

CURRICULUM VITAE ET STUDIORUM (May 2025)

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Scientific activity

2024-2025 Associate Professor of Technical Physics of the Faculty of Engineering at the University of Cagliari

2011-2012 Research Fellowship position in the Department of Mechanical Engineering at the University of Maryland, located in College Park, MD 20742, USA. His tenure lasted from August 04th, 2011 to May 15th, 2012 and he worked in the area of Thermoacoustic Energy Harvesters (TAEH) for converting the acoustic energy into electrical energy without the need for any moving components

2006-2024 Assistant Professor of Technical Physics of the Faculty of Engineering at the University of Cagliari;

2004-2006 Research fellowship in Mathematical models in support of energy planning on a regional scale

2001-2003 Senior Researcher at ST Microelectronics in the field of Digital Signal Processing for Voice Technology and acoustic Automotive applications

1997-2000 PhD at the Department of Mechanical Engineering of the University of Cagliari in Thermo – Mechanical measurements.

Teaching Activity

University Courses

2006-today Course of “HVAC and Solar Energy System” for Civil, Mechanical, Electrical and Power engineer students of the University of Cagliari

2007-today Course of “Technical Physics” for Civil engineer students of the University of Cagliari

2024 2025 Course of Energetic (6 CFU) for Energetic engineer students of the University of Cagliari

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High school Courses

2003-2005 Course of “Electronic and Electro-Technical” at the Technical Institute “Galileo Ferraris” (Iglesias, Italy)

Education

1997-2000 PhD at the Department of Mechanical Engineering of the University of Cagliari in Thermo – Mechanical measurements.

1997 Degree in Electrical Engineering University of Cagliari.

1989 Classical high school degree.

Scientific Coordinator, collaborations of Research Projects

2023 -2027 Responsabile scientifico per il Dipartimento DICAAR dell'Università degli Studi di Cagliari dell'OR8 riguardante il “MIGLIORAMENTO ED OTTIMIZZAZIONE DELLA COMPONENTE TERMODINAMICA DEL PROCESSO PRODUTTIVO DEL PANE SENZA GLUTINE CARASAU”. Obiettivo di ricerca contemplato nel progetto di ricerca AISAC “Tecnologie ict e dell'industria 4.0 per l'analisi e l'ingegnerizzazione di sistemi alimentari complessi per la produzione di pani artigianali locali ad alto valore aggiunto”. Ente finanziatore MIMIT, importo compressive del progetto 10M€

2020 -2023 Scientific coordinator for DICAAR department concerning PON project "Ingegnerizzazione e Automazione del Processo di produzione tradizionale del pane Carasau (IAPC)" (2020-2023)

2017 - 2023 Thermoacoustic technology for solar and waste heat powered energy conversion systems, Progetto Prin Scientific coordinator research unit UNICA

2018 - 2021 "E2read " Efficientamento Energetico dei processi di Refrigerazione della catena Alimentare nella grande Distribuzione

2018 - 2021 Technical Coordinator for the international project Decibel Interreg -Italia- Francia Maritime 2018-2021 "Dépollution acoustique des centres portuaires urbains et insulaires" . International Partnership composed by University of Genoa , ANCI Tuscany, Olbia e da Chambre de Commerce de Bastia et de la Haute-Corse (Francia)

2018 - 2021 Technical Coordinator for the international project Report Interreg -Italia- Francia Maritime 2018-2021 "Rumore e Porti". International Partnership composed by University of Cagliari, of Pisa, of Genoa , Centre Scientifique et Technique du Bâtiment (France), Université de Corse Pasquale Paoli (France) e ARPAT Tuscany

2018 - 2021 Technical Coordinator for the international project LIST-PORT Interreg -Italia- Francia Maritime 2018-2021 "Limitazione Inquinamento Sonoro da Traffico nei Porti commerciali". International Partnership composed by University of Cagliari, of Pisa, Olbia city, Nizza (France), ANCI Liguria, Anci Tuscany, Camera di Commercio di Bastia (France), Groupement d'Intérêt Public pour la Formation et l'Insertion Professionnelle de l'Académie de Nice (Francia) and Olbia city

2016 Direction of the activities concerning the scientific collaboration for the "Investigation on Solar-powered thermoacoustic traveling wave engine converter for Sardinian applications" project in collaboration with Prof. Tetsushi Biwa (Tohoku University, Senday, Japan).

2015 Direction of the activities concerning the scientific collaboration for the "Novel heat engines and refrigerators" project in collaboration with Prof. Arthur Jaworsky (University of Leeds, U.K.)

2009 Energy plan and Strategic Environmental Assessment of the town of Cagliari

2009 Energy Plan and Strategic Environmental Assessment of the town of Olbia

2009 Thermal characterization of ceramic materials for the enthalpy storage at medium and high temperature in a solar thermal power plant

2009 Innovation and Technology in the stone industry: Sandwich Panels. Thermal characterization in the laboratory and implementation of a computational model for predicting the thermal performance of stone sandwich elements (Promea s.r.l.)

2003-2008 Regional Energy plan and Strategic Environmental Assessment of the Sardinia

2008 Project to build a refrigeration system using solar-powered absorption cooling machine (Consortium Parco Geominerario)

2008 Hydrogen from wind energy for the energy independence of the cars of Sardinia. Executive Project. (FRI-EL Green Power S.p.A)

2008 European Union Project "Emergence 2010": Etude d'une installation pilote pour l'utilisation de l'Hydrogene produit a partir de l'Energie Solaire par systeme photovoltaïque. Etude de Faisabilité. Project en Méditerranée pour des energie renouvelables garantissant l'électrification de noyaux de croissance écologique en 2010.

2008 Study of the thermal conductance as a function of multilayer composite materials (Sared s.r.l.)

- 2008 Determination of the thermal conductivity and diffusivity of a series of insulation panels made of Sardinian sheep's wool (Brebey)
- 2007 Determination of the thermal conductivity of building elements for the thermal insulation (Karalis s.r.l.).
- 2007 Steady state efficiency curve of solar thermal collectors according to the UNI-EN12975 standard (Proxima s.r.l.)
- 2007 Wind data analysis to test the potential of wind energy in Sardinia

Research Interests

- Thermoacoustic heat engine and refrigerator experimental analysis and theoretical aspects
- Heat and Mass Transfer
- identification and pattern recognition models applied to non steady state thermodynamic processes;
- physical-mathematical models of short and long-term response and experimental verification of response of ground heat exchangers for energy analysis of ground source heat pump systems;
- thermodynamics of the building – plant system and new experimental and analytical method for buildings energy certification;
- innovative methods for determining the thermal properties of materials (thermal conductivity and diffusivity).
- Solar Energy

Service activity for the community

- 2009-today Referee for the International Journals “Applied Energy” and “Solar Energy”

Publications

Baccoli R., Di Meglio A., Fenu A., Massarotti N. Design and performance of a ThermoAcoustic Electric Generator powered by waste-heat based on linear and nonlinear modelling (2025) Applied Thermal Engineering, 276, art. no. 126938, DOI: 10.1016/j.applthermaleng.2025.126938 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-105006698856&doi=10.1016%2fj.applthermaleng.2025.126938&partnerID=40&md5=f0a32b7b40a3926ee028945fcfa4b2bf>

Durairaj D., Paramasivam S., Rajamohan N., Rajasimman M., Yennamalli R.M., Baccoli R., Gatto G. Performance of functionalized CNT membranes for desalination - Parametric effects and Artificial neural network modelling (2025) Cleaner Engineering and Technology, 26, art. no. 100977, DOI: 10.1016/j.clet.2025.100977 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-105003554097&doi=10.1016%2fj.clet.2025.100977&partnerID=40&md5=905e7b191522b375b105e5929c2d61e7>

Majumder A., Kumar A., Innamorati R., Mastino C.C., Cappellini G., Baccoli R., Gatto G. Cooling Methods for Standard and Floating PV Panels (2023) Energies, 16 (24), art. no. 7939, DOI: 10.3390/en16247939 <https://www.scopus.com/inward/record.uri?eid=2-s2.0->

85180660472&doi=10.3390%2fen16247939&partnerID=40&md5=0c13b575c91af2b58ef563baa30afcf9

Majumder A., Achenza M., Mastino C.C., Baccoli R., Frattolillo A. A Thermo-acoustic building insulation materials fabricated with recycled fibers – Jute, Wool and Loofah (2023) *Energy and Buildings*, 293, art. no. 113211, DOI: 10.1016/j.enbuild.2023.113211 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85161259434&doi=10.1016%2fenbuild.2023.113211&partnerID=40&md5=1fa7e2eaaa2663588a4b6fa0d6eac96d>

Baccoli R., Sollai F., Medda A., Piccolo A., Fadda P. An adaptive nonlinear autoregressive ANN model for high time resolution traffic noise predictions. Experimental results for a port city waterfront (2022) *Building and Environment*, 207, art. no. 108551, DOI: 10.1016/j.buildenv.2021.108551 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85120001650&doi=10.1016%2fj.buildenv.2021.108551&partnerID=40&md5=429633dca46bd780a777d11231c49a0d>

Piccolo A., Prestipino M., Panzera M.F., Baccoli R. Study of the Correlation among Luminous Properties of Smart Glazing for Adaptive Energy Saving Buildings (2023) *Buildings*, 13 (2), art. no. 337, DOI: 10.3390/buildings13020337 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85149226639&doi=10.3390%2fbuildings13020337&partnerID=40&md5=70dc379f600f63c2280d1eb3ac96f61e>

Ramasamy S., Baccoli R., Meo S., Gatto G., Kumar A. Neutral Point Clamped Non-Isolated Three Phase Grid-Integrated PV Inverter Topologies for Leakage Current Reduction (2023) *International Review of Electrical Engineering*, 18 (2), pp. 88 - 99, DOI: 10.15866/iree.v18i2.23629 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85165909266&doi=10.15866%2firee.v18i2.23629&partnerID=40&md5=4e2962a301ca6ebb6d2b259ca7be10d2>

Baccoli R., Kumar A., Concas A., Gatto G., Pintus N., Medda A., Rodriguez G. Thermal diffusivity from Fourier's inverse problem supervised by an optimization model: Theoretical analysis and experimental validation (2022) *Case Studies in Thermal Engineering*, 40, art. no. 102533,, DOI: 10.1016/j.csite.2022.102533 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85142662904&doi=10.1016%2fj.csite.2022.102533&partnerID=40&md5=30374b98d2220ac08fa7d3ec5cf83856>

Kumar A., Moradpour M., Losito M., Franke W.-T., Ramasamy S., Baccoli R., Gatto G. Wide Band Gap Devices and Their Application in Power Electronics (2022) *Energies*, 15 (23), art. no. 9172, DOI: 10.3390/en15239172 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85143754341&doi=10.3390%2fen15239172&partnerID=40&md5=3c5b85b8154d719f800beae71b3e2b2f>

Cossu S., Baccoli R., Ghiani E. Utility scale ground mounted photovoltaic plants with gable structure and inverter oversizing for land-use optimization (2021) *Energies*, 14 (11), art. no. 3084, <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85107494450&doi=10.3390%2fen14113084&partnerID=40&md5=6b9cd43b0f0b7395217a07c33904c44a>

- **Baccoli, R., Kumar, A., Frattolillo, A., Mastino, C., Ghiani, E., & Gatto, G. (2021).** Enhancing energy production in a PV collector – reflector system supervised by an optimization model: Experimental analysis and validation. *Energy Conversion and Management*, 229 doi:10.1016/j.enconman.2020.113774
- Sollai, F., **Baccoli, R., Medda, A., Fancello, G., Serra, P., & Fadda, P. (2020).** Processes for noise reduction in urban port fronts doi:10.1007/978-3-030-58820-5_3 Retrieved from www.scopus.com
- Kumar, A., **Baccoli, R., Fais, A., Cincotti, A., Pilia, L., & Gatto, G. (2020).** Substitution effects on the optoelectronic properties of coumarin derivatives. *Applied Sciences (Switzerland)*, 10(1) doi:10.3390/app10010144
- Marini, M., **Baccoli, R., Bella, A. D., Mastino, C. C., Trulli, N., & Solinas, E. (2020).** Comparison between calculated and measured performances of impact sound insulation for cross laminated timber building elements. Paper presented at the Euronoise 2015, 2503-2507. Retrieved from www.scopus.com
- **Baccoli, R., Frattolillo, A., Mastino C. C., Di Pilla L.** An adaptive dynamic neural network model for thermal characterization of building components, International Conference Climamed 2017 AICARR Beyond NZEB buildings May 10-11 2017 Matera
- Marini, M., **Baccoli, R., Mastino, C.C., Bella, A.D.** [Evaluation of the influence of ventilation holes on the facades sound insulation](#) 2016 ICSV 2016 – 23rd International Congress on Sound and Vibration: From Ancient to Modern Acoustics
- Marini, M., Frattolillo, A., **Baccoli, R., Carlo Mastino** Incidence of the Ventilation Holes and the Mechanical Ventilation Systems of Façade on the Noise Insulation 2016 Energy Procedia
- Marini, M., **Baccoli, R., Mastino, C.C., Di Bella, A., Masullo** Issues on the evaluation of low frequency noise emitted by wind turbines , 2016 Proceedings of the INTER-NOISE 2016 – 45th International Congress
- **Baccoli, R., Mastino, C.C., Innamorati, R., Ricciu, R., Marini, M.** [A mathematical model of a solar collector augmented by a flat plate above reflector: Optimum inclination of collector and reflector](#) 2015 *Energy Procedia*
- **Pia, G., Casnedi, M.L., Ricciu, R. Meloni, P., Baccoli, R., Sanna, U.** [Application of a novel method for a simulation of conductivity of a building material in a climatic chamber](#) 2015 *Energy Procedia*
- **Mura, P.G., Baccoli, R., Innamorati, R., Mariotti, S.** [An energy autonomous house equipped with a solar PV hydrogen conversion system](#) 2015 *Energy Procedia*
- **Mura, P.G., Baccoli, R., Innamorati, R., Mariotti, S.** [Solar energy system in a small town constituted of a network of photovoltaic collectors to produce Electricity for homes and hydrogen for transport services of municipality](#) 2015 *Energy Procedia*
- **Baccoli, R., Mastino, C., Rodriguez, G.** [Energy and exergy analysis of a geothermal heat pump air conditioning system](#) 2015 *Applied Thermal Engineering* , pp. 333-347
- **Marini, M., Baccoli, R., Mastino, C.C., Solinas, E.** [Assessment and comparison among prediction methods for the low frequency noise produced by wind turbines: Application to a case study](#) 2014 Proceedings of Forum Acusticum
- **Baccoli, Mastino C., Amr Baz** Boundary Layer structure to derive marginal condition for spontaneous oscillations of a Thermoacoustic engine coupled with a piezoelectric element. *Energy procedia* Vol 45 2014 .2014 issn 1876-6102
- **Baccoli, Mastino C., Amr Baz** Marginal condition for the onset of Thermoacoustic Piezo System oscillations with variable impedance and subject to variable temperature gradient

Roberto Baccoli, Amr Baz University of Cagliari (Sardinia); University of Maryland (USA) International Congress on Acoustics AIA DAGA Merano 2013.

- Caocci G, **Baccoli** R, Littera R, Orrù S, La Nasa G Comparison Between An Artificial Neural Network And Logistic Regression In Predicting Long Term Kidney Transplantation Outcome. 2013 Intech; Rijeka; Isbn : 9789535109358
- **Baccoli**, Carlini U., Mariotti S., Innamorati R., Solinas E., Mura P. (2010). Graybox and adaptative dynamic neural network identification models to infer the steady state efficiency of solar thermal collectors starting from the transient condition. *Solar energy*, vol. 84; p. 1027-1046, ISSN: 0038-092X, doi: 10.1016/j.solener.2010.03.011
- **Baccoli**, Mura P.G., Carlini U., Innamorati R., Mariotti S., (2010). Energy analysis of a geothermal heat pump air conditioning system for regions with mild climates. In: Rehva congress Clima 2010 sustainable energy use in buildings. Antalya, 9 12 May 2010, ISBN 978-975-6907-14-6
- Mura P.G., Carlini U., Innamorati R., Mariotti S., **Baccoli**, (2010) Methodology to measure the thermal conductance of the elements of the buildings. Metrological analysis of the operations on the materials placed in work and in the laboratory: *Energia per lo sviluppo sostenibile*. Cagliari, 13-17/09/10, vol. 1, ISBN/ISSN: 978 8890411632
- Mura P.G., Carlini U., Innamorati R., Mariotti S., **Baccoli**, (2010) A Mathematical model based on discrete fourier transform for the thermodynamics analysis and applications of geothermal heat pump system in mild climate regions: *Energia per lo sviluppo sostenibile*. Cagliari, 13-17/09/10, vol. 1, ISBN/ISSN: 8890411632.
- Caocci G., **Baccoli**, Vacca A., Mastronuzzi A., Bertaina A., Piras E., Littera R., Locatelli F., Carcassi C., La Nasa G. (2010). Comparison between an artificial neural network and logistic regression in predicting acute graft-versus-host disease following unrelated donor hematopoietic stem cell transplantation in thalassemia patients. *Experimental hematology*, vol. 38; p. 426-433, ISSN: 0301-472X, doi: 10.1016/j.exphem.2010.02.012
- Caocci G., **Baccoli**, La Nasa G. 2009). Hemoglobin Fluctuations and Correlation with Quality of Life and Fatigue. In: Preedy V.R and Watson R.R. *Handbook of Disease Burdens and Quality of Life Measures*. vol. Part 3, p. 1867-1879, New York: Springer New York, ISBN/ISSN: 978-0-387-78664-3 (Print), doi: 10.1007/978-0-387-78665-0_110
- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S., Solinas E. (2008) Test bench apparatus to determine the energy efficiency of solar thermal collectors In: *Energia per lo sviluppo sostenibile*. Palermo, 23/09/08, Milano: Dario Flaccovio Editore – Italy, vol. 1, ISBN/ISSN: 9788877588395
- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S (2007). Methodologies for Energy certification of buildings. In: “Methodologies for Energy certification of buildings”- Internat. Congress- Climamed 2007 – Energy; climate and indoor comfort in Mediterranean countries – Genova – Italy –September 5th through 7th 2007. Genova, 05/09/07, Milano: aicarr, vol. 1, p. 121-129, ISBN/ISSN: 978889562002
- Caocci G., **Baccoli**, Ledda A., Littera R., La Nasa G. (2007). A mathematical model for the evaluation of amplitude of hemoglobin fluctuations in elderly anemic patients affected by myelodysplastic syndromes: correlation with quality of life and fatigue. *Leukemia Research*, vol. 31; p. 249-252, ISSN: 0145-2126
- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S. (2005). Modello computazionale dei flussi di energia, massa e materia in un sistema energetico regionale per la valutazione delle emissioni. *La termotecnica*, vol. 9; p. 56-63, ISSN: 0040-3725
- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S. (2005). Un Algoritmo per il calcolo del fabbisogno regionale di energia per il riscaldamento residenziale. *Cda Condizionamento dell’aria riscaldamento refrigerazione*, vol. 9, ISSN: 0373-7772
- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S. (2005). Scenari di Generazione Elettrica nell’ipotesi di Regione elettricamente isolata – Ruolo del Metano e delle Fonti

Rinnovabili per la riduzione delle emissioni. In: Conferenza Nazionale Sulla Politica Energetica In Italia., 18 – 19 Aprile 2005

- Mura P.G., **Baccoli**, Carlini U., Innamorati R., Mariotti S. (2005). Proposte per la produzione di Idrogeno da Fonti Rinnovabili in Sardegna per impianti industriali di grande potenza. In: Conferenza Nazionale Sulla Politica Energetica In Italia. Bologna, 18-19/10/05