

CURRICULUM VITÆ OF MARCO SALLUZZO

Personal Information



CNR-SPIN

Complesso Monte S. Angelo, via Cinthia 80126, Napoli, Italy



Current Position: Research Director at the National Research Council (CNR) SPIN Institute, UOS NAPOLI

Marco Salluzzo is a researcher at the CNR-SPIN Institute (former INFM-COHERENTIA), Italy since 2003, Prof. (Extraordinary) of Mechanics, Thermodynamics and Electromagnetism at the Engineering Faculty at the University of Naples "Federico II" (until 2013), and Lecturer of the Phd course "Advanced spectroscopy techniques on oxides (2011-2015).

As CNR-Researcher, he participated to national and international projects with leading roles. He was EU coordinator of the EU-H2020 ERANET QUANTERA project QUANTOX (2018-2022), responsible for the INFM-COHERENTIA Institute of the FP6 European STREP Project "NANOXIDE" (2006-2009), coordinator of the CNR-projects/Activities "Advanced spectroscopic characterizations of oxides and interfaces" (2010-2011) and "Superconducting and correlated low dimensional materials and devices for quantum electronics and spintronics" (Activity B), and responsible for the CNR-SPIN unit of the PRIN project "orbital and spin physics in cuprate and manganite heterostructures" (2011-2013) financed by MIUR (Italian funding Agency).

Currently, he is national PI of the PRIN project "two-dimensional oxides platform for spin-orbitronics nanotechnology" (2019-ongoing), and responsible for the CNR-SPIN unit of the PRIN project "QT-FLUO" (2022-ongoing).

MS research activities are focused on the electronic, magnetic and superconducting properties of strongly correlated oxides and related heterostructures, and their quantum spintronic and quantum electronic applications. The main topics over the past seven years research were the electronic and magnetic properties of the two-dimensional electron system at the $\text{LaAlO}_3/\text{SrTiO}_3$ interface, the mechanism of superconductivity in cuprates, and the study of the magneto electric effects in artificial and improper multi-ferroics. He participated to the resonant inelastic x-ray scattering studies on high T_c superconductors which led to the discovery of ubiquitous paramagnon excitations [Nature Physics 7, 725 (2011)] and of the charge density waves in doped superconducting cuprates [Science 337, 821 (2012)]. He guided the research activity in the field of q2DEG electron gas at the oxide interfaces, including the realization of a tuneable ferromagnetic and superconducting q2DEG in delta doped $\text{LaAlO}_3/\text{EuTiO}_3/\text{SrTiO}_3$ heterostructures [Nature Materials 15, 278 (2016)]. Finally, he supervised the CNR-SPIN experimental research activities on the study of improper BiMnO_3 [Appl. Phys. Lett. 103, 062902 (2013)] and artificial LSMO/PZT multiferroics [Phys. Rev. Lett. 115, 157401 (2015)].

He is expert of x-ray spectroscopy and diffraction techniques using synchrotron radiation, of electric field effect phenomena in complex oxides, growth of epitaxial heterostructures, and of scanning probe microscopy of oxides. He has also extensive experience on microwave devices with oxides.

As expert in synchrotron radiation x-ray diffraction and spectroscopy, he was member of the peer Review panel for proposals of the synchrotron radiation facilities SOLEIL (2012-2017) and ESRF (2016-2019), and representative for the "Electronic Structure & Magnetism" scientific community of ESRF (2015-2020).

MS is author of above 110 articles published in peer-reviewed journals (including Science, Nature Materials, Nature Physics, Nature Comm., Adv. materials, Phys. Rev. Lett.) and gave several invited and oral talks at international workshops and conferences (MRS, E-MRS, CMD, ECOSS, WOE, ICAM, APS March meeting).

Bibliometric indexes:

H-INDEX (ISI-WEB)=30

H-INDEX (SCOPUS)=30

H-INDEX (Google Scholar)=34

N. Citazioni totali (ISI-WEB) =4120

N. Citazioni totali (SCOPUS)=4273

N. Citazioni totali (Google Scholar) =6050

ResearcherID: C-5919-2009

Publons: <https://publons.com/a/1365032>

ORCID: <http://orcid.org/0000-0001-8372-6963>

• RESEARCH and SCIENTIFIC HIGHLIGHTS

MS research activity is focused on the physics and quantum application of transition metal oxides. His research activities in the last years have been in the field of topological quantum physics of oxide 2DEGs, and more recently in the field of spin-orbitronics and quantum spin-orbitronics system based on low dimensional systems with large Rashba-like Spin-orbit coupling and characterized by magnetic, and superconducting properties, like strongly correlated oxide materials. He is among the pioneers in the studies of electronic and magnetic properties of the two-dimensional electron system at the $\text{LaAlO}_3/\text{SrTiO}_3$ interface. He guided the research activity in the field of 2D-electron gas at the oxide interfaces, including the realization of a tuneable ferromagnetic and superconducting 2DEGs in delta doped $\text{LaAlO}_3/\text{EuTiO}_3/\text{SrTiO}_3$ heterostructures [Nature Materials 15, 278 (2016)] and demonstration of ballistic quantum point contact in oxide 2DEGs [Nature Electronics (2020)].

-Orbital Reconstruction and magnetism at the LAO / STO interface: In the last decade, the discovery of a quasi 2D-electron gas at the interface between non-magnetic LaAlO_3 and SrTiO_3 (STO) band insulators has boosted the expectations in oxide electronics thanks to the extraordinary functional properties uncovered. A complex phase diagram has been revealed for this system, including unconventional superconductivity and magnetism, possibly related to the presence of strong correlations in quantum-confined 3d-bands. By using a combination of x-ray spectroscopy and diffraction techniques, the CNR-SPIN team, coordinated by MS, has given important contribution in the field by demonstrating that the LAO/STO interface is characterized by an orbital reconstruction, and in particular by a reversal of the bands with respect to bulk SrTiO_3 . This result was interpreted as evidence of intrinsic electronic reconstruction in the system, as opposed to cases of common atomic reconstruction in cases of 2DEGs in semiconducting heterostructures. [M. Salluzzo, et al., *Structural and Electronic Reconstructions at the $\text{LaAlO}_3/\text{SrTiO}_3$ interface*, Adv. Mater. 25, 2333 (2013); M. Salluzzo, et al., *Orbital Reconstruction and the Two-Dimensional Electron Gas at the $\text{LaAlO}_3/\text{SrTiO}_3$ Interface*, Phys. Rev. Lett. 102, 166804 (2009)]. Moreover, we demonstrated that the magnetism of this system is directly related to the formation of oxygen vacancies and therefore it is not intrinsic. [M. Salluzzo, et al., *Origin of interface magnetism in $\text{BiMnO}_3/\text{SrTiO}_3$ and $\text{LaAlO}_3/\text{SrTiO}_3$ heterostructures*, Phys. Rev. Lett. 111, 087204 (2013)].

-Electric field tuneable superconducting and spin-polarized 2D-electron gas at the interface between engineered oxides: Advances in growth technology of oxide materials allow single atomic layer control of heterostructures. In particular delta-doping, a key materials' engineering tool in today's semiconductor technology, is now also available for oxides. The CNR-SPIN team, coordinated by MS, has for the first time engineered a fully electric-field-tuneable spin-polarized and superconducting quasi-2D electron gas (q2DEG) by inserting few unit cells of EuTiO_3 at the interface between LaAlO_3 and SrTiO_3 oxides. The spin polarization emerges below the ferromagnetic transition temperature of the EuTiO_3 layer ($T_{FM}=8$ K) and it is due to the exchange interaction between the magnetic moments of Eu-4f and of Ti-3d electrons. Moreover, in a large region of the phase diagram, superconductivity sets in from a ferromagnetic normal state. The occurrence of magnetic interactions, superconductivity and spin-orbit coupling in the same q2DEG, makes the $\text{LaAlO}_3/\text{EuTiO}_3/\text{SrTiO}_3$ system an intriguing platform for the emergence of novel quantum phases in low-dimensional materials. [D. Stornaiuolo, et al., *Tunable spin polarization and superconductivity in oxide engineered interface*, Nature Materials 15, 278 (2016)].

-Study of the mechanism of superconductivity in High-Tc cuprates by RIXS: In the last few years the research on high Tc cuprate superconductors has advanced tremendously thanks to the development by the Milano-Politecnico team (G. Ghiringhelli, L. Braicovich, 2018 EPS Awards) of the high resolution soft-x-ray Resonant Inelastic x-ray scattering (RIXS) technique. The CNR-SPIN team, coordinated by MS, in collaboration with the Milano-Politecnico team, has contributed substantially to the research discoveries in the field, namely the demonstration of paramagnon excitations [M. Le Tacon, et al. *Intense paramagnon excitations in a large family of high-temperature superconductors.*, Nature Physics 7, 725 (2011)] and of "charge density waves" in superconducting cuprates [G. Ghiringhelli, et al *Long-Range incommensurate Charge Fluctuations in $(Y,Nd)\text{Ba}_2\text{Cu}_3\text{O}_{6+x}$* , Science 337, 821-825 (2012)]. More recently Charge-order has been found by our group also in the new infinite layer nickelates NdNiO_2 (G. Krieger, *Charge and Spin Order Dichotomy in NdNiO_2 Driven by SrTiO_3 Capping Layer*, Phys. Rev. Lett. 129, 027002 (2022)), with some similarities but also crucial differences compared to cuprates. These findings have revolutionized the current understanding of the high Tc superconductivity mechanisms and are a subject of intense international research.

-Multiferroics: Multiferroics, materials characterized by the simultaneous presence of two or more ferroic order parameters, are potentially very interesting for magneto-electric random-access memories. The MS research team has investigated the properties of BiMnO_3 thin films and of artificial multiferroic $\text{LaSrMnO}_3/\text{PZT}$ heterostructures. It has been shown that BiMnO_3 is an improper multiferroic, where the ferroelectric and magnetic orders are linked to the structural modifications induced by the epitaxial growth [G. M. De Luca et al., *Ferromagnetism and ferroelectricity in epitaxial BiMnO_3 ultra-thin films*, Appl. Phys. Lett. 103, 062902 (2013)]. In the artificial ferromagnetic/ferroelectric (LSMO/PZT) heterostructures an indirect magneto-electric coupling has been demonstrated by using polarization dependent x-ray spectroscopy. It has been shown that, the switching of the polarization direction of the PZT layer not only modify the density of carrier in the LSMO layer at the interface, but also the orbital order, compatible with polarization dependent structural distortions. [D. Preziosi, et al., *Electric-Field Control of the Orbital Occupancy and Magnetic Moment of a Transition-Metal Oxide*, Phys. Rev. Lett. 115, 157401 (2015)]. Recently our group have realized the first artificial multiferroic 2DEG, by combining the spin-polarized oxide 2DEG formed at the LAO/ETO interface, and the ferroelectric properties of bulk Ca-doped STO single crystals [J. Bhreihin et al. arxiv 2022].

-Electric field effect and superconducting-insulator transition in cuprates: The MS research team has shown for the first time the possibility of inducing an insulator-superconducting transition by using the electric field effect in ultra-thin films of $Nd_{1.2}Ba_{1.8}Cu_3O_y$ [Cassinese, et to the., *Field-effect tuning of carrier density in $Nd_{1.2}Ba_{1.8}Cu_3O_y$ thin films*, Appl. Phys. Lett. 84, 3933 (2004)]. Following these findings, the team studied the mechanism of field effect in thin films by the first experiment of X-ray spectroscopy in field effect devices. This experiment demonstrated that in cuprates the charges (holes) accumulated by the electric field effect are mainly localized in charge reservoir, and only a fraction of them is transferred to the CuO_2 plane, where the high critical temperature superconductivity resides. [M. Salluzzo, et al. *Indirect Electric Field Doping of the CuO_2 Planes of the Cuprate $Nd_1Ba_2Cu_3O_7$ Superconductor*, Phys. Rev. Lett. 100, 056810 (2008); Highlight ESRF 2007, p93-94].

WORK EXPERIENCE

- from 10/2020 to today

**Research Director at the National Research Council (CNR)
SPIN Institute, UOS NAPOLI**
- from 12/2019 to 10/2020

**Staff Level II Researcher at the National Research Council (CNR)
SPIN Institute, UOS NAPOLI**

Research on the quantum properties of oxide 2DEGs and High Tc superconductors. PI of the PRIN MUR project "two-dimensional oxides platform for spin-orbitronics nanotechnology" (2019-ongoing).
- from 04/2008 to 12/2019

**Staff Level III Researcher at the National Research Council (CNR)
SPIN Institute, UOS NAPOLI**

Research on the quantum properties of oxide 2DEGs and High Tc superconductors. Coordinator of the EU-H2020 ERA-NET QUANTERA project QUANTOX (2018-ongoing). In particular he participated to the Resonant inelastic x-ray scattering studies on high Tc superconductors which led to the discovery of ubiquitous paramagnon excitations [Nature Physics 7, 725 (2011)] and of the charge density waves in doped superconducting cuprates [Science 337, 821 (2012)]. PI of the CNR-project "Advanced spectroscopic characterizations of oxides and interfaces" (2010-2011), of the PRIN project "orbital and spin physics in cuprate and manganite heterostructures" (2011-2013) "financed by MIUR.
- 04/2017

National Academic Qualification as Full Professor in the sector 02B1
- 12/2013

National Academic Qualification as Associate Professor in the sector 02B1
- from 02/2003 to 04/2008

**Tenure Track Researcher at the National Institute for the Physics of Matter (INFN)
COHERENTIA Research Center, Napoli (Italy) (CNR-INFN)**

Research on the quantum properties of oxide 2DEGs and High Tc superconductors. Responsible for the INFN-COHERENTIA Institute of the FP6 European STREP Project "NANOXIDE" (2006-2009)
- from 06/2001 to 01/2003

**Senior Post-doc Fellowship University "Federico II" of Napoli
Department of Physics, Napoli (Italy)**

Research on field effect devices made of high Tc superconducting thin films
- from 04/2000 to 04/2001

Senior Post-doc Fellowship at the National Institute for the Physics of Matter (INFN)

Research on "Realization and characterization of superconducting microwave filters for a cryogenic "front-end" system."
- from 04/2000 to 04/2001

Post-doc Grant at the National Institute for the Physics of Matter (INFN)

Research on "Microwave devices based on high Tc superconductors for mobile phone stations"

from 01/1998 to 03/1999 **Post-doc Grant at the National Institute for the Physics of Matter (INFM)**
Research on " Measurements on superconducting filters for telecommunications"

EDUCATION AND TRAINING

from 01/11/1994 to 06/1998 Ph.D. Degree in condensed matter physics
 Department of Physics "E. Caianiello", University of Salerno. Italy.
 ▪ *Research activity on scanning tunnelling microscopy and spectroscopy on in-situ grown High Tc superconductors, and nanoscale lithography*

on 16/06/1998 Ph.D. Degree in Physics Awarded in condensed matter physics
 Thesis: *Scanning Tunnelling microscopy and electron diffraction study of the growth of superconducting $\text{Bi}_2\text{Sr}_2\text{Ca}_n\text{Cu}_{2n+1}\text{O}_8$ e $\text{Nd}_{1-x}\text{Ba}_{2-x}\text{Cu}_3\text{O}_7$ thin films*

on 13/07/1994 Master Degree in Physics 110/110 "cum laude"
 University "Federico II" of Napoli.

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s) English, French, proficiency Level: C1

Project-related expertise

- Condensed matter physics, in particular superconductivity magnetism and quantum properties of strongly correlated materials.
- X-ray spectroscopy techniques using synchrotron radiation, in particular x-ray absorption spectroscopy, x-ray magnetic circular dichroism, x-ray photoemission spectroscopy and resonant inelastic x-ray spectroscopy
- Low-temperature transport experiments on nanodevices and nanodevice physics.
- Scanning probe microscopy/spectroscopy techniques.
- Microwave spectroscopy and microwave superconducting resonators.
- Diffraction and surface diffraction methods
- Epitaxial growth of complex materials by advanced physical vapour deposition methods

ADDITIONAL INFORMATION

Projects

2023- MUR PRIN PNRR 2022– (SONATA-P2022SB73K)

Superconductivity in KTaO_3 Oxide-2DEG NANodevices for Topological quantum Applications

Role Coordinator and project leader

2023- MUR PRIN PNRR 2022– (IQARO-GAP-101115190)

Spin-orbitronic QuAntum bits in Reconfigurable 2D-Oxides

HORIZON-EIC-2022-PATHFINDERCHALLENGES

Role Resp. of CNR-SPIN unit and WP1 leader

2019-2023 MUR PRIN2017 Prin 2017 – (TOP - SPIN 20177SL7HC)

Two-dimensional oxides Platform for SPIN-orbitronics nanotechnology

Role Coordinator and project leader

2018-2020 ERA-NET Quanterra H2020 project Quantox

"Quantum Technologies with 2D-oxides" grant Agreement no 731473

Role Coordinator and project leader

2014-2018 European H2020 project COST-Action TO-BE: Towards Oxide-Based Electronics

COST Action - code MP1308 - MPNS Domain

Role: Participant

2010-2014 **European FP7-RegPot 2010-1 (Capacities) MAMA**, grant Agreement no. 264098

Role: Participant

2022-today PRIN MIUR project, Quantum Transition-metal FLUOrides-(QT-FLUO) 20207ZXT4Z" nell'ambito del Programma PRIN 2020

Role: PI of the CNR-unit

2011-2013 PRIN 2009 MIUR project, 20094W2LAY_002,: "Ordine orbitale e di spin nelle eterostrutture di cuprati e manganiti";

Role: PI of the CNR-unit

2006-2009 European project FP6 STREP "NANOXIDE": "Novel Nanoscale Devices based on functional Oxide Interfaces", contract no. 033191.

Role : PI for the CRS CNR-INFN COHERENTIA unit

ORGANIZATION OF
INTERNATIONAL WORKSHOPS
AND CONFERENCES

- 2005-2006 **Co-organizer** of the XIII international *Workshop on Oxide Electronics* organizing Committee, October 8-11, 2006. Jolly Hotel, Ischia, Italy
- 2015-2016 **Co-organizer** of the ESRF User Meeting February 2016.
- 2015-2016 **Co-Chair** del User-Dedicated Microsymposia, UDM1 "**Nanoscience: X-ray diffraction and coherence**" at the User Meeting ESRF, February 2016.
- Co-organizer** of the ESRF User Meeting February 2017.
- 2016-2017 **Co-Chair** of the User-Dedicated Microsymposia, UDM1 "**Advances and new science with resonant inelastic X-ray scattering**" at the User Meeting ESRF, February
- 2016-2017
- 2017-2018 **Co-organizer of the** ESRF User Meeting February 2018.
- Chair** of the 5th Workshop on Complex Oxides, May 2018
- 2017-2018 Capri Island (Italy)
- 2018-today Member of the Organizer Committee for the Workshop on Complex Oxides Series held each two years

Scientific advisory and evaluation committees

- Mar-April 2020 External Reviewer for ANR Generic Call for Proposals
- May-July 2019 External Reviewer for FLAG-ERA JTC 2019 - Graphene Flagship
- July-Sep. 2018 External Reviewer for Pazy foundation (Israel)
- Jan-July 2019 Member of the Panel QUANTERA for Evaluation-the second call for Quanterra Projects
- Jun, 2015-2020 Member of the User Organization Committee of the 'European Synchrotron Research Facility, as representative of the Electronic Structure and Magnetism" scientific community.
- Oct., 2016 -2019 Member of the Peer-Review Committee C03 for the evaluation of proposals at the European Synchrotron Research Facility ESRF (France)
- Jan 2012 -2016 External Project Reviewer for the Switzerland National Science Foundation (SNSF) research program and for SNSF young scientist research project within the program "Ambizione" (4 projects evaluated)
- April, 2012 -Dec 2017 Member of the Peer-Review Committee 2 «Electronic & magnetic property of matter, Surfaces and Interfaces» for the evaluation of proposals at the SOLEIL (France) synchrotron facility
- Sept, 2012 -Jan, 2012 Member of the ANVUR-VQR evaluation Panel
- June, 2008 - Dec 2008 Member of the Panel for the Evaluation of INFN-Research Centres

SEMINAR ACTIVITY IN NATIONAL AND INTERNATIONAL CONFERENCE AND SCHOOLS

- 12-14 October 2021 **Workshop on “Low dimensional superconducting hybrids for novel quantum functionalities”** organized by the COST Action nanocoHybri from in Paris, College de France.
Title: *Investigation of oxide heterostructures by Resonant Inelastic x-ray spectroscopy*
- 30 September-4 October 2019 **Invited Talk FisMat2019** Dipartimento di Fisica e Astronomia "Ettore Majorana", Università di Catania.
Title: *Orbital reconstruction and spin polarization in (001) and (111) LaAlO₃/SrTiO₃ and LaAlO₃/EuTiO₃/SrTiO₃*
- September 23-27, 2019 **Invited Talk:105° Congresso Nazionale della Società Italiana di Fisica SIF** Gran Sasso Science Institute
Title: *Spin-polarized two dimensional electron gas at the (001) EuTiO₃ surface*
- 13 October 2018 **Talk at the 25th at the Internation workshop on Oxide Electronics Orbital, Les Diableret, Switzerland,**
Title: *Orbital reconstruction and spin polarization in (100) and (111) LAO/STO and LAO/ETO/STO q2DEG*

- May 20-24 2018 **Invited Talk: Workshop on Complex Oxides 2018 Capri, Italy**
Title: *Electronic and magnetic properties of q2DEGs formed at (001) and (111) titanate oxide interfaces*
- April 11-13 2018 **Invited Talk:** Workshop OSS2018 Oxide Superconducting Spintronics Amalfi
Title: *The 2DEG at the (001) and (111) SrTiO₃ titanate surface and SrTiO₃ based heterostructures*
- October 2-13, 2017 **Invited Lecturer** at the XXI Training Course in the Physics of Strongly Correlated Systems, International Institute for Advanced Scientific Studies (IIASS), Vietri sul Mare (Salerno), Italy.
Title: *Advanced X-Ray Spectroscopy Techniques and Structural, electronic and magnetic reconstructions of the 2DEG formed at titanate oxide interfaces*
- July 05-08, 2017 **Invited Speaker** at the 3rd Functional Oxide Thin Films for Advanced Energy and Information Technology Conference, Rome, Italy
Title: *Tunable spin polarized and superconducting two-dimensional electron gas at engineered delta-doped LaAlO₃/SrTiO₃ interfaces*
- June 13-17, 2016 **Invited Speaker** at the 4th Workshop on the Physic of Complex Oxides, Porquerolles, France
Title: *Tunable spin polarized and superconducting 2D-electron gas at engineered oxide interfaces*
- September 04-09, 2016 **Invited Speaker** at the Conference of the Condensed Matter Division of the European Physical Society (CMD 26), Groeningen (the Netherland)
Title: *Structural, Electronic and magnetic reconstructions of the the q2DEG formed at titanate oxide interfaces*
- September 14-18, 2015 **Invited Speaker** at the EMRS Fall meeting in Warsaw
Title: *Tunable spin polarized and superconducting 2D-electron gas at engineered oxide interface*
- February 03-05, 2014 **Invited Speaker** at the Workshop on Functional Materials for Electronics, ESRF, Grenoble (France)
Title: *Orbital reconstruction and interface magnetism in SrTiO₃ based heterostructures*
- September 09-13, 2013 **Invited Speaker** at FisMat 2013 National Conference on Condensed Matter Physics, Politecnico di Milan, Italy
Title: *Competing phenomena at n-type interface between polar insulating-oxides and SrTiO₃ band insulator*
- May 27 - June 01, 2013 **Invited Speaker:** at the International Conference on QUANTUM IN COMPLEX MATTER (SUPERSTRIPES) 2013, Ischia, Italy
Title: *Competing phenomena at n-type interface between polar insulating-oxides and SrTiO₃ band insulator*
- January 7-10, 2013 **Invited Speaker:** at the 2013 EMN West Meeting, Houston, USA
Title: *Competing phenomena at n-type interface between polar insulating-oxides and SrTiO₃ band insulator*
- September 17-21, 2012 **Invited Speaker:** at the "Congresso Nazionale Della Società Italiana di Fisica", Dipartimento di Fisica, Università Federico II di Napoli, Italy
Title: *Magnetism and superconductivity in High-Tc cuprates studied by X-ray spectroscopy*
- 03-15 October, 2011 **Invited Lecture** at the International School of Oxide Electronics, Cargèse, France
Title: *X-ray spectroscopy techniques*

Teaching Activities

- 2010-2013** **Phd Course in Physics and in innovative technologies for materials, sensors and imaging**
Title: Advanced spectroscopy in strongly correlated systems

- 2007-2010 Extraordinary Professor of "Fisica Generale I" (Mechanics and Thermodynamics) at the University "Federico II" of Napoli, Information Engineering faculty" A. A. 2007-2008, 2008-2009 and 2009-2010
- 2004- 2006 Extraordinary Professor of "Fisica Generale II" (Electromagnetism and Electrostatics) at the University "Federico II" of Napoli, Electronic Engineering faculty" A. A. 2004-2005, 2005-2006
- 2004-2005 Assistant at the "Fisica Generale II" course (Electromagnetism and Electrostatics) at the University "Federico II" of Napoli, Electronic Engineering faculty" A. A. 2004-2005, 2005-2006
- 2002-2003 Assistant at the "Fisica Generale I and II" courses (Mechanics, thermodynamics Electromagnetism and Electrostatics) at the II University of Napoli, Electronic Engineering faculty
- 2000- 2002 Assistant at the "Fisica Generale II" course (Electromagnetism and Electrostatics) at the University "Federico II" of Napoli, Telecommunications Engineering faculty
- 1999-2001 Assistant at the "Fisica Generale I " course at the University "Federico II" of Napoli, Mechanic Engineering faculty
- 1998-2003 Assistant at the "Fisica Generale I " course at the University "Federico II", Engineering faculty

SUPERVISOR OF MASTER,
PHD STUDENTS, AND
POSTDOCTORAL FELLOWS

- 2022 – today Supervisor of Dr. Marthando Rath, Research fellowship contract at CNR-SPIN Institute, UOS of Napoli, On the PRIN MIUR Project QT-FLUO
- 2020 – today Supervisor of Dr. Yu Chen, Research fellowship contract at CNR-SPIN Institute, UOS of Napoli, On the PRIN MIUR Project TOP-SPIN
- 2018-2019 Supervisor of Dr. A. Sambri, Research fellowship contract at CNR-SPIN Institute, UOS of Napoli, On the QUANTERA Eu Project QUANTOX
- 01/09/2014 -22/12/2014 Supervisor of Ermes Scarano, Numero di Matricola N43/590, "CORSO DI LAUREA TRIENNALE IN INGEGNERIA ELETTRONICA UNIVERSITA' FEDERICO II di NAPOLI"
Title: Caratterizzazione di un gas di elettroni bidimensionale per applicazioni spintroniche
- 01/011/2014 -18/12/2015 Supervisor of Nunzia Coppola, Numero di Matricola N94/149
"CORSO DI LAUREA MAGISTRALE IN FISICA UNIVERSITA' FEDERICO II di NAPOLI"
Title: Weak Magnetism in Superconducting NBCO thin films studied by X-Ray spectroscopy
- 01/09/2009 -25/03/2010 Supervisor of Daniele Preziosi, Numero di Matricola 358/085, "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN.
Titolo tesi: Growth and characterization of multiferroic BiMnO3 thin films
- 10/03/2007 -30/11/2009 Supervisor of Zoran Ristic, phd student of the 22° phd cycle in "Tecnologie Innovative per Materiali, Sensori e Imaging", University "Federico II" of Napoli
Title: Scanning Probe Techniques for the Characterization of Electronic Properties of Transition Metal Oxide Surfaces and Interfaces
- 15/05/2007 - 30/11/2008 Supervisor of Dr. Gabriella Maria De Luca, Research fellowship contract .at CNR-INFM, Unità di Napoli "Coherentia", Napoli on "Deposition of Manganites and Superconductors epitaxial thin films" within the **European project FP6 STREP "NANOXIDE"**
- 01/042007- 31/12/2008 Supervisor of Dr. Alessandro Gambardella, Research fellowship contract .at CNR-INFM, Unità di Napoli "Coherentia", Napoli on "Development of a and electric field effect scanning tunnelling microscope" within the **European project FP6 STREP "NANOXIDE":**

- 01/01/2003 -24/03/2004 Supervisor of Antonia Fragneto, Numero di Matricola 60/67," Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN.
Title: Studio della crescita e delle proprietà strutturali di film di Nd_{1-x}Ba_{2-x}Cu₃O_z
- 01/09/2009 -25/03/2010 Supervisor of Daniele Preziosi, Numero di Matricola 358/085, "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN.
Titolo tesi: Growth and characterization of multiferroic BiMnO₃ thin films
- 01/01/2003 - 17/12/2003 Supervisor of Alessandro Gambardella, Numero di Matricola 60/81 "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN.
Titolo tesi: Effetto di Campo Elettrico in film ultrasottili di Nd_{1.2}Ba_{1.8}Cu₃O₇
- 01/05/2002 -22/01/2003 Supervisor of Gabriella Maria De Luca, Numero di Matricola 60/401, , "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN
Titolo tesi: Correlazioni tra proprietà strutturali e di trasporto di film superconduttivi ad alta temperatura critica.
- 01/11/1999 -18/10/2000 Supervisor of Maria Grazia Maglione, Numero di Matricola 07/6113 "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN. Titolo tesi: Proprieta' superconduttive di film di Re₁NdxBa_{2-x}Cu₃O_{7-d} con sostituzioni del neodimio nei siti del bario
- 01/11/1998 -15/07/1999 Supervisor of Pasquale Orgiani Numero di Matricola 60/309 "Laurea in Physics" at the UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II FACOLTÀ DI SCIENZE MM.FF. NN.
Titolo tesi: Filtri per telefonia cellulare basati su dispositivi a microonde di film superconduttivi di YBa₂Cu₃O₇

Research products

Publications in peer-reviewed journals (LAST 10 YEARS)

1. Julien Bréhin, Yu Chen, Maria D'Antuono, Sara Varotto, Daniela Stornaiuolo, Cinthia Piamonteze, Julien Varignon, Marco Salluzzo, Manuel Bibes,
Coexistence and coupling of ferroelectricity and magnetism in an oxide two-dimensional electron gas
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