

PERSONAL INFORMATION

Andrea Lanzini

WORK EXPERIENCE

09/12/2015–Present

Assistant Professor

Politecnico di Torino,

Senior member of the STEPS "Synergies of thermochemical and electrochemical power systems"

Work-package leader EU Project 'DEMOSOFC' (www.demosofc.eu)

Coordination of design activities, energy analysis and techno-economic optimization of SOFC-based plant fed on biogas from sewage sludge.

01/07/2011–08/12/2015

Post-doc research fellow

Politecnico di Torino,

Post-doc researcher at the Energy Department of Politecnico di Torino. Research activity: electrochemical and thermochemical systems for energy (Research Group: 'STEPS, Synergies of thermochemical and electrochemical power systems').

Research about fuel cells systems for combined production of power and heat with carbon capture. Particular focus has been devoted to solid oxide fuel cells fed on coal, biosyngas and biogas from wastes.

1) 2011-2012: PRIN 2008 "Experimental analysis and energy performance evaluation of SOFC cells fed on biogas";

2) 2012-2013: PRIN 2009 "Experimental analysis of SOFC cells fed on coal syngas with carbon capture";

3) 2012-2014: EU project FCH-JU SOFCOM.

4) 2014-2015: EU Project FCH-JU SOFCOM e DEMOSOFC.

15/06/2007–31/01/2008

Research fellow

Politecnico di Torino,

Research Fellow at the Energy department from Politecnico di Torino.

Research activity: microstructural and electrochemical characterization of fuel cell systems.

EDUCATION AND TRAINING

01/05/2008–01/04/2011

PhD in Energetics

Politecnico di Torino,

Thesis title: "Study of Solid Oxides Fuel Cell Systems Running on Poly-Fuel Mixtures".

Evaluation: 'Excelent'

European Doctorate

01/01/2010–01/01/2011

Fulbright Fellowship

Princeton University, Princeton (United States)

Advanced energy system analysis

01/09/2000–01/05/2005

MSc in Energy and Nuclear Engineering

Politecnico di Torino, Corso Duca Degli Abruzzi, 24, Torino (Italy)

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C2	C1	C1	C1
CAE, Certificate in Advanced English – Cambridge University IB-TOEFL: 107/120					
French	B1	B1	B1	B1	B1
Spanish	B1	B1	B1	B1	B1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills ■ Good communication and contact skills gained through my experience and involvement in EU project.

Organisational / managerial skills Good managerial skills obtained during activities in EU projects and leadership of work packages.

Job-related skills ■ Excellent mentoring skills: I have been collaborating with 5 PhD students (co-supervisor) and 3 Postdocs (co-supervisor) since 2011. I am currently the scientific responsible of one PhD student working in the field of multi-energy network modelling. I advised 80+ Master Students since 2012, including theses in collaboration with several foreign institutions. 10 Alumni are now doing research within a Ph.D. program at prestigious international universities and research centers.

Driving licence

ADDITIONAL INFORMATION

Projects

- **Participation to Research Projects**
- DEMOSOFC – DEMONstration of large SOFC system fed with biogas from WWTP. Programme: EU-H2020 FCH 2 JU. Budget 6.0 M€. Period: 2015-2020. Role: WP leader.
- GRINHY – Green Industrial Hydrogen via Reversible High-Temperature Electrolysis. Programme: EU-H2020 FCH 2 JU. Budget 3.0 M€. Period: 2016-2019. Role: Task leader.
- SOFCOM – SOFC CCHP WITH POLY-FUEL: OPERATION AND MANAGEMENT. (www.sofcom.eu). Programme: EU – FP7 FCH-JU (Contract number 278798). Budget 2.94 M€. Period: 2011-2014. Role: Co-writer of the full proposal. Task-leader for energy system analysis activities. Task-leader for experimental testing of SOFC stacks.
- Energy, Environmental, and Economic Analyses of Design Concepts for the Co-Production of Fuels and Chemicals with Electricity via Co-Gasification of Coal and Biomass. (<http://www.osti.gov/scitech/biblio/1047698>). Programme: National Energy Technology Laboratory of the U.S. Department of Energy (DOE). Grant DE-FE0005373. Budget 0.7 M€. Period: 2010-2012. Role: Lead scientist for the work-package on modeling of fuel cell based systems.
-
- PRIN 2008, (Italian call for research projects of national interest): "Experimental, techno-economic investigation of biogas use to feed SOFC-based power plants. Programme: The Ministry of

Education, Universities and Research, Italy. Budget 0.5 M€. Period: 2011-2013. Role: Co-writer of the full proposal. Task leader on modeling techno-economic modeling activities. Task leader on experiments with biogas-fed SOFC.

- PRIN2009, (Italian call for research projects of national interest): "Experimental, techno-economic investigation and strategic opportunity of coal and biomass syngas use to feed SOFC-based power plants with CO₂ capture. Programme: The Ministry of Education, Universities and Research, Italy. Budget 0.5 M€. Period: 2012-2014. Role: Co-writer of the full proposal. Task leader on experiments with syngas-fed SOFC.
- "ENERGY BOX: CHP system for residential and portable applications based on SOFC power and hydrogen storage". Programme: EU project FP7 (MANUNET Call 2010).. Budget 0.7 M€. Period: 2011-2014. Role: Prototyping and experimental testing.

Courses Teaching activities

- **A.A. 2007/2008, 2008/2009, 2009/2010:** tutorials of Fundamentals of Engineering Thermodynamics and Heat Transfer. Mechanical Engineering, Politecnico di Torino.
- **A.A. 2012/2013:** i) teacher of 'Energia, Progresso e Sostenibilità'; ii) tutorials of 'Applicazioni Avanzate di Fisica Tecnica' (Politecnico di Torino).
- **A.A. 2013/2014:** i) teacher of 'Energia, Progresso e Sostenibilità'; ii) tutorials of 'Thermoeconomics' (Politecnico di Torino).
- **A.A. 2014/2015** i) teacher of 'Energia, Progresso e Sostenibilità'; ii) teacher of 'Polygeneration and Advanced Energy Systems'; iii) tutorials of 'Thermal Design and Optimization' (Politecnico di Torino).
- **giu. 2015:** Politechnika Warszawska, Short course: "POLYGENERATION AND ADVANCED ENERGY SYSTEMS".
- **A.A. 2015/2016:** i) teacher of 'Energia, Progresso e Sostenibilità'; ii) teacher of 'Polygeneration and Advanced Energy Systems'; iii) teacher of 'Thermal Design and Optimization', iv) teacher of 'Applicazioni Avanzate di Fisica Tecnica' (Politecnico di Torino).

Honours and awards

- **'Fulbright' 2010-2011 - Visiting Student Research Collaborator** at Princeton University.
- **Politecnico di Torino, Business Enterprise Incubator.** Award for best entrepreneurial ideas 2011 (finalist). Fuel Cell Based Micro-CHP unit for residential and portable applications.
- **European Doctorate (Jun. 2011)**
- **2013 Best ASME student paper.** Award received from the Advanced Energy Systems Division (AESD) of ASME for the work: M. Gandiglio, A. Lanzini, M. Santarelli, P. Leone, "Design and Balance-of-Plant of a Demonstration Plant With a Solid Oxide Fuel Cell Fed by Biogas From Waste-Water and Exhaust Carbon Recycling for Algae Growth", Journal of Fuel Cell Science and Technology (2014), 11(3).
- **Scholarship for visiting professor (Jun 2015)** at Power and Aeronautical Engineering della Warsaw University of Technology. *The scholarship has been supported by the European Union in the framework of European Social Fund through the "Modern Power graduate on the 21st century job market".* Inviting Professor: Prof. Jaroslaw Milewski.
- **Siebel Energy Institute, \$ 50k grant award.**
- Interviews in the framework of EU projects SOFCOM (www.sofcom.eu) and DEMOSOFC (www.demosofc.eu). La Stampa (25/9/2015): <http://www.lastampa.it/2015/09/25/cronaca/dal-biogas-energia-pulita-un-progetto-del-politecnico-wNcniGwGxBalzWEyCcbChL/pagina.html><http://www.lastampa.it/2015/10/28/scienza/ambiente/il-caso/demosofc-il-progetto-smart-che-produce-energia-dalla-depurazione-delle-acque-YVPDeA6pur8t8cENK8LHgO/pagina.html>

Publications Selected peer-reviewed international journal publications:

- [1] Experimental investigation of direct internal reforming of biogas in solid oxide fuel cells Lanzini, A., Leone, P. (2010) International Journal of Hydrogen Energy, 35 (6), pp. 2463-2476. Cited 66 times. 2010, ELSEVIER; 27/01/2010
- [2] Residential solid oxide fuel cell generator fuelled by ethanol: Cell, stack and system modelling with a preliminary experiment Lanzini, A., Santarelli, M., Orsello, G. (2010) Fuel Cells, 10 (4), pp. 654-675.

Cited 28 times. 2010, WILEY; 08/2010

- [3] Microstructural characterization of solid oxide fuel cell electrodes by image analysis technique Lanzini, A., Leone, P., Asinari, P. (2009) *Journal of Power Sources*, 194 (1), pp. 408-422. Cited 25 times. 2009, ELSEVIER; 20/10/2009
- [4] Techno-economic and policy requirements for the market-entry of the fuel cell micro-CHP system in the residential sector Pellegrino, S., Lanzini, A., Leone, P. (2015) *Applied Energy*, 143, pp. 370-382. Cited 4 times. 2015, ELSEVIER; 01/04/2015
- [5] Enhanced biomass-to-liquid (BTL) conversion process through high temperature co-electrolysis in a solid oxide electrolysis cell (SOEC) Pozzo, M., Lanzini, A., Santarelli, M. (2015) *Fuel*, 145, pp. 39-49. Cited 4 times. 2015, ELSEVIER; 01/04/2015
- [6] A comparative assessment on hydrogen production from low- and high-temperature electrolysis Ferrero, D., Lanzini, A., Santarelli, M., Leone, P. (2013) *International Journal of Hydrogen Energy*, 38 (9), pp. 3523-3536. Cited 16 times. 2013, ELSEVIER; 27/03/2013
- [7] Operation of a solid oxide fuel cell under direct internal reforming of liquid fuels Leone, P., Lanzini, A., Ortigoza-Villalba, G.A., Borchiellini, R. (2012) *Chemical Engineering Journal*, 191, pp. 349-355. Cited 16 times. 2012, ELSEVIER; 15/05/2012
- [8] Techno-economic analysis of PEMFC and SOFC micro-CHP fuel cell systems for the residential sector Napoli, R., Gandiglio, M., Lanzini, A., Santarelli, M. (2015) *Energy and Buildings*, 103, pp. 131-146. Cited 5 times. 2015, ELSEVIER; 15/09/2015
- [9] Energy and economic performance of novel integrated gasifier fuel cell (IGFC) cycles with carbon capture Lanzini, A., Kreuz, T.G., Martelli, E., Santarelli, M. (2014) *International Journal of Greenhouse Gas Control*, 26, pp. 169-184. Cited 8 times. 2014, ELSEVIER; 07/2014
- [10] Digester gas upgrading to synthetic natural gas in solid oxide electrolysis cells Lorenzi, G., Lanzini, A., Santarelli, M. (2015) *Energy and Fuels*, 29 (3), pp. 1641-1652. Cited 1 time. 2015, ACS (American Chemical Society)
- [11] Waste to energy: Exploitation of biogas from organic waste in a 500 W solid oxide fuel cell (SOFC) stack Papurello, D., Lanzini, A., Tognana, L., Silvestri, S., Santarelli, M. (2015) *Energy*, 85, pp. 145-158. Cited 8 times. 2015, ELSEVIER; 01/06/2015
- [12] Optimization of dry reforming of methane over Ni/YSZ anodes for solid oxide fuel cells Guerra, C., Lanzini, A., Leone, P., Santarelli, M., Brandon, N.P. (2014) *Journal of Power Sources*, 245, pp. 154-163. Cited 20 times. 2014, ELSEVIER; 01/01/2014
- [13] Thermo-economic analysis of large solid oxide fuel cell plants: Atmospheric vs. pressurized performance Gandiglio, M., Lanzini, A., Leone, P., Santarelli, M., Borchiellini, R. (2013) *Energy*, 55, pp. 142-155. Cited 15 times. 2013, ELSEVIER
- [14] Experimental study of dry reforming of biogas in a tubular anode-supported solid oxide fuel cell Guerra, C., Lanzini, A., Leone, P., Santarelli, M., Beretta, D. (2013) *International Journal of Hydrogen Energy*, 38 (25), pp. 10559-10566. Cited 13 times. 2013, ELSEVIER
- [15] Optimal integration strategies for a syngas fuelled SOFC and gas turbine hybrid Zhao, Y., Sadhukhan, J., Lanzini, A., Brandon, N., Shah, N. (2011) *Journal of Power Sources*, 196 (22), pp. 9516-9527. Cited 31 times. 2011, ELSEVIER

Conferences

Invited conference speaker

- Lanzini, A. (2014), "Contaminants in biogas: siloxanes & chlorines". Workshop Series: Fuel Cell Systems 7th Workshop 2014, Progress in Fuel Cell Systems, Brugge (Belgium), May 20-21th, 2014.
- Lanzini, A. (2014), "Influence of biogas contaminants on SOFC anodes", 1st SOFCOM international workshop: Fuel Cell systems fed by biogenous fuels: biogas and syngas, Espoo (Finland), May 8th, 2014.
- Lanzini, A. (2015), "Clean energy from waste: practical experiences in the framework of EU-funded projects", 3rd World Forum of Local Economic Development (LED), October 13th – 16th, 2016.
- Lanzini, A. (2016), "Industrial-size DEMO of a biogas-fed SOFC". Workshop Series: Fuel Cell Systems 9th Workshop 2016, Progress in Fuel Cell Systems, Brugge (Belgium), May 31st – June 1st, 2016.