

SAVERIO OTTAVIANO

Assistant Professor

Contact

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e-mail: saverio.ottaviano2@unibo.it**EDUCATION AND PROFESSIONAL CAREER**

10/2007-02/2012	<u>Bachelor degree in Energy Engineering</u> , University of Bologna
10/2013-02/2016	<u>Master degree in Mechanical Engineering</u> , University of Bologna Thesis activity: Development of the acquisition software for a micro-organic Rankine cycle test bench.
04/2016-10/2017	<u>Junior research fellow</u> , University of Ferrara Preliminary experimental tests on micro-scale ORC prototype.
11/2017-10/2020	<u>PhD in “Mechanics and Advanced Engineering Sciences” (DIMSAI), (XXXIII cycle)</u> , University of Bologna Thesis title: “ <i>Test bench development, experimental analysis and modelling of micro-organic Rankine cycle for low-grade heat recovery</i> ”.
09/2019-12/2019	<u>Visiting Ph.D. Scholar</u> at the Lappeenranta University of Technology (LUT), Lappeenranta, Finland, under the advisory of Prof. Teemu Turunen-Saaresti, Department of Energy Technologies. <i>Main research topic related to the dynamic modelling of organic Rankine cycle for low-grade heat recovery, using Simscape library.</i>
11/2019-02/2023	<u>Teaching tutor</u> , Department of Industrial Engineering - University of Bologna.
11/2020-02/2023	<u>Postdoctoral research fellow</u> , Department of Industrial Engineering, University of Bologna.
10/2021-02/2023	<u>Adjunct professor</u> , Department of Civil, Chemical, Environmental and Material Engineering (DICAM) - University of Bologna.
02/2023-	<u>Assistant professor</u> , Department of Industrial Engineering (DIN) - University of Bologna.

Research activity: list of main subjects

- Experimental analysis in stationary and transient conditions of micro-ORC system driven by piston expander, suitable for low-temperature heat recovery.
- Experimental analysis of a micro-ORC system working with partial evaporation and two-phase expansion.
- Modelling analysis of ORC systems for performance prediction in stationary and transient conditions.
- Analysis of low-GWP pure fluids and mixtures as working fluid in organic Rankine cycles.
- Development of hybrid propulsion system for marine application, based on PEM fuel cell, photovoltaic panels and Li-ion battery.
- Off-design experimental analysis of small stationary internal combustion engine fuelled with biogas.
- Optimization analysis of a production, storage and conversion grid integrated with non-programmable renewable source.
- Analysis of the performance and control strategy development for power-to-gas systems used as electricity storage: case of small-scale electrolyser supplied by renewable sources.

Participation in funded research projects (most relevant)

- CTO of UNIBOAT (January 2020 – July 2022), teaching and research project aimed at the development of the structure and of the zero-emission powertrain of a single-seater catamaran. The project involves more than 30 students from different Engineering branches. The Team attended the international competition Monaco Energy Boat Challenge, achieving the first place in two consecutive editions (2021 and 2022).
 - Participant in the European project ERA-Net Smart Energy System “Zero emission hydrogen turbine center- ZEHTC” (Project owner Siemens Industrial Turbomachinery AB), aimed at developing a pilot plant for the integration of renewable energy with a gas turbine testing facility, with the production of green hydrogen to be burned in the gas turbine in blend with natural gas. Other participants: Siemens Industrial Turbomachinery, AGA Industrial Gases – Linde Group, Chalmers University, Finspång Municipality, County Administrative Board of Östergötland.
 - Participant in the project “Ricerca di Sistema Elettrico, Accordo di Programma MiSE-ENEA, PAR 2019-21”, in the topic: Micro-cogeneration systems for the use of biogas for electricity and hot water in small islands.
 - Participant in the project “ENERGYNIUS -Energy Networks Integration For Urban Systems”.
 - Participant in the Project “CLEANPORT – Study and design of LNG systems on board of ships” 2016-2018 funded by POR-FESR 2014-2020 regional project.
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- Participant in the Project “EFFICITY – Efficient energy systems for smart urban districts” 2017-2018 funded by POR-FESR 2014-2020 regional project.
- Participant in the Project “FRIMAG – Development of a refrigerator prototype for food storage” 2017-2018 funded by POR-FESR 2014-2020 regional project.
- Participant in the industrial research project with Nova Somor S.r.l. on the topic “Thermodynamic analysis and modelling of a hydraulic piston pump fed by low grade heat sources”.

Editorial activities

- Guest Editor for the special issue of the journal Energies (MDPI), entitled “Generation, Use, Conversion and Exchange of Thermal Energy”.
- Reviewer for international journals (Applied Energy; Energy; Energy Conversion and Management; Applied Thermal Engineering; Energies; International Journal of Hydrogen Energy; Thermal Science and Engineering Process).
- Reviewer for national/international conferences: ASME Turbo Expo, ORC, ATI, ICAC.

INTERNATIONAL CONFERENCES ATTENDANCE

- 77th Conference of the Italian Thermal Machines Engineering Association (ATI 2022), 12-14 September 2022, Bari, Italia (**author and speaker**).
- 26th Biennial International Symposium on Measuring Techniques in Turbomachinery (MTT2622), 28-30 September 2022, Pisa, Italia (**author and speaker**).
- 6th International Seminar on ORC Power Systems, October 11-13 2021, Munich, Germany (**author and speaker**).
- 4th South East European Conference on Sustainable Development of Energy, Water and Environmental Systems (SEE SDEWES 2020), 28 June – 2 July 2020, Sarajevo, Bosnia and Herzegovina (**author and speaker**).
- 5th International Seminar on ORC Power System, ORC 2019, 9-11 September 2019, Athens, Greece (**author**).
- 73rd Conference of the Italian Thermal Machines Engineering Association (ATI 2018), 12–14 September 2018, Pisa, Italia (**author and speaker**).
- Turbine Technical Conference and Exposition, ASME Turbo Expo 2018, 11-15 June, 2018, Lillestrøm (Oslo), Norvegia (**author and speaker**).
- 16th International Conference on Sustainable Energy Technologies, SET 2017, 17-20 July 2017, Bologna, Italia (**author and speaker**).
- 4th International Seminar on ORC Power System, ORC 2017, 13-15 September 2017, Milano, Italia (**author and speaker**).
- 71st Conference of the Italian Thermal Machines Engineering Association (ATI 2018), 14-16 September 2016, Pisa, Italia (**author**).

TEACHING AND MENTORING EXPERIENCE

- From 2021, Professor of Turbomachinery and offshore engineering, Master Course in Offshore Engineering.
 - Professor in the PhD course “*Future Earth, Climate Change and Societal Challenges*”, module C020 – *Energy systems and environmental impact*, AA 2021-2022 (6 hours).
 - Advisor and co-advisor of more than 40 master and bachelor theses.
 - From January 2020 to July 2022, supervisor of the teaching and research project UniBoAT, aimed at developing the propulsion system of an electric catamaran for boat challenge in Monaco.
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PUBLICATIONS

Publications summary

International Journals	9
International conferences	14
National Conferences	6
Technical reports	2
PhD thesis	1
National Journals	2
All	34

Bibliometric indexes

Scopus database (updated to the date of preparation of this resume):

- Number of documents: **23**
- Number of citations: **210**
- h-index: **8**

LIST OF PUBLICATIONS

International Journals

1. Ancona, Maria Alessandra, Branchini, Lisa, Ottaviano, Saverio, Bignozzi, Maria Chiara, Ferrari, Benedetta, Mazzanti, Barbara, Salvio, Marcello, Toro, Claudia, Martini, Fabrizio, Benedetti, Miriam. Energy and Environmental Assessment of Cogeneration in Ceramic Tiles Industry. **Energies**, Volume 16, Issue 1 January 2023 Article number 182.
2. Ottaviano S., Poletto C., Ancona M. A., Melino F. Experimental investigation on micro-ORC system operating with partial evaporation and two-phase expansion. **Energy Conversion and Management**, 2022, 274, 116415. **Corresponding author.**
3. Bianchi M., Branchini L., De Pascale A. Melino F., Ottaviano S., Peretto A., Torricelli N. Performance and total warming impact assessment of pure fluids and mixtures replacing HFCs in micro-ORC energy systems. **Applied Thermal Engineering**, 2022, 203, 117888.
4. Branchini L., Bignozzi M.C., Ferrari B., Mazzanti B., Ottaviano S., Salvio M., Toro C., Martini F., Canetti A. Cogeneration supporting the energy transition in the italian ceramic tile industry. **Sustainability** (Switzerland), 2021, 13(7), 4006.
5. Lombardo W., Ottaviano S., Branchini L., Vasta S., De Pascale A., Sapienza A. CCHP system based on ORC cogenerator and adsorption chiller experimental prototypes: Energy and economic analysis for NZEB applications. **Applied Thermal Engineering**, 2021, 183, 116119.

6. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Replacement of R134a with low-GWP fluids in a kW-size reciprocating piston expander: Performance prediction and design optimization, **Energy**, 2020, 206, 118174.
7. Ancona M.A., Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A. Overall performance evaluation of small scale LNG production processes, **Applied Science**, 2020, 10(3), 785.
8. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Application and comparison of semi-empirical models for performance prediction of a kW-size reciprocating piston expander. **Applied Energy** 249 (2019), 143–156.
9. Bianchi M., Branchini L., Casari N., De Pascale A., Melino F., Ottaviano S., Pinelli M., Spina P.R., Suman A. Experimental analysis of a micro-ORC driven by piston expander for low-Grade heat recovery. **Applied Thermal Engineering**, 148 (2019) 1278-1291.

National and international conferences with peer review

10. Ancona M. A., Bianchi M., Branchini L., Catena F., De Pascale A., Melino F., Ottaviano S., Peretto A. Optimal Strategy of the Energy Management Within the Microgrid Using the Hydrogen Fueled Gas Turbine. **Proceedings of ASME Turbo Expo 2022**, 13-17 June 2022, Rotterdam.
11. Ottaviano S., Poletto C., De Pascale A., Bianchi M. Experimental analysis of partial evaporation micro-ORC for low-temperature heat recovery. **XXVI Biennial Symposium on Measuring Techniques in Turbomachinery Transonic and Supersonic Flow in Cascades and Turbomachines**, 28-30 September 2022, Pisa, Italia.
12. Ancona M. A., Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Poletto C. Experimental and numerical investigation of a micro-ORC system for heat recovery from data centers. **77st Conference of the Italian Thermal Machines Engineering Association (ATI 2022)**, 12-14 September 2022, Bari, Italia.
13. Ancona M. A., Branchini L., Catena F., De Pascale A., Melino F., Ottaviano S. Development of a Test Bench for Biogas-fueled Internal Combustion Engines Working in Cogeneration Mode for Residential Applications. **77st Conference of the Italian Thermal Machines Engineering Association (ATI 2022)**, 12-14 September 2022, Bari, Italia.
14. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Experimental transient analysis of micro-ORC system for low-grade heat recovery. **Proceedings of the 6th International Seminar on ORC Power Systems**, October 11-13 2021, Munich, Germany.
15. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Performance modelling and greenhouse impact assessment of a micro-ORC energy system working with HFCs, low GWP fluids and mixtures. **E3S Web of Conferences, 2021, 238, 10002. Proceedings of 2020 Applied Energy Symposium (ICAE)**, 100RES 2020, 29 - 30 October 2020.
16. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A. Modelling and validation of micro-scale organic Rankine cycle. "**4th South East European Conference on Sustainable Development of Energy, Water and Environment Systems (SEE-SDEWES)**", 28 June – 2 July 2020, Sarajevo, Bosnia and Herzegovina.
17. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Modelling the impact of low-GWP fluids as substitutes of R134a into a kW-size reciprocating piston expander. "**14th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES)**", 1-6 October 2020, Dubrovnik, Croatia.
18. Lombardo W., Ottaviano S., Branchini L., Vasta S., De Pascale A., Sapienza A. A Dynamic Model Of A Solar Driven Trigeneration System Based On Micro-ORC And Adsorption Chiller Prototypes. **AIP Conference Proceedings, 2019, 2191, 020098. Proceedings of the 74th Conference of the Italian Thermal Machines Engineering Association (ATI 2019)**, 11–13 September 2019, Modena, Italia.

19. Ancona M. A., Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Performance prediction and design optimization of a kw-size reciprocating piston expander working with low-GWP fluids. **"5th International Seminar on ORC Power Systems"**, Athens, Greece, 9-11 September 2019.
20. Bianchi M., Branchini L., Casari N., De Pascale A., Fadiga E., Melino F., Ottaviano S., Peretto A., Pinelli M., Spina P.R., Suman A. Uncertainty quantification of performance parameters in a small scale orc test rig. **"5th International Seminar on ORC Power Systems"**, Athens, Greece, 9-11 settembre 2019.
21. Branchini L., Ancona M. A., Bianchi M., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N, Archetti D., Rossetti N., Ferrari T. Optimum size of ORC cycles for waste heat recovery in natural gas compression station. **"Proceedings of the ASME Turbo Expo 2019: Turbomachinery Technical Conference and Exposition GT2019"**, 17-21 June 2019, Phoenix, Arizona, USA.
22. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N. Performance prediction of a reciprocating piston expander with semi-empirical models. **Energy Procedia, 2019, 158, pp. 1737–1743. 10th International Conference on Applied Energy (ICAE2018)**, 22-25 August 2018, Hong Kong, China.
23. Bianchi M., Branchini L., De Pascale A., Melino F., Ottaviano S., Peretto A., Torricelli N., Zampieri G. Performance and operation of micro-ORC energy system using geothermal heat source. **Energy Procedia, 2018, 148, pp. 384–391. Proceedings of the 73rd Conference of the Italian Thermal Machines Engineering Association (ATI 2018)**, 12–14 September 2018, Pisa, Italia.
24. M. A. Ancona, M. Bianchi, L. Branchini, A. De Pascale, F. Melino, S. Ottaviano, A. Peretto, L. B. Scarponi. Heat recovery from a liquefied natural gas production process by means of an organic Rankine cycle. **Proceedings of ASME Turbo Expo 2018: Turbomachinery Technical Conference and Exposition GT2018** June 11-15, 2018, Lillestrøm (Oslo), Norway.
25. Bianchi M., Branchini L., De Pascale A., Orlandini V., Ottaviano S., Pinelli M., Spina P.R., Suman A., "Experimental Performance of a Micro-ORC Energy System for Low Grade Heat Recovery". **Energy Procedia, 2017, 129, pp. 899–906. IV International Seminar on ORC Power Systems, ORC2017.**
26. Bianchi M., Branchini L., De Pascale A., Orlandini V., Ottaviano S., Peretto A., Melino F., Pinelli M., Spina P.R., Suman A, Experimental Investigation with Steady-State Detection in a Micro-ORC Test Bench. **Energy Procedia, 2017, 126, pp. 469–476. 72nd Conference of the Italian Thermal Machines Engineering Association, ATI2017.**
27. Albertini F., Bennati C., Bianchi M., Branchini L., Cugini F., De Pascale A., Fabbri S., Melino F., Ottaviano S., Peretto A, Rosati J, Solzi M, Preliminary Investigation on a Rotary Magnetocaloric Refrigerator Prototype. **Energy Procedia, 2017, 142, pp. 1288–1293. 9th International Conference on Applied Energy, ICAE2017.**
28. Ancona M.A., Bianchi M., Branchini L., De Pascale A. Melino F., Ottaviano S., Peretto A., Preliminary Experimental Investigation on a Hydraulic Piston Pump Driven by a Solar Micro-Orc Prime Mover, **16th International Conference on Sustainable Energy Technologies, SET 2017.**
29. Ancona, M.A., Bianchi, M., Branchini, L., De Pascale, A., Melino, F., Orlandini, V., Ottaviano, S., Peretto, A., Pinelli, M., Spina, P.R., Suman, A., A Micro-ORC Energy System: Preliminary Performance and Test Bench Development. **Energy Procedia, 2016, 101, pp. 814–821. 71st Conference of the Italian Thermal Machines Engineering Association, ATI 2016; Politecnico di Torino; Italy; 14-16 settembre 2016.**

Other publications

30. Ottaviano S. Test bench development, experimental analysis and modelling of micro-organic Rankine cycle for low-grade heat recovery, **Doctoral Thesis**, 2021.
31. M. A. Ancona, L. Branchini, A. De Pascale, F. Ferrari, F. Melino, S. Ottaviano. Sistemi di microcogenerazione per lo sfruttamento di biogas finalizzati alla produzione di acqua calda sanitaria nelle piccole isole – (anno 2 di 3). **Report Ricerca di Sistema Elettrico**, Accordo di Programma MiSE-ENEA, PAR 2019-21.

32. M. A. Ancona, L. Branchini, A. De Pascale, F. Ferrari, F. Melino, S. Ottaviano. Sistemi ibridi di accumulo per l'incremento dello sfruttamento della risorsa rinnovabile nell'ambito delle comunità energetiche (anno 2 di 3). **Report Ricerca di Sistema Elettrico, Accordo di Programma MiSE-ENEA, PAR 2019-21.**
33. Ancona M.A., Bianchi M., Branchini L., De Pascale A., Melino F., Orlandini V., Ottaviano S. I sistemi a Ciclo Rankine organico nell'ambito della micro cogenerazione. **InfobuildEnergia** (Rivista online), 1 marzo 2017.
34. Ancona, M.A., Bianchi, M., Branchini, L., De Pascale, A., Melino, F., Orlandini, V., Ottaviano, S., Peretto, A., Pinelli, M., Spina, P.R., Suman, A Realizzazione di un banco prova per la caratterizzazione sperimentale di un sistema energetico micro-ORC. Rivista **La Termotecnica** (gennaio/febbraio 2017).

Bologna, 10/06/2023

Saverio Ottaviano

