

Curriculum Vitae

Personal Information

Name: Binotti Marco
Place and date of birth: Cremona, Italy, 10/05/1984
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Professional experience

- ▶ 07/2015 – until now
Coordinator of the H2020 project BIONICO www.bionico-project.eu
Research area: *green hydrogen production*
- ▶ 09/2015 – until now
Assistant Professor, Energy Department, Politecnico di Milano. Research area: *CSP, hydrogen production.*
- ▶ 03/2016 – until now
Adjunct professor of ‘*Power generation systems*’ for Environmental Engineering MS students, Politecnico di Milano.
- ▶ 09/2009 – until now
Teaching assistant for Energy Engineering classes of:
 - *Power production from renewables*
 - *Energy systems*
 - *Energy systems and environmental impact*
 - *Thermodynamics and turbomachinery*
- ▶ 03/2013 – 03/2016
Adjunct professor of ‘*Machines and Energetic systems*’ for Environmental Engineering BS/MS students, Politecnico di Milano.
- ▶ 03/2013 – 09/2015
Research Fellow, Energy Department, Politecnico di Milano.
Research area: *Renewables energies*
- ▶ 07/2009 – 12/2009
Research Fellow, Energy Department, Politecnico di Milano. Research area: *Carbon Capture and Storage*

Education and training

- ▶ 01/2010 – 3/2013
PhD, Energy and Nuclear Science and Technology
Energy Department, Politecnico di Milano.
PhD thesis: *Linear Fresnel Reflectors: study of the technology and steps toward optimization.*
- ▶ 10/2011 – 07/2012
Visiting student at the National Renewable Energies Laboratories (NREL), Golden, Colorado, USA.
Research area: *Linear Fresnel collector modeling.*
- ▶ 10/2006 – 04/2009
Master Degree in Energy Engineering, 110/110 cum laude, Politecnico di Milano.
MS thesis: *Electricity production from fossil fuels with carbon capture by sorption enhanced water gas shift.*

- 02/2008 – 07/2008 Erasmus, 3me, Technische Universiteit Delft, The Netherlands
- 09/2003 – 07/2006 Bachelor Degree in Energy Engineering, 110/110 cum laude, Politecnico di Milano.
BS thesis: *Technical and economic analysis of a pulverized coal power plant*

Language knowledge

- Italian Native Speaker
- English Fluent

Computer skills and competences

- Microsoft Office™ (Word™, Excel™, PowerPoint™, VBA) good knowledge
- Thermoflex™ good knowledge
- SolTrace, System Advisor Model, Solar Pilot good knowledge
- MATLAB good knowledge
- Aspen Plus, Exchanger design and Rating good knowledge
- Fluent basic knowledge
- COMSOL multiphysics good knowledge
- Solid modeling (Solid Edge™, Inventor™) basic knowledge

Research projects

Project Name/Topic	Year	Partners	Personal contribution
H2020 –sCO ₂ -Flex <i>Supercritical CO₂ cycle for flexible coal power plant</i>	2017-2020	EFD, UJV REZ A.S, Polimi, Fives Cryo, Centro sviluppo materiali (CSM), Duisburg-Essen University, Stuttgart University, Centrum Vyzkumu REZ S.R.O., Zabala	Simulation of different sCO ₂ -cycles layout
H2020-BIONICO <i>Hydrogen production from biomass using catalytic membrane reactor</i> www.bionico-project.eu	2015-2019	Politecnico di Milano, ICI, ENC energy, Tecnalia, JM, Rauschert, Quantis, TUE	Project coordinator, System analysis, dissemination activity <i>Supervision of 3 MS thesis</i>
<i>Study and optimization of the ACC of the EP plant of Livorno - Ferraris</i>	2015	EP	Data analysis and development of a dedicated tool for the simulation of the low Pressure steam turbine and Air cooled condenser
<i>Once trough boilers for EOR</i>	2015	Cannon BONO Energia	Technology review of once trough boilers for Enhanced Oil Recovery and study of heat exchange correlations.
<i>Study of innovative gaseous HTF in concentrating solar power plants with linear collectors</i>	2014	ENI	Development of dedicated tools for the simulation of solar fields using gaseous HTF. Overall plant performance and cost analysis. <i>Co-Supervision of 2 MS Thesis</i>
<i>Study of Advanced Molten Salts for Linear Collectors</i>	2014	ENI	Simulation of Solar fields with Advanced Solar Salts and optimization of the night operation of the system

<i>Study of CSP solutions for Small CSP application</i>	2014	ENI	Optimization of the solar field and of the ORC power block using dedicated tools <i>Co-supervision of 1 MS thesis</i>
<i>Energy technology mix for rural areas villages in developing countries</i>	2013	ENI	Technology for decentralized heat and power production overview and CSP solar technology application potential. Simulation of case studies.
<i>Outlook of microalgae cultivation and electric energy production</i>	2012	ENEL	Review of the microalgae cultivation and energy conversion technologies. Development of tools for the simulation of a microalgae cultivation plant integrated with a coal power plant (co-firing of microalgae in the boiler)
<i>Modeling of CSP plants with parabolic trough collector using molten salts technology (ENEA)</i>	2011	ENEL	System nominal and yearly simulation and optimization.
<i>Modeling of CSP plants with parabolic collector and synthetic oil</i>	2010	ENEL	System nominal and yearly simulation and optimization.
<i>Modeling of CSP plants using linear Fresnel collectors</i>	2010	ENEL	System nominal and yearly simulation and optimization.
<i>FP7-CAESAR</i> Carbon-free Electricity by SEWGS: Advanced materials, Reactor-, and process design http://caesar.ecn.nl/home/	2009	Politecnico di Milano, SINTEF, BP, Air Products, ECN	Overall System simulation and fuel processor integration

Journal and Conferences Reviewer

- ▶ conferences: SolarPaces, ASME power & energy & exhibition conference, International conference on nuclear engineering, ASME Energy and Sustainability, International Conference on Applied Energy, Conference of the Italian Thermal Machines Engineering Association,
- ▶ Journals: Energy, Solar Energy, Renewable energy, Energy Science & Engineering

Conference proceedings

- ▶ M.Binotti, M.Astolfi, S.Campanari, G.Manzolini, P.Silva, *Preliminary assessment of sCO₂ power cycles for application to CSP Solar Tower plants*, Proceedings of the 8th ICAE 2016 conference
- ▶ M.Binotti, G.Di Marcoberardino, M.Biassoni, G.Manzolini, *Solar Hydrogen Production With Cerium Oxides Thermochemical Cycle*, Proceedings of the SOLARPACES 2016 International Conference, October 2016 Abu Dhabi
- ▶ D.Casartelli, M.Binotti, P.Silva, E.Macchi, E.Roccaro, T.Passera, *Power block off-design control strategies for indirect solar ORC cycles*, Energy Procedia (2015), Proceedings of the SolarPACES 2014 International Conference
- ▶ F.Rinaldi, M.Binotti, A.Giostri, G.Manzolini, *Comparison of Linear and Point Focus Collectors in Solar Power Plants*, Energy Procedia (2014), Proceedings of the SolarPACES 2013 International Conference, <http://dx.doi.org/10.1016/j.egypro.2014.03.158>
- ▶ M.Binotti, G.Zhu, A.Gray, G.Manzolini, *An Analytical Approach Treating Three-Dimensional Geometrical Effects Of Parabolic Trough Collectors*, Proceedings of the ASES conference 2012
- ▶ A.Giostri, M.Binotti, P.Silva, E.Macchi, G.Manzolini, *Comparison of two linear collectors in solar thermal plants: parabolic trough vs Fresnel*, Proceedings of ESFuelCell 2011
- ▶ M.Astolfi, M.Binotti, A.Giostri, G.Manzolini, P.Silva, A. De Marzo, L.Merlo. *Indirect molten salts storage management and size optimization for different solar multiple and sites in a parabolic trough solar power plant*, Proceedings of SolarPACES 2011 conference

- M.Binotti, A.Giostri, M.Astolfi, L.Colombo, E.Macchi, G.Manzolini. *Partial admission vs sliding pressure applied to DSG solar plant based on linear Fresnel Reflector*, Proceedings of SolarPACES 2011 conference
- V.Spallina, M.Binotti, M.Gazzani, *Analysis and Modeling of a Recuperated SOFC- Gas Turbine Hybrid Cycle*, Proceeding of the EFC conference 2011

Peer reviewed scientific publications

- S.Polimeni, M.Binotti, L.Moretti, G.Manzolini, *Comparison of sodium and KCl-MgCl₂ as heat transfer fluids in CSP solar tower with sCO₂ power cycles*, submitted to Solar Energy
- M.Binotti, M.Astolfi, S.Campanari, G.Manzolini, P.Silva, *Preliminary assessment of sCO₂ cycles for power generation in CSP Solar Tower plants*, Applied Energy 2017 <https://doi.org/10.1016/j.apenergy.2017.05.121>
- A.Giostri, M.Binotti, E.Macchi, *Microalgae cofiring in coal power plants: Innovative system layout and energy analysis*, Renewable Energy 2016 <http://dx.doi.org/10.1016/j.renene.2016.04.033>
- M.Astolfi, M.Binotti, S.Mazzola, L.Zanellato, G.Manzolini *Heliostat aiming point optimization for external tower receiver*, Solar Energy 2016 <http://dx.doi.org/10.1016/j.solener.2016.03.042>
- M Binotti, P.De Giorgi, D.Sanchez,G.Manzolini, *Comparison of Different Strategies for Heliostats Aiming Point in Cavity and External Tower Receivers*, Journal of Solar Energy Engineering (2016), Transaction of the ASME,
- M.Binotti, G.Manzolini, G.Zhu, *An alternative methodology to treat solar radiation data for the optical efficiency estimate of different types of collectors*, Solar Energy (2014) <http://dx.doi.org/10.1016/j.solener.2014.10.011>
- M.Binotti, G.Zhu, A.Gray, G.Manzolini, P.Silva, *Geometric analysis on three-dimensional effects of parabolic trough collectors*, Solar Energy (2013) <http://dx.doi.org/10.1016/j.solener.2012.10.025>
- A.Giostri, M.Binotti, P.Silva, E.Macchi, G.Manzolini. *Comparison of Two Linear Collectors in Solar Thermal Plants: Parabolic Trough Versus Fresnel*, Journal of Solar Energy Engineering (2013), <http://dx.doi.org/10.1115/1.4006792>
- A.Giostri, M.Binotti, M.Astolfi, P.Silva, E.Macchi, G.Manzolini *Comparison of different solar plants based on parabolic trough technology*, Solar Energy (2012) <http://dx.doi.org/10.1016/j.solener.2012.01.014>
- G.Manzolini, E.Macchi, M.Binotti, M.Gazzani. *Integration of SEWGS for carbon capture in natural gas combined cycle. Part A: Thermodynamic performances*, International Journal of Greenhouse Gas Control (2011), <http://dx.doi.org/10.1016/j.ijggc.2010.08.006>
- G.Manzolini, E.Macchi, M.Binotti, M.Gazzani. *Integration of SEWGS for carbon capture in natural gas combined cycle. Part B: Reference case comparison*, International Journal of Greenhouse Gas Control (2011), <http://dx.doi.org/10.1016/j.ijggc.2010.08.007>

MS Theses supervision

#	Year	Title	Authors	Role
22	2017	Techno-economic assesement of innovative high temperature solar receiver coupled with sCO ₂ cycles	S.Polimeni	Co-supervisor
21	2017	Techno-economic analysis of closed OTEC cycles using zeotropic mixtures	L.Rizzo	Supervisor
20	2017	Innovative CSP tower system coupled with solar micro gas turbine	C.Sterpos	Co-supervisor
19	2016	Design di una torre solare per la produzione di idrogeno tramite reattore termochimico	A.Mondadori	Supervisor
18	2016	Techno-economic analysis of closed OTEC cycles for power generation	C.Bernardoni	Supervisor

17	2016	Progetto bionico. Produzione di idrogeno da biogas tramite membrane reformer : scenari di utilizzo dell'idrogeno prodotto e sistemi di abbattimento dell'H ₂ S	S.Porro	Supervisor
16	2016	Modellazione termica del ricevitore CPC di un collettore Fresnel	G.Di Martino	Supervisor
15	2016	Performance and cost assessment of integrated solar combined cycles using direct steam generation in linear collectors	A.Ferrara; A.D'angelo	Co-supervisor
14	2016	Produzione di idrogeno solare tramite reattore termochimico ad ossidi di cerio	M.Biassoni	Supervisor
13	2015	Ottimizzazione tecno-economica di centrali solari a torre con ricevitore esterno a sali fusi	D.Testori	Co-supervisor
12	2015	Modalità di produzione dei combustibili solari con la tecnologia termodinamica	C.Di Ciero	Co-supervisor
11	2015	Simulazione e analisi tecno-economica di cicli supercritici a CO ₂ con accumulo termico a sali fusi per impianti solari a torre	F.Lo Mauro; N.Lazzarin	Co-supervisor
10	2015	Studio di un sistema fotovoltaico termico basato su concentratore CPC e cella fotovoltaica CIGS	S.Riccardo; F.Marconcini	Co-supervisor
9	2015	Strategie di puntamento ottimizzato per centrali solari a torre	L.Zanellato	Co-supervisor
8	2014	Analisi tecnico-economica di sistemi lineari a bassa concentrazione per fotovoltaico ibrido per applicazione residenziale	S.Ferrari	Co-supervisor
7	2014	Studio di cicli OTEC chiusi per la produzione di energia elettrica e acqua dissalata	M.Mura	Supervisor
6	2014	Thermodynamic optimization and annual performance characterization of concentrated solar power plants employing advanced supercritical CO ₂ Brayton cycle configurations	L.Moretti	Co-supervisor
5	2014	Analisi tecnico-economica di un impianto solare termodinamico con motore a fluido organico	D.Casartelli	Co-supervisor
4	2014	Valutazione termodinamica di cicli diretti per impianti solari a concentrazione con miscele a base CO ₂	A.Gennaro	Co-supervisor
3	2013	Sviluppo di un codice di calcolo per l'ottimizzazione di un impianto solare termodinamico con fluido termovettore gassoso	A.Robbati	Co-supervisor
2	2013	Studio delle prestazioni di impianti solari a torre basati su tecnologie commerciali	F.Rinaldi	Co-supervisor
1	2011	Utilizzo dell'anidride carbonica in sistemi solari a concentrazione lineare	A.Serafino; S. Lambrughì	Co-supervisor

Thesis abstracts and full texts are available at: <https://www.politesi.polimi.it/>

Milano, 19/07/2018