UNIVERSITÀ DEGLI STUDI DELL'AQUILA
Prof. Roberto Carapellucci
Curriculum scientifico

(Aggiornato il 2023/06/25)

(post Facebook @Univaq del 19-06-2023)

UnivAQ **N E W S**

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Il nostro professore del DIIIE - Dipartimento di Ingegneria Industriale e dell?informazione e di economia ha ri cevuto l'ambito riconoscimento dell'ASME (American Society of Mechanical Engineers) la più autorevole s ocietà americana e tra le più prestigiose società a livello mondiale nel campo dell?ingegneria meccanica. La socie tà collabora con la comunità ingegneristica internazionale per sviluppare soluzioni alle sfide del mondo reale che tu tte le persone devono affrontare a livello globale.

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(please see below for CV English version)

Roberto Carapellucci è attualmente Professore Ordinario nel SSD ING-IND/09 (Sistemi per l?Energia e l?A mbiente), e presta servizio presso il Dipartimento di Ingegneria Industriale e dell?Informazione e di Economia de ll'Università dell'Aquila. È Presidente del Consiglio di Area Didattica di Ingegneria Industriale e docente dei co rsi di Macchine, nel percorso formativo Ingegneria Meccanica della laurea triennale di Ingegneria Industriale, e di Gestione dei Sistemi Energetici, nella laurea magistrale di Ingegneria Meccanica.

È autore di oltre centotrenta pubblicazioni scientifiche presentate in consessi nazionali ed internazionali sui t emi della termodinamica applicata alle macchine, degli impianti termici, dei sistemi energetici integrati, dei cicli innovativi di turbine a gas, dell?utilizzo di fonti energetiche rinnovabili. Dal 2019 è Associate Editor of the ASME Journal of Energy Resources Technologies (JERT). È revisore per numerose riviste internazionali, tra c ui Proc. Instn Mech. Engrs - Part A: Journal of Power and Energy, Energy Conversion & Management - Elsevier Ltd., Applied Energy - Elsevier Ltd., International Journal of Hydrogen Energy - Elsevier Ltd., Renewable Energy - Elsevier Ltd., Experimental Thermal and Fluid Science - Elsevier Ltd., Energy & Fuels - ACS Publications, International Journal on Thermal Science - Elsevier Ltd., International Journal on Energy Research - John Wiley & Sons, Ltd., Solar Energy - Elsevier Ltd.

Nel Maggio 2023 è stato eletto al grado Fellow dalla American Society of Mechanical Engineers (ASME). L 'elezione di un membro al grado Fellow è un onore molto prestigioso a disposizione dei membri dell'ASME. I l Fellow Grade è il più alto grado di appartenenza all'interno dell'ASME (FASME); la nomina di un ca ndidato al grado Fellow deve avere almeno Quattro sponsor, e l?elezione viene effettuata dall?ASME Comm

ittee of Past Presidents a seguito del riconoscimento per il candidato di ?exceptional engineering achievements an d contributions to the engineering profession and to ASME,? come riportato nella lettera di conferimento del ti tolo.

Dal 2019 è membro dell?Executive Committee of Advanced Energy Systems Division (AESD) del l?American Society of Mechanical Engineering (ASME). In tale Comitato ha ricoperto negli anni diversi ru oli, come responsabile di specifiche sezioni della Divisione Energia dell?ASME tra cui ?Media editor?, ?Honor s and awards?, ?Secretary and treasurer?, ?Vice-Chair?.

Dal 2017 al 2019 è stato Presidente del Technical Committee ?Systems Analysis? della divisione AESD dell? ASME, dal 2015 al 2016 vice-Presidente del medesimo comitato tecnico, al quale partecipa come membro dal 2011.

Ha ricoperto il ruolo di chair/organizer del Track Energy per l?International Mechanical Engineering Co ngress & Exposition in tre anni successivi (IMECE2016, Phoenix, Arizona, Nov 13-17 2016; IMECE2018, Pittsburgh, Pennsylvania , Nov 9-15 2018; IMECE2019, Salt Lake City, Utah, Nov 11-14 2019), organizzando in ciascuna conferenza 14-18 topics, 35-40 technical sessions (with 160-200 papers/presentations), 1-2 plenary sessions e 1 poster session. Per il ruolo ricoperto come responsabile del track Energia del congresso IMECE, in ciascuno dei tre anni ha ricevuto da ASME un Certificate of Appreciation ?in testimony of the high regard of your peers and the deep appreciation of the Society for your va lued services in advancing the engineering profession as a Track Organizer at ASME International Mechanical Engineering Congress and Exposition?.

Ha ricoperto il ruolo di chair/organizer del Topic ?Design and Analysis of Energy Conversion Systems? nel cong resso IMECE2012, tenutosi a Houston dal 9 al 15 novembre 2012. L?incarico è stato confermato per i suc cessivi undici Congressi IMECE (dal 2013 al 2023). Nel medesimo consesso internazionale, Roberto Carapellucci è stato anche session organizer/chair di numerose sessioni tecniche, tra cui ?High Temperature Fue l Cells?, ?Exergy Analysis of Process and Systems?, ?Hydrogen Energy?, ?Exergy Analysis and Thermoeconom ics?, ?Advanced Power Generation and District Heating?, ?Carbon Capture and Storage?, ?Advanced Power Cycles?, ? P and Cooling Systems?, ?Natural Gas-Based Systems and Combustion Processes?.

CV English version

CV-Carapellucci-Roberto-2023 - English version.pdf

ROBERTO CARAPELLUCCI
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RESEARCH INTERESTS

- Thermodynamics applied to engines and thermal power plants
- Advanced power plant solutions for improving performance and reducing emissions
- Optimization of heat recovery steam generators in combined cycle power plants
- Carbon capture technologies
- Fuel cell stationary power plants

Renewable energy sources

Modeling and experimentation on internal combustion engines

EDUCATION

Ph.D., Mechanical Engineering, University of L?Aquila, April 1992

M.S., Mechanical Engineering, University of L?Aquila, July 1987

PROFESSIONAL EXPERIENCE

University of L?Aquila, L?Aquila, Italy

Full Professor, December 2016-present

Associate Professor, September 2001-November 2016

Assistant Professor, May 1991-August 2001

Graduate Research Assistant, September 1987-April 1991

Academic Spinoff E3R - Energy and Environmental Engineering and Research, L?Aquila, Italy

Co-Founder and Member, February 2018-present

PROFESSIONAL ACTIVITIES

Journal Editorial Board

Associate Editor of the ASME Journal of Energy Resources Technologies (JERT) since October 2019

Leadership/Member

Fellow of the American Society of Mechanical Engineers (ASME) since May 2023.

Member of the Executive Committee of the Advanced Energy Systems Division (AESD) of the American Society of Mechanical Engineers (ASME) since July 2019.

Positions and responsibilities held within the AESD Executive Committee

- Vice-Chair for year 2023-2024
- Secretary/Treasurer for year 2022-2023
- Honors and awards for year 2021-2022
- Media editor for year 2020-2021
- Member for year 2019-2020

Chair of the Systems Analysis Technical Committee of the ASME AESD from 2017 to 2019.

Vice-Chair of the Systems Analysis Technical Committee of the ASME AESD from 2015 to 2016.

Member of the Systems Analysis Technical Committee of the ASME AESD since November 2011.

Conferences

Chair of the Energy track at ASME IMECE 2019, 2018 and 2016.

Co-Chair of the Energy track at ASME IMECE 2017 and 2015.

Organizer of Plenary sessions at ASME IMECE from 2016 to 2022 on various topics, including ?Thoughts on the Future of Po wer Generation: A Low Carbon Perspective?, ?Thoughts of the Future of Energy in Buildings: An HVAC Perspective?, ?Metal Oxide-Based Thermochemical Redox Processes for Producing Solar Fuels and Storing Thermal Energy?.

Organizer of many topics in International conferences, including topics on ?Design and Analysis of Energy Conversion Sy stems?, ?Carbon Capture and Storage?, ?Biofuels & waste-to-energy?.

Organizer/chair of several technical sessions in International conferences, including sessions on ?Advanced Power Cycles and St orage Systems?, ?CHP and Residential Cogeneration?, ?Design and Analysis of Energy Systems?, ?Advanced Power Cycles?, ?Im provement in performance and emissions of energy systems?, ?Solar/Waste-Heat Power Generation?, ?Engines Behaviour and Fuel Characteristics?, ?CHP and Cooling Systems?, ?Natural Gas-Based Systems and Combustion Processes?, ?Carbon Capture and Storag , ?CHP and Desalination Systems?, ?High Temperature Fuel Cells?, ?Exergy Analysis of Process and Systems?, ?Hydrogen Energy?, ? gy Analysis and Thermoeconomics?, ?Advanced Power Generation and District Heating?, ?Natural Gas-Based Systems and Combusti

on Processes?.

Journal Reviewer

Peer-reviewer for several International journal, including: 1) Applied Energy; 2) Energy Conversion & Management; 3) Int. Journal of Hydrogen Energy; 4) Energy; 5) Journal of CO2 Utilization; 6) Journal of Power Sources; 7) Proc. Instn Mech. Engrs - Part A: Journal of Power and Energy; 8) Journal of Membrane Science & Technology; 9) Environmental Modelling & Software; 10) Journal of Renewable Energy; 11) Renewable Energy; 12) Solar Energy; 13) ASME Journal of Solar Energy Engineering; 14) ASME Journal of Energy Resources Technology; 15) Experimental Thermal and Fluid Science; 16) Energy & Fuels; 17) Int. Journal on Thermal Science; 18) Oil & Gas Science and Technology; 19) Thermal Science; 20) Proc. Instn Mech. Engrs - Part E: Journal of Process Mechanical Engineering; 21) Applied Thermal Engineering; 22) Int. Journal of Energy Research; 23) Int. Journal of Green Energy; 24) Int. Journal of Sustainable Engineering; 25) Journal of Defense Management; 26) Journal of Energy Engineering; 27) Journal of the Energy Institute; 28) Journal of Energy Resources Technology; 29) Journal of Power and Energy; 30) Sustainability.

Conference Reviewer

Peer-reviewer for many International conferences, including: 1) ASME Cogen Turbo; 2) ASME IMECE Conference; 3) IECEC Conference; 4) ECOS International Conference; 5) Clean Air Conference; 6) World Renewable Energy Congress; 7) iEMSs Congress.

ACADEMIC EXPERIENCE

Teaching

University of L?Aquila

Since A.Y. 2000/2001, in the role of associate or full (since 2016) professor, Roberto has held continuously, in graduate level degrees or master, two or three courses for each academic year. Currently he has ownership of the courses of *Fluid Machinery and Thermal Power Plants*(9 ECTS, Bachelor's course in Industrial Engineering) and *Management of Energy Conversion Systems*(9 ECTS, Master?s course in Mechanical Engineering).

Dissertations/Theses directed as Supervisor

Supervisor of more than 160 theses, including Ph.D. dissertations, Master?s or Bachelor?s theses; since 2011:

- N. 7 Ph.D. dissertations in Engineering of Fluid Machinery and Thermal Power Plants
- N. 8 Master?s theses in Mechanical Engineering
- N. 1 Master?s thesis in Engineering of Energy Systems
- N. 91 Bachelor?s theses in Mechanical/Industrial Engineering

Research

Judgement for Research Quality Assessment (Italian VQR 2011-2014)

Evaluation equal to A (Excellent) for both publications submitted for Research Quality Assesment

PROFESSIONAL AFFILIATION

American Society of Mechanical Engineers, Member (2011-present)

Italian Thermotechnical Association, ATI, Member (1991-present)

Italian Thermofluodynamic Union, UIT, Member (2015-present)

GRANTS AND CONTRACTS

The research activities within European or Italian Projects has been carried out in close collaboration with the entire group of Thermal Engines and Energy Conversion Systems, with direct responsibility often entrusted to the Group Coordinator Professor Roberto Cipollone. The main research projects in which Roberto Carapellucci participated include about 15 European research projects and more than 40 Italian research projects. In 40% of them, he played a role of project manager and/or supervisor of activity lines within the research group.

UNIVERSITY SERVICE

Department Committees (*selected list, since 2011*)

- Chair of the Bachelor?s Degree Council in Industrial Engineering, that includes six training specializations in Biomedical, Ch emical, Electrical, Industrial Electronics, Management and Mechanical Engineering (since November 2021)
- Vice-Chair of the Master?s Degree Council in Mechanical Engineering (since November 2015 to October 2018)
- Vice-Chair of the Joint Professors-Students Commission of the Engineering Degree Courses of which the Department is responsible (since November 2019 to October 2021). Member of this Commission since December 2013.
- Member of the Quality Review Group of the Master?s Degree in Mechanical Engineering (responsible of quality objectives) (s ince January 2013)
- Co-Organizer of the professionalizing course "In Factory with Manufacturing Companies", with the involvement of numerous companies and more than 300 students of Bachelor?s and Master?s courses in Mechanical, Chemical, Electrical and Management Engineering (years 2017, 2018, 2019)

University Committees (*selected list, since 2011*)

- Member of the Academic Board of the PhD course in Industrial and Information Engineering and Economics (since November 2012)
- Member of the National Commission for the confirmation judgments in the role of University Researchers in the Scientific Disciplinary Sector ING-IND/09 ?Energy and Environment Systems? (three-year period 2012-2014)
- Inclusion in the Permanent Register of Experts of the Steering Committee for Research Evaluation (CIVR, 2004-present)

PUBLICATIONS

Google Scholar / ORCID: orcid.org/0000-0002-4606-0418 / Scopus Author ID: 55881063100

Selected List (*Out of **53** Journal Articles, **71** Conference Proceedings, **2** Book Chapters, **2** Theses, & **2** Patents*)

- Carapellucci R, Di Battista D (2022). Optimization of Supercritical CO2 Cycle Combined with ORC for Waste Heat Recovery, Proceedings of the ASME 2022 International Mechanical Engineering Congress & Exposition, IMECE2022, October 30 - November 3, 2022, Columbus, OH,USA.
- Carapellucci R, Giordano L (2022). Application of Artificial Network to Predict the Performance of Thermoelectric Power Plants at design Conditions, Proceedings of the ASME 2022 International Mechanical Engineering Congress & Exposition, IMECE2022, October 30 - November 3, 2022, Columbus, OH,USA.
- Abbate S, Di Paolo L, Di Battista D, Carapellucci R , Cipollone R (2022). Synergy between Cities and surrounding territory to achieve the international agreements on energy and CO2 reduction. The Municipality of Avezzano in the Abruzzo Region (Italy) case, Journal of Physics: Conference Series, Volume 2385, ATI Annual Congress (ATI 2022).
- Fatigati F, Di Bartolomeo M, Vittorini D, Coletta A, Carapellucci R , Cipollone R (2022). Small-scale ORC-based unit for domestic micro-cogeneration operating in the temperature range of the solar thermal flat panels, Journal of Physics: Conference Series, Volume 2385, ATI Annual Congress (ATI 2022).
- Vittorini D, Di Diomede D, Di Battista D, Carapellucci R , Cipollone R (2022). Model Parameterized Assessment of a Thermal Storage Unit for Engine Oil Warm-up Improvement, Journal of Physics: Conference Series, Volume 2385, ATI Annual Congress (ATI 2022).
- Carapellucci R, Giordano L (2021). Regenerative gas turbines and steam injection for repowering combined cycle power plants: Design and part-load performance, Energy Conversion and Management, vol. 227, 113519.
- Di Battista D, Fatigati F, Carapellucci R , Cipollone R (2021). An improvement to waste heat recovery in internal combustion engines via combined technologies, Energy Conversion and Management, vol. 232, 113880.
- Abbate S, Di Paolo L, Carapellucci R , Cipollone R (2021). Carbon uptake dynamics associated to the management of unused lands for urban CO2 planning, Renewable Energy, vol. 178, 946-959.

- Fatigati F, Di Giuliano A, Carapellucci R , Gallucci K, Cipollone R (2021). Experimental Characterization and Energy Performance Assessment of a Sorption-Enhanced Steam-Methane Reforming System. Processes, vol. 9, 1440.
- Di Battista D, Carapellucci R (2021). On the Maximization of the Waste Heat Recovery from Exhaust Gases of Internal Combustion Engines, Proceedings of the ASME 2021 International Mechanical Engineering Congress & Exposition, IMECE2021, November 1-5, 2021 , Virtual, Online., https://doi.org/10.1115/IMECE2021-69941.
- Carapellucci R, Giordano L (2020). Steam, dry and autothermal methane reforming for hydrogen production: A thermodynamic equilibrium analysis, Journal of Power Sources 469, 228391.
- Di Battista D, Carapellucci R , Cipollone R (2020). Integrated evaluation of Inverted Brayton cycle recovery unit bottomed to a turbocharged diesel engine, Applied Thermal Engineering, vol. 175, 115353.
- Carapellucci R, Di Battista D (2020). Combined Brayton, Inverse Brayton and Steam Cycles Power Plants, Proceedings of the ASME 2020 International Mechanical Engineering Congress & Exposition, IMECE2020, November 15-19, 2020, Portland, Oregon, USA.
- Di Battista D, Carapellucci R , Fatigati F, Cipollone R (2019). Inverted brayton cycle as an option for waste energy recovery in turbocharged diesel engine, SAE Technical Papers, Volume 2019, Article number 0060.
- Vittorini D, Cipollone R, Carapellucci R (2019). Enhanced performances of ORC-based units for low grade waste heat recovery via evaporator layout optimization, Energy Conversion and Management, Vol. 197, 111874.
- Di Battista D, Fatigati F, Carapellucci R, Cipollone R (2019). Inverted Brayton Cycle for waste heat recovery in reciprocating internal combustion engines, Applied Energy, vol. 253, 113565.
- Carapellucci R, Di Battista D, Cipollone R (2019). The retrofitting of a coal-fired subcritical steam power plant for carbon dioxide capture: A comparison between MCFC-based active systems and conventional MEA, Energy Conversion and Management, Vol. 194, 124-139.
- Carapellucci R, Giordano L (2019). Upgrading existing gas-steam combined cycle power plants through steam injection and methane steam reforming, Energy, vol. 173, 229-243.
- Carapellucci R, Cipollone R, Di Battista D (2018). MCFC-based system for active CO2 capture from flue gases, Proceedings of the ASME 2018 International Mechanical Engineering Congress & Exposition, IMECE2018, November 9-15, 2018, Pittsburgh, Pennsylvania, USA.
- Carapellucci R, Giordano L, Vaccarelli M (2017). Application of an amine-based CO2 capture system in retrofitting combined gas-steam power plants, Energy, vol. 118, 808-826.
- Carapellucci R, Giordano L (2017). Methane Steam Reforming and Steam Injection for Repowering Combined Cycle Power Plants, Proceedings of the ASME 2017 International Mechanical Engineering Congress & Exposition, IMECE2017, November 3-9, 2017, Tampa, Florida, USA.
- Carapellucci R, Giordano L (2016). Studying the effects of combining internal and external heat recovery on techno-economic performances of gas-steam power plants, Energy Conversion and Management, vol. 107, p. 34-42.
- Vaccarelli M, Sammak M, Jonshagen K, Carapellucci R, Genrup M (2016). Combined cycle power plants with post-combustion CO2 capture: Energy analysis at part load conditions for different HRSG configurations, Energy, vol. 112, 917-925.
- Carapellucci R, Giordano L, Vaccarelli M (2016). The use of biomass to reduce power derating in combined cycle power plants retrofitted with post-combustion CO2 capture, Energy Conversion and Management, vol. 107, p. 52-59.
- Carapellucci R, Favre E, Giordano L, Roizard D (2016). Hydrogen Production from Methane Steam Reforming with CO2 Capture through Metallic Membranes, Proceedings of the ASME 2016 International Mechanical Engineering Congress & Exposition, IMECE2016, November 11-17, 2016, Phoenix, Arizona, USA.

- Carapellucci R, Giordano L (2015). Upgrading existing coal-fired power plants through heavy-duty and aeroderivative gas turbines, Applied Energy, vol. 156, p. 86-98.
- Carapellucci R, Giordano L, Vaccarelli M (2015). Studying heat integration options for steam-gas power plants retrofitted with CO2post -combustion capture, Energy, vol. 85, p. 594-608.
- Carapellucci R, Giordano L, Pierguidi F (2015). Techno-economic evaluation of small-hydro power plants: Modelling and characterisation of the Abruzzo region in Italy. Renewable Energy, vol. 75, 395-406.
- Carapellucci R, Favre E, Giordano L, Roizard D (2015). Methane Steam Reforming and Metallic Membranes to Capture Carbon Dioxide in Gas Turbine Power Plants, Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition, IMECE2015, November 13-19, 2015, Houston, Texas, USA.
- Carapellucci R, Giordano L (2012). Modeling and optimization of an energy generation island based on renewable technologies and hydrogen storage systems, International Journal of Hydrogen Energy 37 (2012) 2081-2093.