

Scientific Curriculum of Carlo Barone

Personal information: Carlo Barone [REDACTED]. During the research activity, 67 scientific publications have been made on scientific journals with peer review, on journals or books with conference proceedings, and in books chapters. Carlo Barone has been the first author of 34 of these publications. The bibliometric indicators are:

- citations = 742, h-index = 19, i10-index = 26 (Scopus source);
- citations = 728, h-index = 19, i10-index = 26 (Web of Science source).

Professional positions:

- November 2019 – today: Senior Researcher (RTDB - Tenure Track) at the Department of Physics (University of Salerno). Scientific Sector = 02/B1 - Experimental Condensed Matter Physics.
- April 2008 – August 2019: Research Fellow at University of Salerno. Scientific Sectors = FIS/01 - Experimental Physics and FIS/03 - Condensed Matter Physics.
- November 2004 – October 2007: PhD in Physics (Research Area: Experimental Condensed Matter Physics) at the Department of Physics (University of Salerno).

Education and training:

- February 2008: Philosophiæ Doctor in Physics (University of Salerno), by discussing a thesis entitled “Electrical transport and low-frequency noise in perovskitic magnetic compounds”.
- September 2003: Master in “Technologies and Applications of Computer science for the Territorial Management (GIS)” (IIASS - Vietri sul Mare, Salerno).
- July 2002: Degree in Physics (University of Salerno), by discussing a thesis entitled “Temporal variations of Q-coda parameter in Vesuvius area”.

Scientific habilitations and professional certificates:

- April 2017: National Scientific Habilitation for Associate Professor in 02/B1 (Experimental Condensed Matter Physics).
- October 2014: Professional certificate as “Crane Operator” (EQF = 3).
- February 2004: Professional certificate as “Expert in Computer Applications for the Territorial Management” (EQF = 7).

Scientific responsibility in Italian and international projects:

- February 2021 – February 2024: Principal Investigator and Coordinator of the project entitled: “Fluctuations and complexity in Condensed Matter Physics and modeling of Sanitary Systems”, funded by University of Salerno.
- December 2019 – December 2025: Principal Investigator and Coordinator of the project entitled: “Study of the electric transport and fluctuation properties in innovative materials”, funded by University of Salerno.
- April 2012 – February 2013: Principal Investigator and Coordinator of the “Seed” project entitled: “Is weak localization detected by $1/f$ noise?”, funded by National Research Council (CNR-SPIN Institute).

Participation in Italian and international projects:

- 2021 – 2023: INFN DARTWARS Experiment - “Detector Array Readout with Traveling Wave Amplifiers”, funded by National Institute for Nuclear Physics.

- 2019 – 2022: FARB 2018 Project - “Complexity in Condensed Matter Physics and in Sanitary Systems”, funded by University of Salerno.
- 2019 – 2021: INFN SIMP Experiment - “Single Microwave Photon Detection”, funded by National Institute for Nuclear Physics.
- 2017 – 2021: INFN FEEL Experiment - “Future Energy Efficient Electronics”, funded by National Institute for Nuclear Physics.
- 2017 – 2020: FARB 2017 Project - “Complexity, Fluctuations and Coherence in Solid State Physics and Sanitary Systems”, funded by University of Salerno.
- 2015 – 2017: FARB 2015 Project - “Complexity in Solid State Physics and Sanitary Systems”, funded by University of Salerno.
- 2013 – 2015: FARB 2013 Project - “Complex Systems in Physics and Public Health”, funded by University of Salerno.
- 2011 – 2014: European Project FP7-NMP IRON-SEA - “Establishing the basic science and technology for Iron-based superconducting electronics applications”, funded by European Union.

Fellowships:

- June 2008 – July 2008: Winner of a THIOX Short Visit Grant entitled “Low-frequency noise measurements in manganite thin films for bolometric applications” at GREYC-Ensicaen Laboratory (Université de Caen & ENSICAEN, Caen, France), funded by European Science Foundation (Strasbourg).
- April 2007 – June 2007: Winner of a THIOX Exchange Grant entitled “Low frequency noise measurements in $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ thin films: effect of geometries, contact materials and substrates” at GREYC-Ensicaen Laboratory (Université de Caen & ENSICAEN, Caen, France), funded by European Science Foundation (Strasbourg).

Institutional activities:

- November 2020 – today: Member of the Committee for the University Funds of Basic Research (FARB – ex 60%) at the Department of Physics (University of Salerno).
- January 2020 – November 2020: Member of the Help Teaching/Tutoring Committee at the Department of Physics (University of Salerno).
- November 2018 – today: Member of the Technical and Scientific Committee for Istituto Tecnico Superiore (ITS) ERMETE, funded by Regione Campania and Ministero dell’Istruzione, dell’Università e della Ricerca (Italy).

Editorial and referee activities:

- March 2018 – today: Member of REPRISE, the Register of Scientific Experts set up at the MIUR, for the section “Applied research”.
- June 2015 – today: Member of the Editorial Board for Scientific Reports, a journal from Nature Publishing Group.
- 2013 – today: Referee for several international scientific journals (Journal of Non-Crystalline Solids, Physics Letters A, Materials Today: Proceedings, ACS Applied Materials & Interfaces, Nanoscale, etc.).

Awards and recognitions for research activity:

- 2017: Research Award by the University of Salerno as contributing author of the paper entitled: “Correlation between Electronic Defect States Distribution and Device Performance of Perovskite Solar Cells” [Advanced Science 4, 1700183 (2017)], added into Highlights 2017 of the CNR-SPIN Institute.

- 2016: Research Award by the University of Salerno as first author of the paper entitled: “Unravelling the low-temperature metastable state in perovskite solar cells by noise spectroscopy” [Scientific Reports 6, 34675 (2016)], added into Highlights 2016 of the CNR-SPIN Institute.

Participation at invited seminars and conferences:

- 6 invited talks and seminars from 2011 to 2021.
- 15 oral contributions at international conferences from 2005 to 2021.
- 22 poster contributions at international conferences from 2006 to 2021.

Didactic activity:

- Academic Years 2019/2020 and 2020/2021: Didactic activity at the University of Salerno inside the courses of Laboratory of Physics II (Degree in Physics), Physics with Practice in Laboratory II (Degree in Mathematics), and Physics I (Degree in Chemistry).
- Academic Years 2016/2017, 2019/2020 and 2020/2021: Graduate School Lecture entitled “Electric noise spectroscopy: a window inside condensed matter properties” inside the PhD Course in Mathematics, Physics and Applications at University of Salerno.
- July 2012: Member of the examination Committee for the assignment of the PhD title in "Electronics, microelectronics and nanoelectronics" at Université de Caen Basse-Normandie (Caen, France).

Brief description of the scientific activity:

The research activity of Carlo Barone has mainly concerned with the experimental study of low-temperature electric transport properties in superconductivity and in innovative materials and devices. A special attention has been focused on the analysis of intrinsic electric fluctuations in high critical temperature superconductors, in manganites, in polymer/carbon nanotubes composites, and in photovoltaic devices (such as: silicon, organic, and perovskite solar cells). In particular, recently photovoltaic devices based on perovskites have been developed, similar to polymeric cells but with significantly better energy efficiency. The investigation of electric transport, photoresponse and fluctuation mechanisms carried out on high-quality perovskitic cells, fabricated at the Institut für Silizium Photovoltaik in Berlin, has allowed to highlight the effects of structural transitions in the perovskite and the evaluation of active defect states. Beyond the experimental activity, theoretical models of transport and fluctuation mechanisms at work in the materials and devices studied have been developed, in order to obtain more detailed information on the kinetic and dynamic processes of the charge carriers.