdO_x catalysts for natural gas combustion in premixed burners (oral presentation);
 Galletti C., Specchia S., Saracco G., Specchia V. CO-selective methanation over Ru-Al₂O₃ catalysts in H₂-rich gas for PEM FC applications (oral presentation).
29. Convegno G.R.I.C.U. 2008, Le Castella (KR, Italia), **2008**, September 14-17:
 Vella L.D., Specchia S., De Rogatis L., Montini T., Fornasiero P., Saracco G., Specchia V. Rh-based SCT-CPO reactors for syngas production (oral presentation);
Specchia S., Finocchio E., Busca G., Saracco G. Studies on ageing mechanisms of Pd/LaMnO₃·2ZrO₂ (oral presentation).
30. 32nd Fuel Cell Seminar 2008, Phoenix (AZ, USA), **2008**, October 27-31:
Specchia S., Icardi U.A., Spinella C.R., Baglio V., D'Urso C., Stassi A., Aricò A.S., Antonucci A., D'Arrigo G. Planar structure μ DMFCs (poster session);
 Galletti C., Specchia S., Saracco G., Specchia V. Pt-based catalysts for MT-WGS reaction for PEM-FC applications (poster session);
 Gavello G., Ambrosio E.P., Icardi U.A., Specchia S., Penazzi N., Specchia V., Saracco G. Effect of freezing on PEM-FC components (poster session);
 Mulas G., Penazzi N., Lucariello M., Dumitrescu M.A., Specchia S. Nanostructured bimetallic alloys prepared via mechanic-chemical synthesis as PEMFC electrocatalysts for transport applications (poster session);
 Ambrosio E.P., Francia C., Specchia S., Spinelli P., Manzoli M. Synthesis of carbon supports for catalytic applications in PEMFC (poster session).
31. Hydrogen and Fuel Cells 2009, Vancouver (BC, Canada), **2009**, May 31 / June 3:
 Gavello G., Francia C., Specchia S., Icardi U.A., Graizzaro A., Penazzi N., Specchia V., Spinelli P. Effects of sub-freezing temperature on PEMFC performance (oral presentation).



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32. 6th World Congress on Oxidation Catalysis 6WCOC, Lille (France), **2009**, July 5-10:
Specchia S., Burelli S., Vella L.D., Specchia V. Catalytic combustion of CH₄ and H₂ into micro-monoliths (oral presentation).
33. 8th World Congress on Chemical Engineering, 8WCCE & Camure-7, Montreal (QB, Canada), **2009**, August 23-27:
Specchia S., Vella L.D., De Rogatis L., Montini T., Specchia V., Fornasiero P. Effect of the catalyst load on syngas production in SCT-CPO reactors (oral presentation).
34. International Congress on Structured Catalysts and Reactors, ICOSCAR-3 Ischia (NA, Italy), **2009**, September 27-30:
Specchia S., Toniato G. Natural gas combustion catalysts for environmental-friendly domestic burners (oral presentation).
35. 11th International Conference on Microreaction Technology, IMRET 11, Kyoto (Japan) **2010**, March 8-10:
Specchia S., Tacchino S., Vella L.D., Specchia V. Facing the catalytic combustion of CH₄/H₂ mixtures into Monoliths (oral presentation);
Galletti C., Specchia S., Specchia V. CO selective methanation in H₂-rich gas for fuel cell application: Microchannel reactor performance with Ru-based catalysts (poster presentation).
36. 21st International Symposium on Chemical Reaction Engineering, ISCRE21, Philadelphia (PA, USA) **2010**, June 13-16:
Specchia S., Rossati A., Conti F., Specchia V. Kinetic studies on Pd/CeO₂ZrO₂ catalyst for methane combustion (oral presentation).
37. The Sixth Tokyo Conference on Advanced Catalytic Science and Technology, TOCAT6, Sapporo (Japan) **2010**, July 18-23:
Djinović P., Galletti C., Specchia S., Specchia V. Ru-based catalysts for CO selective methanation reaction in H₂-rich gases (oral presentation);
Specchia S., Finocchio E., Busca G., Specchia V. Surface chemical studies of fresh and aged Pd/BaCeO₃·ZrO₂ catalyst for methane combustion (poster presentation).
38. 2nd International Symposium on Air Pollution Abatement Catalysts, APAC 2010, Krakow (Poland) **2010**, September 8-11:
Vella L.D., Specchia S., Specchia V. Alumina-supported Nickel catalysts for catalytic partial oxidation of methane in SCT reactors (oral presentation);
Djinović P., Galletti C., Specchia S., Batista J., Levec J., Pintar A., Specchia V. Influence of the preparation method on the performance of Rh catalysts on CeO₂ for WGS reaction (oral presentation).
39. GEI-ERA 2012, Salina (MS, Italy), **2012**, June 17-22:
Specchia S., D'Urso C., Baglio V., Antonucci A., Aricò A.S., Icardi U.A., Saracco G., Spinella C.R., D'Arrigo G. Development of planar μ -DMFCs (oral presentation).
40. 9th International Conference on Mechanisms of Catalytic Reactions, IX-MCR 2012, St. Petersburg (Russia) **2012**, October 22-25:
Finocchio E., Specchia S. Sulphur ageing mechanisms on Pd/BaCeO₃·2ZrO₂ catalyst for natural gas combustion (oral presentation).
41. 3rd North American Symposium on Chemical Reaction Engineering, NASCRE3, Houston (TX, USA) **2013**, March 15-17:
Amjad U., Galletti C., Vita A., Pino L., Specchia S. A comparative study on hydrogen production from steam and oxidative steam reforming of methane with noble metals (oral presentation).
42. XIV^e Congrès de la Société Française de Génie des Procédés, Lyon (France), **2013**, October 8-10:



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- Specchia S., Aricò A.S., Jones D., Schuster M., Sgroi V., Gasteiger H.A., Bonde J.L., Cros N., Tsoitridis G. DURAMET: improved durability and cost-effective components for new generation solid polymer electrolyte direct methanol fuel cells (poster presentation).
43. SMAU Smart City Road Show: Smart Communities and Social Innovation, Torino (Italy), **2014**, May 14-15:
Picco C., Specchia S. Smart Hospital a Orbassano: energia a Km zero dai rifiuti sanitari: raccolta “smart”, sterilizzazione e valorizzazione energetica (oral presentation).
44. 6th Forum on New Materials - CIMTEC2014, Montecatini Terme (PT, Italy), **2014**, June 15-19:
Vasile N.S., Monteverde Videla A.H.A., Specchia S. 3D Direct Methanol Fuel Cell (DMFC) validation model for analysing new materials and components (oral presentation).
45. International Symposium on Air & Water Pollution Abatement Catalysis - AWPAC2014, Krakow (Poland), **2014**, September 1-5:
Farin B., Monteverde Videla A.H.A., Specchia S., Gaigneaux E.M. Bi_xMo_yO_z catalysts prepared by solution combustion synthesis for the oxidative dehydrogenation of propane (oral presentation).
46. AIChE Annual Meeting, Atlanta (GA, USA), **2014**, November 16-21:
Vita A.S., Cristiano G., Italiano C., Pino L., Specchia S. Biogas steam and oxy-steam reforming reactions over Me/CeO₂-based (Me = Rh, Pt, Ni) structured cordierite monoliths (oral presentation) → **awarded as best oral presentation.**
47. EmHyTeC-2014, Euro-Mediterranean Hydrogen Technologies Conference, Taormina (Italy), **2014**, December 9-12:
Ercolino G., Ashraf M.A., Specchia, V., Specchia S. Performance of SR or ATR fuel processors integrated with WGS and PSA units for hydrogen production (poster presentation).
48. International Conference on Electrochemical Energy Science and Technology EEST2015, Vancouver (BC, Canada), **2015**, August 16-22:
Alipour Moghadam Esfahani R., Monteverde Videla A.H.A., Vankova S., Specchia S. Influence of the metallic Ni- or Mo- precursors in the synthesis of Ti₃O₅ as potential support for methanol tolerant ORR Pt-based catalysts (oral presentation);
Monteverde Videla A.H.A., Osmier L., Ercolino G., Stelmachowski P., Kotarba A., Specchia S. Mesoporous cobalt oxide for oxygen evolution reaction under alkaline conditions: a comparative study of three synthesis methods (oral presentation).
49. AIChE Annual Meeting, Salt Lake City (UT, USA), **2015**, November 8-13:
Vita A.S., Ashraf M.A., Italiano C., Fabiano C., Pino L., Specchia S. “Syngas production by biogas Steam and Oxy Steam Reforming processes on Rh/CeO₂ catalyst coated on ceramics monolith and open foams.” (oral presentation) → **awarded as best oral presentation.**
Ashraf M.A., Ercolino G., Specchia V., Specchia S. Sensitivity analysis of Fuel Processors based on SR integrated with WGS and PSA for pure Hydrogen production from Natural Gas. (oral presentation).
50. ICOSCAR5, San Sebastian (Spain), **2016**, June 22-24:
Ashraf M.A., Sanz O., Montes M., Specchia S., Ru/La-Al₂O₃ washcoated monoliths for methane steam reforming (poster presentation).
51. International Conference on Electrochemical Energy Science and Technology EEST2016, Kunming (P.R. China), **2016**, August 16-22:
Monteverde Videla A.H.A., Jakubek T., Stelmachowski P., Kotarba A., Specchia S. Controlled potassium nanostructuring of cobalt and manganese oxide based electrocatalyst toward oxygen evolution reaction in alkaline media (oral presentation).
52. Hydrogen - POWER THEoretical and Engineering Solutions International Symposium HYPOTESIS XII, Siracusa (Italy), **2017**, June 28-30:



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Alipour Moghadam Esfahani R., Rivera Gavidia L.M., Garcia G., Pastor E., Specchia S. Platinum supported Mo-doped titanium nanotubes suboxide (Pt/TNTS-Mo) as an innovative carbon-free electrocatalyst for ORR in PEMFC (oral presentation);

Ashraf M.A., Sanz O., Specchia S., Montes M. Insight into effect of catalyst loading on methane steam reforming and controlling regime in metallic catalytic monoliths (oral presentation).

KEYNOTE LECTURES at international congresses or workshops:

1. PEMFC Freeze Technical Workshop @ *Nuvera Fuel Cells Inc*, Billerica (MA, USA), **2009**, February 20:
Effects of Sub-Freezing Temperature on PEMFC Performance (invited lecture), *reference Dr James Cross*.
2. NEST International Conference, Tours (France), **2009**, May 26-27:
 μ DMFCs @ Politecnico di Torino: recent developments (keynote lecture), *reference Dr Marie-Pierre Sajot*
3. XVII Congreso Chileno de Ingenieria Quimica, Vina del Mar (Chile), **2009**, October 25-28:
Durability of PEM-FCs: studies on freezing conditions and H₂ crossover (keynote lecture), *reference Prof. Carlos Carlesi Jara*
4. Indo-Italian Conference on Emerging Trends in Waste Management Technologies ETWMT-2009, Pune (India), **2009**, December 3-4:
The use of hydrogen as clean energy vector (keynote lecture), *reference Prof. Dr. Santhos N. Kaul*
5. 5th Annual International Conference on Fuel Cells Durability & Performance, Alexandria (VA, USA), **2009**, December 8-9:
Effect of freezing/thawing cycles on the performance of PEM fuel cells (keynote lecture), *reference Dr. Serge Pann*
6. 10th International Symposium on the Scientific Bases for the Preparation of Heterogeneous Catalysts, PREPA10, Louvain-la-Neuve (Belgium) **2010**, July 11-15:
Solution combustion synthesis as intriguing technique to quickly produce performing catalysts for specific applications (extended oral), *reference Prof. Eric M. Gaigneaux*
7. 2nd International Symposium on Air Pollution Abatement Catalysts, APAC 2010, Krakow (Poland) **2010**, September 8-11:
Hydrocarbons valorisation to cleaner fuels: H₂-rich gas production via fuel processors (keynote lecture), *reference Prof. Patrick Da Costa*
8. International Congress on Climate Change ICC-2010, *Osmania University*, Hyderabad (India) **2010**, December 9-11:
R&D activities on Fuel Cells at Politecnico di Torino (keynote lecture), *reference Prof. Janardhan Reddy*
9. International Conference on Electrochemical Materials and Technologies for Clean Sustainable Energy, CSE-2013, Guangzhou (P.R. China), **2013**, July 5-9:
Improved durability and cost-effective components for new generation solid polymer electrolyte DMFCs (keynote lecture), *reference Prof. Pei Kan Shen*
10. AIChE Annual Meeting Global Challenges for Engineering a Sustainable Future, San Francisco (CA, USA), **2013**, November 3-8:
Fuel processing activities at European level: a panoramic overview (keynote lecture), *reference Dr. Gunther Kolb*



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11. Korea-Italy Bilateral Symposium “Hydrogen and Fuel Cells: current issues and perspectives”, Korea Institute of Science & Technology (KIST), Seoul (South Korea), **2015**, April 21-22:
Influence of the morphology of Fe-N-C electrocatalysts for promoting the oxygen reduction reaction by using iron phthalocyanine precursor and different SiO₂ templates” (keynote lecture), *reference Dr. Suk Woo Nam and Prof. Francesco Canganella*
12. HYCELTEC 2015, V Iberian Symposium on Hydrogen, Fuel Cells and Advanced Batteries, Tenerife (Spain), **2015**, July 5-8:
Optimization of a Fe-N-C electrocatalyst supported on ordered mesoporous carbon functionalized with polypyrrole for oxygen reduction reaction (keynote lecture), *reference Prof. Elena M. Pastor Tejera.*
13. International Conference on Electrochemical Energy Science and Technology EEST2015, Vancouver (BC, Canada), **2015**, August 16-22:
3D multi-physic modeling and validation of a gas diffusion electrode for analysing transport and kinetic phenomena of noble and non-noble based catalysts for PEMFC (keynote lecture), *reference Dr JiuJun Zhang.*
14. International Conference on Electrochemical Energy Science and Technology EEST2016, Kunming (P.R. China), **2016**, August 16-22:
Highly active and stable Pt-(NbO)_x/MWCNT catalysts for oxygen reduction reaction in PEMFC (keynote lecture), *reference Dr JiuJun Zhang.*
15. European Materials Research Society E-MRS 2016 Fall Meeting, Symposium Q “Advanced materials for fuel cells and electrolyzers”, Warsaw (Poland), **2016**, September 19-22:
Insights of Fe-N-C electrocatalysts for ORR prepared by sacrificial method: from RDE to DAFC single cell testing (invited lecture), *reference Dr Claudia D’Urso.*
16. HySA/Catalysis 2016 Workshop, Cape Town (South Africa), **2016**, October 25-27:
Fuel processors for the production of H₂-rich streams: CO-PROX or CO-SMET as best CO clean-up step? (keynote lecture), *reference Dr Niels Luchters and Prof. Jack Fletcher.*
17. Simpósio Matéria 2016, Rio de Janeiro (Brazil), **2016**, November 27 – December 3:
Designing non-noble metal catalysts for PEMFC and DMFC (keynote lecture), *reference Prof. Paulo Emilio V. de Miranda.*
18. HYCELTEC 2017, VI Iberian Symposium on Hydrogen, Fuel Cells and Advanced Batteries, Porto (Portugal), **2017**, June 19-23:
M–M’–N–C (M, M’ = Fe, Co, Cu, Zn) catalysts for oxygen reduction reaction derived from transition metal phthalocyanines: on the beneficial effects of using two metals (keynote lecture), *reference Prof. José Sousa.*
19. 5th International Symposium on Advanced Vehicle Energy Concepts and Structures, 5th AVECS, Oshawa (ON, Canada), **2017**, September 18-19:
PGM-free catalysts for PEFC (keynote lecture), *reference Prof. Justin Gammage.*

INVITED TALKS at international universities or research centres:

1. Department of Chemical and Biochemical Engineering, Faculty of Engineering, *The University of Western Ontario*, London (ON, Canada), **2006**, August 24:
Hydrogen and Fuel Cells at the Politecnico di Torino (invited lecture), *reference Prof. Franco Berruti*
2. Department of Applied Chemistry Graduate School of Urban Environmental Sciences, *Tokyo Metropolitan University*, Tokyo (Japan), **2008**, September 5:



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- Research activities at Politecnico di Torino on fuel processors for H₂ production from syngas to CO clean-up (invited lecture, 276th Applied Chemistry Colloquium), *reference Prof. Masatake Haruta*
3. Department of Mechanical Engineering, Faculty of Science and Technology, *Tokyo University of Science*, Tokyo (Japan), **2008**, September 11:
Research activities at Politecnico di Torino on fuel processors for H₂ production from syngas to CO clean-up (invited lecture), *reference Prof. Masanori Hayase*
 4. Institute for Fuel Cell Innovation, *National Research Council of Canada*, Vancouver (BC, Canada), **2009**, June 5:
Research activities @ Politecnico di Torino on Fuel Processors for H₂ production: from syngas to CO clean-up (invited lecture), *reference Dr JiuJun Zhang, Dr Mashid Karimi*
 5. Department of Chemical and Biochemical Engineering, Faculty of Engineering, *The University of Western Ontario*, London (ON, Canada), **2009**, August 28:
Overview on various possible uses of the natural gas at Politecnico di Torino (invited lecture), *reference Prof. Franco Berruti*
 6. IChE *Indian Institute of Chemical Engineering*, Mumbai (India), **2009**, December 4:
Research activities on hydrogen and fuel cells @ Politecnico di Torino (invited lecture), *reference Dr. Dhawal Saxena*
 7. Instituto de Quimica, *Universidade de Sao Paulo*, Sao Paulo (SP, Brasil), **2011**, August 11:
Advanced research activities @ Politecnico di Torino on Low-Temperature Fuel Cells (invited lecture), *reference Prof. Roberto M. Torresi*
 8. Centro de Tecnologia COPPE, *Universidade Federal de Rio de Janeiro*, Rio de Janeiro (RJ, Brasil), **2011**, September 1:
Advanced research activities @ Politecnico di Torino on Syngas production and CO Clean-Up (invited lecture), *reference Prof. Martin Schmal*
 9. Institute for Fuel Cell Innovation, *National Research Council of Canada*, Vancouver (BC, Canada), **2011**, November 14:
Advanced research activities @ Politecnico di Torino on Low-Temperature Fuel Cells (invited lecture), *reference Dr. JiuJun Zhang*
 10. Faculty of Chemistry, *Ural Federal University*, Ekaterinburg (Russia), **2011**, December 16:
Advanced research activities @ Politecnico di Torino on Low-Temperature Fuel Cells (invited lecture), *reference Prof. Vladimir Cherepanov*
 11. College of Materials Science and Engineering, *China Jiliang University*, Hangzhou (Zhejiang, P.R. China), **2012**, November 9:
An intriguing technique to prepare catalysts: solution combustion synthesis (invited lecture), *reference Prof. Yuexiang Huang*
 12. Department of Chemical Engineering, *Delft University of Technology*, Delft (The Netherlands), **2013**, January 28:
Mesoporous carbon supported non-noble metal Fe–N_x electrocatalysts for PEMFC ORR (invited lecture), *reference Prof. Ger J.M. Koper*.
 13. Faculty of Chemistry, *Jagellonian University in Krakow*, Krakow (Poland), **2014**, March 7:
An intriguing technique to prepare catalysts: solution combustion synthesis (invited lecture), *reference Prof. Andrzej Kotarba*
 14. Department of Materials Science, *Westphalian University of Applied Sciences*, Gelsenkirchen (Germany), **2014**, August 7:



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- Advanced research activities @ Politecnico di Torino on Low-Temperature Fuel Cells (invited lecture), *reference Prof. Michael Brodmann.*
15. Department of Energy System Engineering, *Daegu Gyeongbuk Institute of Science & Technology* (DGIST), Daegu (South Korea), **2015**, April 23:
Towards new possible correlations between ORR activity and electro-donor properties of Pt/C-based catalysts for PEMFC (invited lecture), *reference Prof. Hasuck Kim and Prof. Jong Sung Yu.*
 16. Department of Physical Chemistry, *Universidad de La Laguna*, Santa Cruz de Tenerife (Spain), **2015**, July 9:
Towards new possible correlations between ORR activity and electro-donor properties of Pt/C-based catalysts for PEMFC (invited lecture), *reference Prof. Elena M. Pastor Tejera*
 17. Department of Chemical and Biological Engineering, *The University of British Columbia*, Vancouver (BC, Canada), **2015**, August 13:
Development and characterization of non-noble-based electrocatalysts for ORR and OER (invited lecture), *reference Prof. David P. Wilkinson*
 18. College of Environmental Science and Engineering, *Donghua University*, Shanghai (P.R. China), **2017**, May 16:
Design of non-noble metal catalysts for ORR in low-temperature fuel cells (invited lecture), *reference Prof. Jinli Qiao*
 19. Institute of Advanced Technologies for Energy “Nicola Giordano” (ITAE), *Consiglio Nazionale delle Ricerche* (CNR), Messina (Italy), **2017**, July 3:
Towards new possible correlations between ORR activity and electro-donor properties of Pt/C-based catalysts for PEMFC (invited lecture), *reference Dr. Salvatore Freni*
 20. School of Engineering, Centre for Clean Energy and Environment, *University of Connecticut*, Storrs (CT, USA), **2017**, August 7:
Designing PMG-free catalysts for DMFC and PEMFC (invited lecture), *reference Prof. Radenka Maric*
 21. *National Renewable Energy Laboratory*, Golden (CO, USA), **2017**, September 1:
Insights on PEFC R&D activities @ POLITO: alternative catalysts to Pt/C for ORR & multiphysic modelling issues (invited lecture), *reference Dr Bryan Pivovar*
 22. Institute of Technology, *University of Ontario*, Oshawa (ON, Canada), **2017**, September 20:
Development of highly active and stable low-Pt content and C-free catalysts for the oxygen reduction reaction (invited lecture), *reference Prof. E. Brad Easton*
 23. Kyoto Institute of Technology, Kyoto (Japan), **2018**, May 16:
Oxygen reduction reaction in PEFC: low-Pt content, PGM-free, and C-free catalysts, *reference Prof. Naoto Tsutsumi*

Ph.D. & M.Sc. EVALUATION:

Member of the Evaluation Committee and final defence of the following PhD thesis:

1. PhD candidate *Mrs Marta Radaelli*, “Applicazione dei processi elettrochimici per la rimozione di inquinanti” (supervisor Prof. Lidia Szyrkowicz), PhD course in Environmental Science, *Università Cà Foscari*, Venezia (Italy), **December 2007** (Committee on 11/12/2007 @ Venezia)
2. PhD candidate *Mrs Reine Abbas Ghaleb*, “Production d’énergie propre à partir d’une source renouvelable: combustion catalytique du biogaz” (supervisors Proff. Patrick Gelin and Edouard



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- Garbowski), PhD course in Chemistry, *Université Claude Bernard Lyon 1*, Villeurbanne (France), **March 2008** (Committee on 28/03/2008 @ Villeurbanne).
3. PhD candidate *Mrs Xuyen Kim Phan*, “Catalyst formulations for use in microstructured reactors for conversion of synthesis gas to liquids” (supervisors Proff. Anders Holmen and Hilde Venvik), PhD course in Chemical Engineering, *Norwegian University of Science and Technology*, Trondheim (Norway), **January 2011** (Committee on 14/01/2011 @ Thronheim).
 4. PhD candidate *Mr Dario Livio*, “Catalytic partial oxidation of light hydrocarbons: experimental and modeling study in autothermal lab-scale reformer” (supervisors Proff. Alessandra Beretta and Gianpiero Groppi), PhD course in Chemical Engineering, *Politecnico di Milano*, Milano (Italy), **February 2013** (Committee on 21/02/2013 @ Milano).
 5. PhD candidate *Mr Benjamin Farin*, “An organic-inorganic route toward NiMoO₄ more efficient in the propane oxidation” (supervisors Proff. Eric. M. Gaigneaux and Michel Devillers), PhD course in Biological, Agricultural and Environmental Engineering, *Université Catholique de Louvain*, Louvain-la-Neuve (Belgium), **April 2014** (Committee on 03/04/2014 @ Louvain-la-Neuve).
 6. Ph.D. candidates *Mr Roberto Cagliero*, “Macro instrumented indentation test for structural materials: experimental and numerical methods” (supervisors Proff. Giulio Barbato and Giovanni Maizza), and *Mrs Enrica Pessana*, “Reference gas mixtures of atmospheric pollutants: production and utilization in condition of metrological traceability” (supervisors Proff. Massimo Santarelli and Michela Sega), Ph.D. course in Metrology Measuring Science and Technique, *Politecnico di Torino*, Torino (Italy), **April 2016** (Committee on 29/04/2016 @ Torino).
 7. Ph.D. candidate *Mr Matteo Testi*, “Novel methods and models to validate H₂ storage in solid state materials” (supervisor Dr Luigi Crema), Ph.D. course in Physics, *Università degli Studi di Trento*, Trento (Italy), **February 2017** (Committee on 17/02/2017 @ Trento).
 8. Ph.D. candidate *Mr Pedram Aghaei*, “Experimental and numerical investigation of heat transfer for the structured reactor with open-cell metal foams” (supervisors Proff. Enrico Tronconi and Gianpiero Groppi), Ph.D. course in Industrial Chemistry and Chemical Engineering, *Politecnico di Milano*, Milano (Italy), **February 2017** (Committee on 24/02/2017 @ Milano).
 9. Ph.D. candidate *Mr Pouya H. Moud*, “Catalytic conversion of undesired organic compounds to syngas in biomass gasification and pyrolysis applications” (supervisor Prof. Klas Engvall), Ph.D. course in Chemical Engineering, School of Chemical Science and Engineering, *KTH Royal Institute of Technology*, Stockholm (Sweden), **September 2017** (Committee on 29/09/2017 @ Stockholm).
 10. Ph.D. candidates *Mr Andrea Perego*, “Nanostructured titanium nitride by pulsed laser deposition as support for fuel cell catalysts” (supervisor Proff. Renzo Marchesi and Andrea Casalegno) and *Mr Claudio Rabissi*, “DMFC local performance investigation for optimized durability” (supervisor Proff. Renzo Marchesi and Andrea Casalegno), Ph.D. course in Energy and Nuclear Science and Technology, *Politecnico di Milano*, Milano (Italy), **May 2018** (Committee on 25/05/2018 @ Milano).
 11. Ph.D. candidate *Mrs Mahrokh Samavati*, “Design and analysis of solid oxide electrolysis-based systems for synthetic liquid fuels production” (supervisors Proff. Massimo Santarelli and Andrew Martin), Ph.D. course in Energetics, *Politecnico di Torino & KTH Royal Institute of Technology*, Torino (Italy), **June 2018** (Committee on 08/06/2018 @ Torino).

Evaluation of PhD thesis only:

1. PhD candidate *Mr Diego Scognamiglio*, “Produzione decentralizzata di idrogeno tramite reforming autotermico del metano” (supervisor Prof. Pier Luca Maffettone), PhD course in Chemical Engineering, *Università di Napoli Federico II*, Napoli (Italy), **October 2008**.



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2. PhD candidate *Mrs Kiran Singh*, “Studies of removal of volatile organic compounds (VOCs) using biofilters” (supervisor Prof. Birendra Rai), PhD course in Biochemical Engineering, *Banaras Hindu University*, Varanasi (India), **June 2011**.
3. PhD candidate *Mrs Sonia Ascaso*, “Noble metal free catalysts for the simultaneous removal of soot and NOx from diesel engines” (supervisors Proff. M^a Jesús Lázaro Elorri and Rafael Moliner), PhD course in Chemical Engineering, *Universidad de Zaragoza* (Spain), **April 2015**.
4. PhD candidate *Mrs Maidhily M.*, “Synthesis of structure tailored metal oxide nanostructures and their application in low temperature fuel cells” (supervisors Prof. Dr. K.S. Dhathathreyan, Prof. Dr. D. Arivuoli), PhD course in Chemical Engineering, *Anna University*, Chennai (India), **October 2015**.
5. PhD candidate *Mr Ee Teng Kho*, “Capturing the attributes of reducible oxides for steam reforming and methanation reaction” (supervisor Prof. Rose Amal), PhD course in Chemical Engineering, *The University of New South Wales*, Sidney (Australia), **October 2016**.
6. PhD candidate *Mrs Daniela Barba*, “Simultaneous production of H₂ and sulphur by catalytic oxidative decomposition of H₂S” (supervisor Prof. Vincenzo Palma), PhD course in Industrial Engineering, *Università degli Studi di Salerno*, Fisciano (Italy), **January 2018**.
7. PhD candidate *Mr Ramin Khezri*, “Gasification of napier grass in an auto-thermal fluidized bed gasifier” (supervisors Proff. Wan Azlina and Wan Abdul Karim Ghani), PhD course in Industrial Engineering, *Universiti Putra Malaysia*, Serdang (Malaysia), **April 2018**.

Evaluation of M.Sc. thesis only:

1. M.Sc. candidate *Mr Darryl Edward Brown*, “Kinetic models for the Pt/CeO₂ catalysed water-gas shift reaction” (supervisor Prof. Jack C.Q. Fletcher), M.Sc. course in Chemical Engineering, *University of Cape Town*, Cape Town (South Africa), **October 2017**.
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