

University of Salento, Italy /// NNL-CNR-Nanotec

The University of Salento (UniSalento) is relatively young but characterized by a strong dynamics and highly committed towards the growth of the Salento region in terms of scientific and technological competitiveness. These objectives are targeted thanks to modern educational programs and high profile research activities. The Scuola Superiore ISUFI at UniSalento is one of six school of excellence in Italy and a reservoir of talented young researchers/students, having the objective to develop the intellectual capital of excellence in different fields. On the other hand, nanotechnology research is carried out jointly with the CNR-Institute of Nanotechnology. In particular, the joint laboratories represent one of the largest European nanotechnology facilities, where around 150 scientists with different backgrounds work in close collaboration to foster exploratory and seeding research in cross-disciplinary areas (such as nano- and molecular electronics, spintronics and nanobiotechnologies). A large collection of sophisticated scientific equipment is available, among them:

1. A **nanofabrication** facility, which relies on a class 1000/10000 clean room equipped with/for electron beam lithography, focused ion beam, mask aligners, a mask generator, reactive ion etching and ICP-RIE systems, evaporators, atomic layer deposition;
2. A growth and **epitaxy** facility containing a double-chamber AIXTRON MOCVD and a Riber MBE machine for the growth of inorganic semiconductors and three sputtering systems for the deposition of oxides, metals, magnetic layers and piezoelectric materials; This is complemented by a chemistry and **nanochemistry** lab for the synthesis of functional organic compounds and advanced colloidal nanocrystals, containing glove boxes and fume-hoods;
3. A **molecular devices fabrication** facility, for film technology of organic compounds, containing a multichamber cluster tool for vacuum deposition of organic/metal/insulating layers and device testing without breaking the vacuum, glove boxes (2 with evaporators) and fume-hoods for fabrication and characterization of OLED and organic solar cells in fully inert atmosphere.
4. A **RF and LT spintronics lab** with a cryogenic RF probe station (down to 4 K and up to 0.5 T and 70 GHz), three superconducting magnets up to 10.5 T including a vector (6T, 1T, 1T) magnet combined to a dilution fridge (down to 10 mK). This lab is equipped for variable temperature DC magnetotransport, RF and ESR measurements, magnetospectroscopy, vibrating sample magnetometry and a.c. susceptibility. The facility for transport experiments includes femtoamperometric systems, parameter and vector network analysers.
5. A **lab-on-chip** laboratory for molecular diagnostics and cell studies optimizing biochips for RT-PCR, pM flow immunoassays, real-time monitoring of cellular processes (attachment, micromotion, migration, morphology, growth and apoptosis). Sensing facilities are equipped for electrochemistry, impedance spectroscopy, magnetoresistance, acoustic and optical read-out. On the microfluidics side, expertise spans from soft lithography to microchannels, valves, mixers, DEP separation and droplet microfluidics; the supporting **biology laboratory** includes a sterile chamber for cell culture, a nano-spotter for microarrays, a nanoplotter, a fluorescence scanner and complete setups for proteomics and genomics;
6. A **scanning probe and material characterization lab**, including a Veeco Multimode 8 with PicoForce interface, a Veeco Catalyst AFM system combined with TIRF and confocal microscope, a Park AFM, a NT-MDT AFM operating also in low vacuum, a WiTec AFM-Raman, an Omicron ultra-high vacuum variable-temperature STM, a Createc low-temperature STM also equipped for XPS, a micro-FTIR, a micro-XRF system a confocal and a STED microscope;
7. A lab for **electron microscopy and structural characterization** including TEM and high resolution SEM-FEG (point resolution smaller than 1 nm) equipped for EDS (Energy Dispersive X-ray Spectrometry) and allowing for operation under variable pressure conditions for the study of insulating and polymeric materials; an X-ray diffractometer of last generation.
8. A **spectroscopy** facility for material characterization, based on NIR-UV-vis absorption, Fourier Transform Infrared Spectroscopy (FTIR), Raman, photocurrent up to 6 micron wavelength, photoluminescence (PL), Time-Correlated Single Photon Counting (TCSPC), tunable pump-probe and optical gain measurements, Ultrafast Spectroscopy with a 80 fs-pulsed Ti-sapphire laser with streak camera, spatially resolved spectroscopies (micro-photoluminescence, NSOM luminescence with 100 nm resolution, all at 20K).

The UniSalento team has a strong background in cooperative research projects either as member or coordinator. Moreover, due to the strong interdisciplinary know-how, high-level research and state-of-the-art

equipment, **several multinational companies were attracted in the UniSalento-Technological District**, and joint R&D activities devoted to frontier technological research are currently in progress with STMicroelectronics, IBM, Leonardo, Sea Marconi. In the last years, **spin-offs** and pre-competitive research activities were also launched in high-tech areas out of own **patents** and **know-how**.

GENERAL INFORMATION

PERSONAL DATA

Full name: Giuseppe Maruccio **Sex:** Male
Date and place of birth: 12 February 1978, Galatina (Lecce, Italy)
Nationality: Italian

Orcid ID: [0000-0001-7669-0253](https://orcid.org/0000-0001-7669-0253)
Scopus Author ID: [6603673127](https://scopus.org/authid/detail.url?authorID=6603673127)
WoS Researcher ID: [A-1486-2009](https://www.researcherid.com/rid/A-1486-2009)



CONTACT INFORMATION

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CURRENT POSITION

Research Delegate for the Rector for the University of Salento; Associate Professor (FIS/01, “Experimental Physics”) at Department of Mathematics and Physics “Ennio De Giorgi”, University of Salento (Lecce, Italy).

QUALIFICATIONS

National Scientific Qualification (ASN) as Full Professor in Experimental Physics of Matter (02/B1) and Applied Physics (02/D1).

HIGHLIGHT

Giuseppe Maruccio (1978) graduated in Physics (magna cum laude; best student in Physics at Lecce University from its institution in 1967) in 2000 and got his PhD in 2004. In 2005, he worked in Wiesendanger group (Hamburg) on wavefunction mapping by spatially resolved dI/dV images. Back in Lecce in 2006, he is presently Associate Professor at the Dept. of Mathematics and Physics and responsible for the spintronics and lab on a chip group and the laboratories RF<-spintronics, lab-on-chip&biosensors, FMR/MOKE spectroscopies ed Imaging-STED in the joint infrastructure UniSalento/CNR-Nanotec.

At only 28 years, he was coordinator of the EU project SpiDME on molecular spintronics and then he was successfully granted in other open competitions (UE, FIRB, PRIN and MAE projects), attracting also funds from external sources such as private companies (Ekuberg Pharma s.r.l., Sensichips). He was involved in other EU projects in FP7 and H2020 (MolArNet as WP leader and the H2020-ICT project Madia as WP leader and scientific responsible for the Lecce node) and coordinated the presentation of many EU proposals for cooperation and training actions (about 30, in many cases evaluated as eligible for funding). Moreover he participated in writing large scale projects at the Institute level which allowed to buy advanced instrumentation.

In 2010 he was Chair of the International conference “Trends in Spintronics and Nanomagnetism”, with the participation of Prof. Albert Fert, father of spintronics and Nobel Prize in Physics 2007, and Guest Editor of the conference proceedings (J. Physics: Conference Series, Vol. 292). G. Maruccio is author of more than 130 publications and 4 patents in addition to several invited contributions at international conferences, institutions and PhD schools (h-index 24, citations >1700). He is Member of the **Editorial Board** of J. of Sensors (Hindawi, 2016 Impact Factor 1.704, CiteScore 1.4) and of Sensors (ISSN 1424-8220, <http://www.mdpi.com/journal/sensors/>, impact factor 2.475) and Review Editor in Nanobiotechnology, part of the journal(s) Frontiers in Molecular Biosciences, Bioengineering and Biotechnology and Materials. He was in the editorial boards of (i) Journal of Spintronics and Magnetic Nanomaterials and (ii) International Scholarly Research Notices, beyond being referee for prestigious journals (Science, Nature Nanotechnology, Phys. Rev. Lett., Lab on a chip, Nano Letters, ACS Nano, J. Am. Chem. Soc., ...) and funding agencies (EU-FP7, EU-H2020, MIUR, Israel Science Foundation, TWAS) and scientific evaluation agencies (ANVUR).

In 2013, along with some Department colleagues, he created the dissemination journal *Ithaca* (<http://ithaca.unisalento.it/>, e-ISSN: 228 2-8079). In 2011-2012, he was member of the Governing Board of CNR-Nano-NNL, delegated for stimulating and strengthening internal and external scientific collaborations, until abolition of the board with the change of local director. From December 2014, he is Research Delegate for the Rector for the University of Salento, taking responsibilities for Fund Raising, Research evaluation (VQR and SUA-RD campaigns), Dissemination events (e.g. the organization of the local events for the European Researcher Night), Research Exploitation Activities (as the reference for the Industrial Liason Office of Apulia Region). In 2016, he was awarded with the Excellence Award, City of Lecce. In 2017, he was part of a Working Group (made of four Research Delegates) within CRUI (The Conference of Italian University Rectors) for the preparation of the Position Paper of Italian Universities as midterm review for H2020 and toward FP9. From 2016, he is Security Responsible (Preposto) for the Characterization Facility at CNR-Nanotec.

EDUCATION AND ACADEMIC BACKGROUND

- **Degree in Physics** (magna cum laude; best student in Physics at Lecce University from its institution in 1967), University of Lecce, July 2000 (at only 22 years). Thesis title: “Quantum Dots Laser”. Thesis Supervisor: Prof. Roberto Cingolani. Giuseppe Maruccio passed all exams with the highest marks and for his thesis work he received the highest mark cum laude. In the following, a list of sustained examinations.

English	Appropriate
French	Appropriate
Mathematical Analysis I	30/30
Mathematical Analysis II	30/30 cum laude
Geometry	30/30 cum laude
General Physics I	30/30
General Physics II	30/30
Analytical and Pure Mechanics	30/30 cum laude
Chemistry	30/30 cum laude
Physical Experiments I	30/30
Physical Experiments II	30/30

Physical Experiments III	30/30
Mathematical Methods for Physics	30/30 cum laude
Institutions of Theoretical Physics	30/30 cum laude
Condensed Matter Physics	30/30
Institutions of Nucl. and Subnucl. Phys.	30/30
Solid State Physics	30/30
Quantum Mechanics (part A)	30/30
Theoretical Physics	30/30 cum laude
Laboratory of Materials Physics	30/30
Materials Physics (part B)	30/30

- International School of Solid State Physics. 21st Course: Quantum Devices And Nanostructures (QDN-2). Erice-Sicily: 19 - 27 July 2001
- **Ph.D. in Physics**, University of Lecce, 5th October 2004. Thesis title: “Molecular Electronics at the nanoscale”. Supervisor: Prof. Roberto Cingolani.
- COMSOL Multiphysics Intensive course (40 hours, Roma, 26-30/5/2014, at CNR, Via del Fosso del Cavaliere 100): Equation Based Modeling with COMSOL Multiphysics, CAD and Meshing with COMSOL Multiphysics, Optimization with COMSOL Multiphysics, Electromagnetic modelling with COMSOL Multiphysics, CFD (fluidodynamics) with COMSOL Multiphysics).

PROFESSIONAL EXPERIENCE

- **From December 2014:** Research Delegate for the Rector for the University of Salento.
- **2014-present:** Associate Professor (FIS/01, Experimental Physics) at University of Salento (Lecce, Italy)
- **2007-2014:** Researcher (FIS/01, Experimental Physics) at University of Salento (Lecce, Italy)
- **2004-2007:** Tenure Track Researcher at the National Nanotechnology Laboratory of CNR-INFM (Lecce, Italy)
- **January-December 2005: Marie Curie Fellow** at the Institute of Applied Physics, University of Hamburg, Prof. R. Wiesendanger group (working in the Marie Curie International Training Network “Nanospectra”)
- **December 2004:** Guest researcher at the Institute of Applied Physics, University of Hamburg, Prof. R. Wiesendanger group (participation in the EU project “Nanospectra”)
- **May 2004-July 2004:** post-doctorate researcher at the National Nanotechnology Laboratory of INFM. Contract on Scanning probe microscopy and molecular electronics.
- **June 2001-May 2004:** Ph. D. Student in Physics at the University of Lecce, research activity carried out at the National Nanotechnology Laboratory of INFM
- **July 2000-June 2001:** post-graduate researcher at INFM Lab. Lecce. Contract on Quantum Dots Lasers (European Project GSQ: V Framework Programme, Frame: Information Societies Technology, RTD Project: GaAs based second window quantum dot lasers)
- **March 2000:** Visiting Research Scholar to EPFL. Activity: process of Quantum Dots Laser structures within Prof. Ilegems group

LANGUAGES: Italian (native), English (fluent), French, Latin

COMPUTATION ABILITIES

- **Programming languages and Scientific utilities: advanced knowledge and large experience with:** Matlab, LabView, **good knowledge of** Comsol Multiphysics, Mathematica, C++; **basic knowledge of** Fortran. Advanced knowledge of data analysis softwares, e.g. Microcal Origin
- **Operating systems and system utilities:** Windows, Linux, Antivirus, partition, defragmentation and backup tools, Management of hardware, Client FTP, SSH.
- **General utilities:** Office Suite, CoreIDRAW Graphics Suite, Adobe Creative Suite, Nero Suite, other graphic/audio/video utilities, website management/Design.

CREENTIALS

INSTITUTIONAL RESPONSIBILITIES

From December 2014: **RESEARCH DELEGATE FOR THE RECTOR** for the University of Salento, taking responsibilities for Fund Raising, Research evaluation (VQR and SUA-RD campaigns), Dissemination events (e.g. the organization of the local events for the European Researcher Night), Research Exploitation Activities (as the reference for the Industrial Liason Office of Apulia Region until 2016). More in detail:

FUND RAISING & PROJECT MANAGEMENT AT UNIVERSITY LEVEL

- 2014 – present:** **Coordination of Fund Raising activities at UniSalento** (including the preparation of open call bulletins) and of the research project working group and general monitoring of the PON projects at University of Salento (including contacts with MIUR)
- 2014-present:** **LEAR (legal entity appointed representative) for H2020** for University of Salento, Lecce
- 2017-present:** **Component of the Bilateral Committee among UniSalento and Italian Institute of Technology.**
- 2017:** **Member of the Working Group CRUI** (The Conference of Italian University Rectors) for the preparation of the Position Paper of Italian Universities as H2020 midterm review and toward FP9.
- 2017-present:** **Member of the Working Group APRE** (Italian National contact point) for the European Innovation Council (**EIC**)

RESEARCH EVALUATION

- 2014 – present:** Coordination of the MIUR **SUA-RD 2011-2013 e 2014** evaluation campaign for University of Salento
- 2014 – present:** Coordination of the MIUR **VQR2011-2014** evaluation campaign for University of Salento and following analysis of results and impact

RESEARCH EXPLOITATION

- 2014-2016:** Local Responsible/Contact for the **Industrial Liason Office** of Apulia Region for favouring exploitation of research results.
- 2015 – present:** Responsible for **Future Lab** project (funded by Apulia Region) and then **CLab** project (funded by MIUR) for supporting entrepreneurship and start-up initiatives
- 2014-2016:** Organization of **events for favouring research exploitation.**
- 2016:** Representative for the **Apulia Start Cup promoting committee.**
- 2014 – present:** Associate Member of the **UniSalento Commission for Research Exploitation**
- 2014-2016:** Participation to the Working group for defining the university **policies for Patent and Spin Off Regulation/support.**
- 2017:** Co-Organizer of the **X Summer School Netval 2017, “Exploiting Innovation in Healthcare”**, 11-14 September 2017, Lecce, in collaboration among Università del Salento, ARTI Puglia, Politecnico di Bari, Università di Bari, Università di Foggia, DREAM, CNR, IIT, INFN, ENEA, DHiTech.
- 2017:** ARTI (Apulian Regional Agency for Technology and Innovation) Representative in the Evaluation Commission for the **Startup Weekend** (21/5/2017) and presentation StartCup Puglia 2017.

RESEARCH DISSEMINATION

- 2015-present:** Organization of the European Researchers’ Night in Lecce, Lecce, Italy. From 2018, Coordinator of the EU-Project ERN-Apulia for the organization of the European Research Nigh in Apulia Region (Lecce, Bari, Brindisi, Foggia, Taranto and Castellana Grotte)

OTHER

- 2017:** Member of the Working Group for writing UniSalento document for **Open Access Policy**

OTHER RESPONSIBILITIES

- 2016-present:** Security Responsible (Preposto) for the Characterization Facility at CNR-Nanotec-Lecce, Member of the boards for the Facilities Materials e Nanofabrication at CNR-Nanotec-Lecce
- From 2015:** **Adjunct professor** at Ton Duc Thang University ([TDTU](#)) in Ho Chi Minh City, Vietnam.
- 2014-2015:** Responsible for the Joint Lab among Sensichips SRL and CNR-Nano in Lecce (Italy) for the development of research activities of common interest in the field of advanced sensors, microfluidics and lab on a chip platforms.
- 2011 – 2012:** Member of the Governing Board of the National Nanotechnology Laboratory – CNR-Institute of Nanoscience, Lecce and responsible for fostering internal and external scientific collaborations
- 2011-2012:** Member of Technical and scientific Committee of I.I.S.S. "Enrico Mattei" (Istituto Tecnico Industriale in Maglie (Lecce)).
- From 2017:** Responsible for two Joint Study Agreements with IBM-Research Almaden for sensors, spintronics and biotech research.
- 2018-present:** Co-responsible for the Biomedical Devices Laboratory at DReAM (laboratorio diffuso di ricerca interdisciplinare applicata alla medicina)
- 2011 – present** Member of *Thesis Commission* of the Teaching board of Physical Sciences and Technologies
- 2007 – present** *Member* of Teaching Board for the Ph.D. Programs in “Bio-Molecular Nanotechnologies”, then “Physics And Nanosciences” and from 2017 *Coordinator* of the Teaching Board for the Ph.D. Programs in “Nanotechnology”

OTHER INDICATORS FOR QUALITY, REPUTATION, AND INNOVATIVE POTENTIAL

- *Granted* as project coordinator or local responsible from EU (SpiDME, MolArNet, Madia, ERN-Apulia), Italy (MAE, FIRB and PRIN) and private companies. Participation in writing large projects funded at Institute level. Coordination/Participation in submission of ≈ 30 EU proposals from 2007, who often received a good evaluation.
- Results on molecular electronics/spintronics, lab-on-a-chip, wavefunction mapping, nanomechanics and photonics were *published in top journals* such as Nat. Mat. (1), Nat. Nanotech. (1, news and views), PNAS (1), NanoLetters (2), Advanced Materials (2), Small (2), Acs Nano (1), Lab on a Chip (3), Biosensors and Bioelectronics (1), Nanoscale (2), Applied Physics Letters (4).
- G. Maruccio delivered a number of *invited* talks/lectures and contributions to books, encyclopedia and international journals.
- Four patents were deposited based on G. Maruccio research (see dedicated section for details).
- *Talented junior researchers* were attracted to work in his group: Dr. C.L.Indira from MIT (Mooodera group), Dr. S.Karmakar from Indian Association for the Cultivation of Science, Dr. Elena Rodica Ionescu (actually associate professor in France).
- 2015, Plenary Lecture at the “International Conference on Magnetic Materials & Applications - ICMAGMA 2015”, VIT University, Vellore, Tamil Nadu -(2-4 Dec.2015), organized by the MAGNETICS SOCIETY OF INDIA

AWARDS

- 2016:** *Excellence Award*, City of Lecce for GMaruccio work in Research.
- 2016:** Award “*Premio Ricerca e Innovazione 2016*” for best thesis at UniSalento at his student Marco Scigliuzzo (thesis title: Optimization of SAW Filters and Resonators)
- 2012:** Winner of *Concorso “Tempo di leggere. Tempo di scrivere.”*, *Province school office*, Lecce with book entitled “La poesia della natura. Dall'infinitamente piccolo all'infinitamente grande” (written with students at Scuola media-Istituto comprensivo di Scorrano within the project PON C 1 FSE 2011 -1825 – Obiettivo C – Azione 1).
- 2006:** At 28 years, G.Maruccio was *among the youngest coordinator of an EU project*.
- 2000:** *Best student* in Physics at University of Lecce from its institution in 1967.

ORGANISATION OF SCIENTIFIC MEETINGS

- 2010** *Chair (& proceeding editor)* of the international conference “*Trends in Spintronics and Nanomagnetism*” (TSN2010, Lecce, 2010) with the participation of A. Fert (father of spintronics and Nobel Prize for Physics 2007).
- 2011** International Workshop “*Entanglement in Solid State Systems*” (WESSS; Lecce, 20-22 Settembre 2011) (*organizer*)
- 2012** International conference “*Recent Trends in Advanced Materials*” (ICRAM-2012) (*Member of the International Advisory Committee*; VIT University, Vellore, India, 20-22 February 2012), organized by

- the School of Advanced Sciences.
- 2015** International conference “*Magnetic Materials & Applications*”, (*International Advisory Committee Member*; Vellore, 02-04 December 2015) organized by MAGNETICS SOCIETY OF INDIA
- 2015** International Workshop on “*Micro-Nano-Bio-ICT Convergence Systems*” (MiNaB-ICT215; Otranto, Italy, 13-15 July 2015) (*Member of the Local Technical Committee and Organising Committee*).
- 2016** International conference Joint Event on Sensing for Smart Anything Everywhere: “*Materials, Technologies, Applications*” (ISOCS & MiNaB-ICT216; Otranto, Italy, 25-29 June 2016) (*Member of the Local Technical Committee*).
- 2017** **Co-Organizer** of the *X Summer School Netval 2017, “Exploiting Innovation in Healthcare”*, 11-14 September 2017, Lecce, in collaboration among Università del Salento, ARTI Puglia, Politecnico di Bari, Università di Bari, Università di Foggia, DREAM, CNR, IIT, INFN, ENEA, DHiTech.
- 2018** *Member of the Executive Committee* for the conference *FOTONICA 2018*, 20a Edizione - Convegno Italiano delle Tecnologie Fotoniche, Lecce, 23-25 maggio 2018 – Grand Hotel Tiziano e dei Congressi – viale Porta d’Europa – Lecce
- 2018** *Member of the Technical Program Committee* for *International Conference on IC Design and Technology (ICICDT2018)*, Otranto, Italy, June 4th–6th, 2018, with participation of leading companies such as STMicroelectronics, NXP, Toshiba, Soitec, Renesas Electronics
- 2018** *Scientific committee member* for the International Conference On *Nanomedicine And Nanobiotechnology 2018*, of the ICONAN Conference Series will be held in Rome on Sept 26-28th, 2018
- 2019** *Member of the Local Organizing Committee* for the *14th International Symposium on Macrocyclic and Supramolecular Chemistry - ISMSC2019*, to be held on 2-6 June 2019 in Lecce (Italy) with the confirmed participation of the 2016 Nobel Laureates in Chemistry: Bernard Lucas FERINGA (University of Groningen) and James FRASER STODDART (Northwestern University)
- 2019** *Member of the Local Organizing Committee* for the *International conference Magnonics*, to be held on 28 July-1 August 2019 in Carovigno (Brindisi, Italy)

PARTICIPATION TO EDITORIAL BOARDS

- **From 2017:** Member of the Editorial Board of *J. of. Sensors* (Hindawi, 2016 Impact Factor 1.704, CiteScore 1.4)
- **In 2013**, along with some colleagues at Dept. of Mathematics and Physics, he created the journal *Ithaca*, which intends to disseminate science among people who are attracted by science and want to know more than what is available in newspapers without having the possibility to read specialist scientific journals (<http://ithaca.unisalento.it/>, e-ISSN: 228 2-8079).
- **From 2018:** Review Editor in *Nanobiotechnology*, part of the journal(s) *Frontiers in Molecular Biosciences, Bioengineering and Biotechnology and Materials*.
- **2018:** Guest Editor for the Special Issue “Lab-on-a-Chip–From Point of Care to Precision Medicine” published on *Sensors* (ISSN 1424-8220). This special issue belongs to the section “*Biosensors*”.
- **From 2014 to 2017:** Member of the Editorial Boards of (i) the *Journal of Spintronics and Magnetic Nanomaterials* (in 2012), (ii) *ISRN Nanotechnology and ISRN Electronics* (then merged in International Scholarly Research Notices).
- **2010:** Guest Editor for the proceedings of the international conference “Trends in Spintronics and Nanomagnetism 2010”.

COMMISSIONS OF TRUST

- G. Maruccio served as external evaluator for the Italian scientific evaluation agencies (ANVUR)
- G. Maruccio serves/served as referee for national and international funding agencies, among which:
 - *MIUR* (PRIN, FIRB and SIR projects)
 - *EU: FP7* (invited once), *Horizon 2020* (invited once), *ERC* (one evaluation)
 - *Israel Science Foudation* and *Israel Ministry of Science Technology and Space* (for the evaluation of research projects),
 - *TWAS* (the Academy of Sciences for the Developing World),
 - Università Italo-Francese (bando Vinci)
- G. Maruccio served as external evaluator for Università di Roma La Sapienza and Università di Firenze
- G. Maruccio serves as referee for several international journals, among which:
 - *AAAS* (Science),
 - *NPG* (Nature Nanotechnology, Scientific Reports),
 - *American Physical Society* (Phys. Rev. Lett.),
 - *American Chemical Society* (Nano Letters, ACS Nano, J. Am. Chem. Soc., Langmuir),
 - *Royal Society of Chemistry* (Journal of Material Chemistry, Physical Chemistry Chemical Physics, Chemical Society Reviews, Chemical Communications, Soft Matter, Lab on Chip, Nanoscale),
 - *Wiley* (Advanced Materials, Small, Electroanalysis and Eur. J. Org. Chem.),
 - *Institute of Physics Publishing* (Nanotechnology),
 - *Elsevier* (Biosensors and Bioelectronics, Sensors & Actuators: B. Chemical, Microelectronic Engineering, Journal of Biotechnology)
 - *American Institute of Physics* (Appl. Phys. Lett., J. Appl. Phys.),
 - *IEEE* (Transactions on Nanotechnology, Journal of Display Technology).

TEACHING AND TUTORING ACTIVITIES

LIST OF COURSES TAUGHT

- **TUTORING (from 2001):**
 - Supervisor for more than 47 undergraduate students in Physics, Materials Engineering, Biotechnology, Biology, Optics&Optometry.
 - Supervisor for 9 Ph.D. students
 - Supervisor for 12 post-docs.
 - Tutor of four ISUFI Students for their Licenza Thesis.
- **Teaching at University of SALENTO (Physics students):**
 - **From 2018:** Instructor for the *Physics and Nanoengineering of biosystems* course at Medical Biotechnologies and Nano-Biotechnologies master degree (6 CFU);
 - **From 2015:** Instructor for the *Nanoelectronics* course at Physics master degree (7 CFU);
 - **From 2015:** Instructor for the 1st year *Physics I* course at Optics and Optometry bachelor degree (8 CFU);
 - **2011-2015:** Instructor for the *Physics of Nanostructures* course at Physics master degree (6 CFU);
 - **2011-2015:** Assistant at 2nd year *Physical Experiments III* course (6 CFU), supervising the students during lab experiments and discussing their final reports on the experiments.
 - Seminars and thematic lectures in several courses at University of Salento.
 - **From 2011:** Member of *Thesis Commission* of the Teaching board of Physical Sciences and Technologies.
- **Teaching at Scuola Superiore ISUFI (School of Excellence):**
 - Instructor for the *Molecular systems and devices* course (a.a.2016-2017) for V Year students within Natural Science Area.
 - Instructor for the *Nanomagnetism* course (a.a. 2008-2009);
 - Instructor for the *Nanomechanics* course (a.a. 2006-2007 and a.a. 2007-2008).
- **Teaching/responsibilities at Ph. D. schools (University of Salento):**
 - **2010-2014:** Instructor for the course *Introduction to Nanotechnologies* (3 CFU) for Ph.D. students in Physics.
 - **2015-2016:** Instructor for the course *Advanced Material Characterization* (3 CFU) for Ph.D. students in Physics.
 - **2007-2017:** Member of *Teaching Board* for the Ph.D. in “BIO-MOLECULAR NANOTECHNOLOGIES” and then “PHYSICS AND NANOSCIENCES”.
 - **From 2017:** Coordinator of *Teaching Board* for the Ph.D. in “NANOTECHNOLOGY”, including members from IBM, STMicroelectronics and Trinity College Dublin.
- **Teaching at University of BARI “Aldo Moro”:**
 - **a.a. 2008-2009:** Instructor for the 5rd year *Biomedical Engineering* course (5 CFU, 50 hours) for Industrial and Environmental Biotechnologies students. Seven students then decided to go in Lecce for their thesis.
 - **a.a. 2016-2017, a.a. 2017-2018:** Instructor for the 4th year *Nanobiotechnology (and biosensors)* course (6 CFU) for Industrial and Environmental Biotechnologies students.
- **Other LOCAL teaching experiences**
 - **2009.** Instructor for the module of **Geometric and Ondulatory Optics, Light-Matter Interaction** (17 hours) within the Research Project “Imaging non invasivo per diagnostica morfo-funzionale avanzata”
 - **2009.** Instructor for the Nanotechnology course at Università delle Tre Età, Sede Autonoma di Maglie.
 - **2014.** Topical Lecture “Nanosciences and Nanotechnologies: new frontiers and applications”, at associazione culturale Palazzo Comi, Lucignano (Lecce).
 - Several Courses and lectures at schools on Physics and Nanotechnology.
- **Other teaching experiences in ITALY:**
 - *X National School of Materials Science INFM-INSTM* – Topical Lessons on Molecular Devices (1/10/2004)

- *XVII Settimana della Cultura Scientifica e Tecnologica*, La Civiltà delle Macchine Intelligenti, Cagliari, 20 Aprile 2007, Aula Magna della Facoltà d'Ingegneria, Topical Lecture on “**Nanotechnology**”
- *2012, Topical lecture “Spintronic devices” at Italian School of Magnetism*, Pavia, February 5-10, 2012
- *2018, 4th Italian School of Magnetism on “Advanced magnetic materials and devices for biomedical applications”*, Turin, Italy (21-25/5/2018), invited lecture (2h) entitled *Sensors and their integration*.

TEACHING STRATEGY AND TEACHING PHILOSOPHY

The employed teaching strategies strongly depends on the *level of students* and are fitted to their know-how, interest and specific degree (either Physics, Engineering, Biology/Biotechnology or Optics and Optometry). *Basic courses* (such as Physics I) are taught writing at the whiteboard with the support of textbooks as reference tools and slides for images, summaries, video and experimental demonstrations which are useful to acquire the concepts and keep high the interest and attention. *Advanced courses* (such as Nanoelectronics) are instead taught mainly by means of power point presentations which provide the basic material to study (when textbook are still not available due to the novelty of the topics). In this last case, a main target is to introduce the students to current research in the field and for this reason slides include also some summaries of recent research results which typically are just examples not required for the examination. *Concerning evaluation* of the students, for basic courses it is based on written exercises and oral discussion. For advanced courses, the examination starts instead from a presentation of the student on recent research topics relevant for the course and then continues with questions and discussion of topics addressed during lectures.

SUPERVISION OF UNDERGRADUATE STUDENTS

1. **Master Thesis in Materials Engineering** entitled “Studio e fabbricazione di un transistor a metalloproteina”, Faculty of Engineering, Università degli Studi di Lecce, Student: Pasquale Calogiuri, A.A. 2001-2002.
2. **Master Thesis in Physics** entitled “*Elettronica molecolare su scala nanometrica*”, Faculty of Science, Università degli Studi di Padova, Student: Marco Zanella, A.A. 2003-2004.
3. **Bachelor Thesis in Fisica**, Faculty of Science, Università degli Studi del Salento, Student: Francesca Attanasio, A.A. 2003-2004.
4. **Master Thesis in Materials Engineering** entitled “*Progettazione, fabbricazione e studio di nanodispositivi per l'elettronica molecolare*”, Faculty of Engineering, Università degli Studi di Lecce, Student: Pasquale Marzo, A.A. 2004-2005.
5. **Master Thesis in Materials Engineering** entitled “*Progettazione, fabbricazione e studio di nanodispositivi per la spintronica molecolare*”, Faculty of Engineering, Università degli Studi di Lecce, Student: Luca Sanarica, A.A. 2005-2006.
6. **Master Thesis in Materials Engineering** entitled “*Fabbricazione di biosensori magnetoresistivi*”, Faculty of Engineering, Università degli Studi del Salento, Student: Luca Palmirota, A.A. 2006-2007 (Score: **110/110 cum laude**).
7. **Master Thesis in Human Biology** entitled “*Realizzazione di cell-chip ed analisi impedenziometriche ed AFM di popolazioni cellulari*”, Faculty of Science, Università degli Studi del Salento, Student: Serena Chiriaco, A.A. 2007-2008 (Score: **110/110 cum laude**).
8. **Master Thesis in Physics** entitled “*Studio e applicazione di ipertermia in nanomedicina*”, Faculty of Science, Università degli Studi del Salento, Student: Anna Grazia Monteduro, A.A. 2007-2008 (Score: **110/110 cum laude**).
9. **Bachelor Thesis in Physics** entitled “*Computazione quantistica con quantum dots*”, Faculty of Science, Università degli Studi del Salento, Student: Antonio Andrea Gentile, A.A. 2007-2008.
10. **Master Thesis in Human Biology** entitled “*Realizzazione di cell-chip ed analisi impedenziometriche ed AFM di popolazioni cellulari*”, Faculty of Science, Università degli Studi del Salento, Student: Elisabetta Tarentini, A.A. 2008-2009.
11. **Bachelor Thesis in Physics** entitled “*Studio di giunzioni tunneling con superconduttori e ferromagneti*”, Faculty of Science, Università degli Studi del Salento, Student: Annelisa Caprificio, A.A. 2008-2009.
12. **Bachelor Thesis in Biotechnologies for the innovation of processes and products** entitled “*Fabbricazione di microreattori per la sintesi di radiofarmaci*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Andrea Pagliara, A.A. 2009-2010.
13. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Development and characterization of a novel bio-hybrid robotic actuator driven by C2C12 skeletal muscle cells*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Giada Graziana Genchi, A.A. 2009-2010. Experimental activity carried out at Scuola Superiore Sant'Anna (Pisa), Center for research in Micro and Nano Engineering, Polo Sant'Anna Valdera, research group of Prof. Arianna Menciacchi (Score: **110/110 cum laude**).
14. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Realizzazione di un cell chip impedenziometrico per saggi di migrazione cellulare*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Francesca Dioguardi, A.A. 2009-2010 (Score: **110/110 cum laude**).
15. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Realizzazione di un biochip con componenti attivi di microfluidica per saggi immunologici*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Anna Bove, A.A. 2009-2010 (Score: **110/110 cum laude**).
16. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Realizzazione e caratterizzazione di un biosensore magnetoresistivo*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Giacomo Mandriota, A.A. 2009-2010 (Score: **100/110**).
17. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Progettazione e realizzazione di un DNA chip*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Francesco de Feo, A.A. 2009-2010 (Score: **110/110 cum laude**).
18. **Master Thesis in Industrial and Environmental Biotechnologies** entitled “*Rilevazione label-free dell'Antigene Prostatico Specifico mediante immunochip impedenziometrico*”, Faculty of Biotechnology, Università degli Studi di Bari, Student: Alessandro Montanaro, A.A. 2009-2010 (Score: **106/110**).
19. **Master Thesis in Physics** entitled “*Radio-Frequency QPC for Spin-QuBits Read-Out*”, Faculty of Science, Università degli Studi del Salento, Student: Pasquale Scarlino, A.A. 2009-2010 (Score: **110/110 cum laude**).

- Experimental activity carried out at Delft University of Technology, Kavli Institute of NanoScience, research group of Prof. Lieven M. K. Vandersypen.
20. **Bachelor Thesis in Physics** entitled “*Ottimizzazione e caratterizzazione di giunzioni TMR*”, Faculty of Science, Università degli Studi del Salento, Student: Martina Montanaro, A.A. 2010-2011 (Score: **110/110 cum laude**).
 21. **Master Thesis in Physics** entitled “*Caratterizzazione morfologica e citomeccanica di cellule tumorali mediante microscopia ottica ed a scansione di forza*”, Faculty of Science, Università degli Studi del Salento, Student: Mariafrancesca Cascione, A.A. 2011-2012 (Score: **110/110 cum laude**).
 22. **Master Thesis in Physics** entitled “*Sintesi e caratterizzazione di BiFeO_3 come materiale multiferroico per applicazioni spintroniche*”, Faculty of Science, Università degli Studi del Salento, Student: Chiara Leo, A.A. 2011-2012 (Score: **110/110 cum laude**).
 23. **Bachelor Thesis in Physics** entitled “*Dal Magnetismo classico al nanomagnetismo*”, Faculty of Science, Università degli Studi del Salento, Student: Pierpaolo Nicolardi, A.A. 2011-2012 (Score: **90/110**).
 24. **Master Thesis in Physics** entitled “*Eccitazione di onde di spin in film magnetici e loro simulazione in regime non lineare*”, Faculty of Science, Università degli Studi del Salento, Student: Gianluca De Pasquale, A.A. 2011-2012 (Score: **110/110**).
 25. **Master Thesis in Physics** entitled “*Caratterizzazione ed ottimizzazione di strutture 2DEG*”, Faculty of Science, Università degli Studi del Salento, Student: Paolo Di Carolo, A.A. 2011-2012 (Score: **106/110**).
 26. **Master Thesis in Physics** entitled “*Ottimizzazione e caratterizzazione di giunzioni TMR*”, Faculty of Science, Università degli Studi del Salento, Student: Silvia Rizzato, A.A. 2011-2012 (Score: **110/110 cum laude**).
 27. **Master Thesis in Biotecnologie** entitled “*Rilevazione di ocratossina A mediante QCM e SPR*”, Faculty of Science, Università degli Studi del Salento, Student: Marco D’Eredità, A.A. 2011-2012 (Score: **106/110**).
 28. **Bachelor Thesis in Physics** entitled “*Caratterizzazione di nanoparticelle superparamagnetiche a base di ossido di ferro*”, Faculty of Science, Università degli Studi del Salento, Student: Laura Polimeno, A.A. 2012-2013 (Score: **105/110**).
 29. **Master Thesis in Physics** entitled “*Progettazione e caratterizzazione di cavità 3D per applicazioni in computazione quantistica*”, Faculty of Science, Università degli Studi del Salento, Student: Angelo Leo, A.A. 2013-2014 (Score: **103/110**).
 30. **Master Thesis in Physics** entitled “*Spin-polarized scanning tunneling microscopy study of structural and magnetic properties of Ni/Fe/Ir(111)*”, Faculty of Science, Università degli Studi del Salento, Student: Davide Iaia, A.A. 2013-2014 (Score: **110/110 cum laude**). Experimental activity carried out at Institute of Applied Physics, University of Hamburg, research group of Prof. R. Wiesendanger.
 31. **Master Thesis in Physics** entitled “*Diodi balistici a gas bidimensionale di elettroni*”, Faculty of Science, Università degli Studi del Salento, Student: Luciano Sasso, A.A. 2013-2014 (Score: **108/110**).
 32. **Master Thesis in Physics** entitled “*Realizzazione di giunzioni tunnel magnetiche per applicazioni biosensoristiche*”, Faculty of Science, Università degli Studi del Salento, Student: Fausto Sirsi, A.A. 2013-2014 (Score: **110/110 cum laude**). Part of the experimental activity carried out in the group of Prof. G. Reiss, Universität Bielefeld.
 33. **Bachelor Thesis in Physics** entitled “*Analisi impedenziometriche per saggi biologici*”, Faculty of Science, Università degli Studi del Salento, Student: Andrea Tommasi, A.A. 2013-2014 (Score: **95/110**).
 34. **Master Thesis in Physics** entitled “*Fabbricazione e Caratterizzazione di fotodiodi GaN per rivelatori e sensori*”, Faculty of Science, Università degli Studi del Salento, Student: Manlio Rosano, A.A. 2013-2014 (Score: **110/110**).
 35. **Master Thesis in Physics** entitled “*Nanofabrication improvement of a device for Quantum Simulations with Quantum Dot Arrays*”, Faculty of Science, Università degli Studi del Salento, Student: Carla Sanna, A.A. 2013-2014 (Score: **110/110**). Experimental activity carried out at Delft University of Technology, Kavli Institute of NanoScience, research group of Prof. Lieven M. K. Vandersypen.
 36. **Bachelor Thesis in Physics** entitled “*Fabbricazione e caratterizzazione di giunzioni tunnel magnetiche*”, Faculty of Science, Università degli Studi del Salento, Student: Vittorio Pantaleo, A.A. 2014-2015 (Score: **110/110 cum laude**).
 37. **Master Thesis in Physics** entitled “*Optimization of SAW Filters and Resonators*”, Faculty of Science, Università degli Studi del Salento, Student: Marco Scigliuzzo, A.A. 2014-2015 (Score: **110/110 cum laude**).
 38. **Master Thesis in Medical Biotechnologies and Nanobiotechnologies** entitled “*Ottimizzazione di un polimero a stampo molecolare per lo sviluppo di microsensori per neopterina*”, Faculty of Science, Università degli Studi del Salento, Student: Damiano Totaro, A.A. 2014-2015 (Score: **110/110 cum laude**).
 39. **Bachelor Thesis in Physics** entitled “*Caratterizzazione di film di BiFeO_3 su STO*”, Faculty of Science, Università degli Studi del Salento, Student: Valeria Carluccio, A.A. 2015-2016 (Score: **110/110**).

40. **Bachelor Thesis in Physics** entitled “*La computazione quantistica con spin qubit in quantum dots*”, Faculty of Science, Università degli Studi del Salento, Student: Martino Centonze, A.A. 2015-2016.
41. **Master Thesis in Physics** entitled “*Studio di film magnetici in cavità 3D*”, Faculty of Science, Università degli Studi del Salento, Student: Laura Polimeno, A.A. 2015-2016 (Score: **110/110 e lode**).
42. **Bachelor Thesis in Optics and Optometry** entitled “*Valutazione del sistema visivo a distanza proximale: confronto tra test classici e digitali*”, Faculty of Science, Università degli Studi del Salento, Student: Alessandra Rizzato, A.A. 2015-2016.
43. **Master Thesis in Medical Biotechnologies and Nanobiotechnologies** entitled “*Comparazione tra biosensori innovativi basati su onde acustiche superficiali e spettroscopia di impedenza elettrochimica per rilevazioni ambientali*”, Faculty of Science, Università degli Studi del Salento, Student: Sandro Spagnolo, A.A. 2015-2016 (Score: **110/110 cum laude**).
44. **Master Thesis in Medical Biotechnologies and Nanobiotechnologies** entitled “*Ottimizzazione di un sensore plasmonico per applicazioni diagnostiche*”, Faculty of Science, Università degli Studi del Salento, Student: Giorgio Giuseppe Carbone, A.A. 2015-2016 (Score: **110/110 cum laude**).
45. **Bachelor Thesis in Physics** entitled “*Analisi comparativa di dispositivi a onde acustiche superficiali su differenti substrati piezoelettrici*”, Faculty of Science, Università degli Studi del Salento, Student: Federica Vergari, A.A. 2016-2017 (Score: **105/110**).
46. **Master Thesis in Physics** entitled “*Beam steering with Phase-Only Spatial Light Modulator for Optogenetic applications*”, Faculty of Science, Università degli Studi del Salento, Student: Paolo Giglio, A.A. 2016-2017 (Score: **109/110**).
47. **Master Thesis in Biology** entitled “*Sviluppo di biosensori per la rilevazione di patogeni alimentari*”, Faculty of Science, Università degli Studi del Salento, Student: Ilaria Parlangei, A.A. 2016-2017 (Score: **103/110**).

SUPERVISION OF GRADUATE STUDENTS

1. “*Nanodevices for Molecular Electronics and Spintronics*”, **Pasquale Marzo** (now teaching at school).
2. “*EIS Cell-Chips: new tools for cell biology*”, **Elisabetta Primiceri** (presently postdoc at CNR-Nanotec-Lecce).
3. “*Design and Optimization of Hybrid Spintronic Devices*”, **Susmit Kumar** (then postdoc in Spain and Norway).
4. “*Protein EIS biosensors for on-chip diagnostics*”, **Maria Serena Chiriaco** (now postdoc at CNR-Nanotec-Lecce).
5. “*Beyond Moore’s Law: new functional oxides and ballistic devices*”, **Anna Grazia Monteduro** (now postdoc in Lecce).
6. “*Spintronic Tunnel Junctions with Magnetic Molecules*”, **Zoobia Ameer** (presently postdoc back in Pakistan).
7. “*Optimization of magnetoresistive, plasmonic and SAW devices for spintronics and sensing*”, **Silvia Rizzato** (now postdoc at CNR-Nanotec-Lecce).
8. “*Fluid dynamic studies and microfluidic applications of self-catalytic propellers*”, **Alessandra Zizzari** (now postdoc at CNR-Nanotec-Lecce).
9. “*Investigation of strong coupling in cavity magnonics*”, **Angelo Leo**.
10. “*Optimization of magnetoresistive sensors for early diagnosis of neurodegenerative diseases*”, **Fausto Sirsi** (in progress, temporary title), **Daniela Lospinoso** (XXXII ciclo)

SUPERVISION OF POSTDOCTORAL FELLOWS

1. **Elena Ionescu** (Romania), about 1 year, presently associate professor at Université de Technologie de Troyes, Laboratoire de Nanotechnologie et d'Instrumentation Optique (LNIO), France.
2. **Chaitanya Lekshmi** Indira (India), about 2 years, presently associate professor at Dept. of Chemistry, CMR Institute of Technology.
3. **Shilpi Karmakar** (India), about 1.5 year, presently working in a company.
4. Past Graduate Students already mentioned before: **Elisabetta Primiceri**, **Maria Serena Chiriaco**, **Anna Grazia Monteduro**, **Susmit Kumar**, **Pasquale Marzo**, **Zoobia Ameer**, **Silvia Rizzato**.
5. Other postdocs for a few months: **Marco Beccari**, **Daniele Valerini**, **Eleonora Bellini**.

RESEARCH ACTIVITIES & STRATEGY

RESEARCH GROUP AND LABORATORIES

At the moment, G. Maruccio is the scientific coordinator of the spintronics and lab on a chip group in the joint labs UniSalento/CNR-Nanotec in Lecce, which includes three postdocs and two Ph.D. students. He is responsible of the following laboratories:

1. A **RF and LT spintronics lab** with a cryogenic RF probe station (down to 4 K and up to 0.5 T and 70 GHz), three superconducting magnets up to 10.5 T including a vector (6T, 1T, 1T) magnet combined to a dilution fridge (down to 10 mK). This lab is equipped for variable temperature DC magnetotransport, RF and ESR measurements, magnetospectroscopy, vibrating sample magnetometry and a.c. susceptibility. The facility for transport experiments includes femtoamperometric systems, parameter and vector network analysers.
2. A **lab-on-chip** laboratory for molecular diagnostics and cell studies optimizing biochips for RT-PCR, pM flow immunoassays, real-time monitoring of cellular processes (attachment, micromotion, migration, morphology, growth and apoptosis). Sensing facilities are equipped for electrochemistry, impedance spectroscopy, magnetoresistance, acoustic and optical read-out. On the microfluidics side, expertise spans from soft lithography to microchannels, valves, mixers, DEP separation and droplet microfluidics; the supporting **biology laboratory** includes a sterile chamber for cell culture, a nano-spotter for microarrays, a nanoplotter, a fluorescence scanner and complete setups for proteomics and genomics;

Moreover, G. Maruccio has access to institute facilities:

1. A **nanofabrication** facility, which relies on a class 1000/10000 clean room equipped with/for electron beam lithography, focused ion beam, mask aligners, a mask generator, reactive ion etching and ICP-RIE systems, evaporators, atomic layer deposition;
2. A **scanning probe lab**, including a Veeco Multimode 8 with PicoForce interface, a Veeco Catalyst AFM system combined with TIRF and confocal microscope, a Park AFM, a NT-MDT AFM operating also in low vacuum, a WiTec AFM-Raman, an Omicron ultra-high vacuum variable-temperature STM, a Createc low-temperature STM also equipped for XPS, a micro-FTIR and a micro-XRF system;
3. A lab for **electron microscopy and structural characterization** including TEM and high resolution SEM-FEG (point resolution smaller than 1 nm) equipped for EDS (Energy Dispersive X-ray Spectrometry) and allowing for operation under variable pressure conditions for the study of insulating and polymeric materials; an X-ray diffractometer of last generation.

The cost of the equipment in G. Maruccio lab exceeds 1.5 M€. These competences and equipment attracted requests from colleagues and companies for joint activities and projects.



Figure 1. Research activities in G. Maruccio group and their connections.

RESEARCH STRATEGY

This multidisciplinary research on one side is driven by curiosity and the need to find new funds to support research. On the other hand, it provides advantages for cutting edge research at the frontier among different disciplines. However, these activities are connected at a more fundamental level as shown in the following figure with specific methodologies, materials and devices crossing the fields from sensing to quantum computation applications, from engineering to physics, from material science to life science.

Experimental Techniques

- Lithographic techniques (e-beam, photolithography, soft lithography, wet and reactive ion etching)
- Optical spectroscopy techniques: Photoluminescence, electroluminescence and photocurrent spectroscopy, fluorescence and confocal microscopy / STED.
- Scanning probe techniques (AFM: contact and tapping mode, STM/STS)
- Advanced scanning probe microscopy/spectroscopy: wavefunction mapping (to map the local density of states and thus wavefunctions), electric force microscopy (EFM) and surface potential microscopy, scanning capacitance microscopy (SCM), scanning conductance microscopy, magnetic force microscopy (MFM), piezoelectric force microscopy (PFM), Force-spectroscopy (nano-scale adhesive and elastic response, binding forces, colloidal studies, and chemical sensing).
- Charge/spin Transport: temperature dependence, photoresponse and photocurrent spectroscopy, conductance in high magnetic field, RF measurements
- Dielectric spectroscopy and ferroelectric characterization for the study of high-k materials, functional oxides, multiferroic and piezoelectric materials.
- Magnetic characterization: Vibrating Sample Magnetometry for the measurement of magnetic hysteresis and susceptibility as a function of the temperature; MOKE and ferromagnetic resonance spectroscopy, and strong coupling studies in cavity magnonics.
- Electrochemistry, in particular cyclic voltammetry and impedance spectroscopy with application to biosensors.
- Functionalization techniques and methods for surface characterization
- Techniques for prototype preparation and microsoldering

Theoretical and Computational Background

- Poisson-Schrodinger simulations of nanostructures (band diagram, electric field, confined states, etc.)
- Finite-elements Simulation (Comsol Multiphysics): in particular applications in microfluidics and lab on a chip, micro/nano-electronics, spintronics using the modules: Microfluidics, Molecular Flow, AC/DC, RF, Heat Transfer, Wave Optics, MEMS, Semiconductor, Optimization, Particle Tracing.
- Labview and Matlab codes for data acquisition and analysis.

RESEARCH SUMMARY

A key point of Giuseppe Maruccio is his strongly interdisciplinary profile, not anchored to a specific research field (as demonstrated by his experimental/theoretical competences, publications, collaborations and projects). The reasons of this large multidisciplinary expertise are a strong capacity of starting new research lines to respond scientific needs, calls and industrial requests in order to create a set of competences, know-how and equipments exploitable for addressing the next scientific challenge on frontier research (spintronics, quantum computation, scanning probe microscopy/spectroscopy) as well for satisfying technological requirements by producing key enabling technologies of industrial interest (biosensors and lab on chip, microfluidics, devices for electronics and photonics, etc.). During the years, this approach permitted G. Maruccio to consolidate his own research group and provide job opportunities to supervised students and young researchers. G. Maruccio started this path during his thesis activities (on optical spectroscopy, photonics and quantum dot lasers), PhD work and early postdoc (molecular electronics) until further developing it by starting new research lines and own projects after having a permanent position. More in detail the first research experiences regarded:

- **1999-2000.** Undergraduate research project in solid-state physics and low-dimensional systems: Optical properties of Quantum Dots, nanostructures and microcavities; Fabrication and characterization of Quantum Dots Lasers with application in telecommunication (EU and Agilent Technologies funded this research). This work led to a patent and publications among which two Applied Physics Letters in 2001.
- **2000-2007. Biomolecular electronics.** Pioneering work on biomolecular electronics started during graduate research (2000-2004) when G. Maruccio demonstrated field effect transistors based on modified DNA bases (guanosine, Nano Letters 2003) and redox proteins (the blue copper protein Azurin, Adv. Mat. 2005). In the

case of proteins, the retention of their native conformation and functional properties was probed by AFM, EC-STM and fluorescence spectroscopy on self-assembled monolayers and in high electric fields. The prototype transistors consisted of a silver gate electrode and an EBL-fabricated nanojunction bridged by the molecular layer (Nano Letters 2003, Adv. Mat. 2005). With the demonstration of the first protein transistor, a leading position was established in this field of research (Nat. Nanotech. News & Views 2012). Successively, a new method was patented for simultaneous, economic fabrication of large arrays of nanodevices working at ambient conditions (TO2007A000341). This method was then employed to investigate transport through individual Azurin proteins directly immobilized on the electrodes with observation of clear molecular signatures such as a negative differential resistance (Small 2007). However, after quite some experiments it was concluded that conjugated molecules and nanoparticles are more suitable for fabricating reliable electronic nanodevices with commercial applications. From a different perspective, biomolecules are now investigated for biosensors and lab on chip applications, while back from Hamburg, G.Maruccio moved its activities in nanoelectronics towards spintronics and nanomagnetism (see below).

Presently G. Maruccio research activity is focused mainly on three sectors and in all of them he demonstrated a strong ability of innovation and originality:

- **2006-now. Nanoelectronics, Spintronics and nanomagnetism.** Coming back from Hamburg in 2006, G.Maruccio started a new research line in Lecce on spintronics and nanomagnetism. This is driven by his fascination for nanoscale magnetism and *charge/spin transport phenomena in molecules/nanosystems*, as well as by the medium-long term perspective that many interesting discoveries and application can be expected in this field exploiting spin transport and quantum information storage in molecules, molecular magnets and magnetic nanoparticles. G.Maruccio was the coordinator of the EU project SpiDME (Spintronic Devices for Molecular Electronics) involving CNR-INFN, the Institute for Applied Physics at the University of Hamburg (Germany), the Institute for Molecules and Materials in Nijmegen (The Netherlands) and the Trinity College Dublin (Ireland). The project aimed both at the understanding of the interaction between the electron spin and its solid-state environment and at the fabrication of a new generation of molecular spin devices, which exploit the spin degree of freedom to store, carry and manipulate information. This approach can pave the way to the fabrication of conceptually new devices and can be considered as a potential “step forward” in the direction of future nanoelectronics. At the moment, special emphasis is dedicated to (1) the fabrication of hybrid organic/inorganic spin devices based on single magnetic molecules/nanoparticles; (2) the study and modelling of charge/spin transport in such devices with special attention to the interplay between single electron tunneling and spin-polarized tunneling. The feasibility of molecular-scale electronics/spintronics is also investigated for possible industrial applications (Nat. Mat. 2009, ACS Nano 2011, Nanoscale 2012b). More recently, activities were started on: multiferroic materials and functional oxides (J.Mat.Chem.C 2016), spin waves and spin dynamics, spin crossover compounds, surface acoustic waves, quantum electronics, resonant cavities and quantum computations. These efforts led to a reduction of work on core activities but are the first step for the new research lines and projects for the next years. Moreover the network of national and international collaborations is being enlarged thanks to contacts with important research groups in the field. Results of this networking activities are: (i) the high relevance project “Spintronic devices for mass-scale electronics” funded in the frame for scientific and technological co-operation between Italy and India; (ii) the FIRB project “Molecular nanomagnets on metallic and magnetic surfaces for applications in molecular spintronics”; (iii) the EU project MolArNet: Molecular Architectures for QCA-inspired Boolean Networks; (iv) the international conference “Trends in Spintronics and Nanomagnetism” (TSN2010) with the participation of Prof. Albert Fert, father of spintronics and Nobel Prize in Physics 2007; (v) the EU project MADIA: Magnetic Diagnostic Assay for neurodegenerative diseases; (vi) the submission of several EU projects (see list below). In February 2016, an **ERC-Consolidator proposal** was submitted where seeding activities on cavity QED, spin waves, surface acoustic waves, multiferroic materials and colloidal lithography are planned to be merged to establish the new field of quantum cavity hybrid magnonics (the project received an excellent evaluation for half of the reports and very good for the remaining half, without acceding to funding).
- **2008-now. Lab on chips and biosensors.** These activities include the fabrication of Lab on Chips, Cell chips, DNA/protein chips/sensors and development of innovative detection strategies (2 Italian Patent). G. Maruccio also developed microheaters and temperature sensors for PCR chips along with the controlling software for thermal cycles (in Labview with PID feedback). The development of new biosensor prototypes is also an important part of this activity. The detection schemes are electrical, electrochemical (by impedance spectroscopy or cyclic voltammetry) or magnetic (using GMR and TMR sensors). (see Analyst 2009, Microel. Eng. 2009 (both papers), Biomedical Microdevices 2009, Biosens. Bioelectron. 2010, Lab Chip 2011 (two papers) and 2013). More recently, these research has been focused on the use of surface acoustic waves for detection and microfluidics and the exploitation of colloidal lithography for the fabrication of plasmonic sensors. On the medical side, the new target is the detection and analysis of circulating biomarkers for liquid

biopsies as well as for personalized therapy, while a further goal concerns application of the same technologies to agrifood and environmental fields.

- **2004-now. Scanning Probe microscopy.** This activity started thanks to specific expertise developed/acquired by Giuseppe Maruccio, even in the course of his postdoc in the labs of Prof. Roland Wiesendanger, Institute of Applied Physics, University of Hamburg, one of the worldwide leader groups in the field of scanning tunneling microscopy and spectroscopy. In particular, the research carried out in this field in these years concerned:
 - **Nanomechanics.** In 2004, G.Maruccio started a new line of research in Lecce concerning Force-spectroscopy characterization of surfaces, nanostructures and self-assembled monolayers of molecules and biomolecules in order to probe nanomechanical and other fundamental properties of sample surfaces (including nano-scale adhesive and elastic response), measure binding forces and enable chemical sensing and unfolding studies on proteins. This technique was/is used to investigate the mechanical properties of polymeric nanofibers fabricated by soft lithography, amyloid fibrils, cells and to study fluorinated compounds (Appl. Phys. Lett. 2005, Biomacromolecules 2008, Nanotechnology 2009 (both papers)).
 - **2003-now. Advanced SFM.** In particular, Surface Potential Microscopy was used to investigate samples exposing different functional groups such as prototype halogen-bonded co-crystals of long-chain perfluorocarbons in order to gain information on the structure and composition of their fundamental crystal faces. These crystals were found to show surfaces with well-defined ledges formed by intersecting crystal planes having different chemical compositions with the perfluorocarbons (PFCs) covering the largest area of the crystal as a reminiscence of the strong segregation observed in the bulk crystal structure (CrystEngComm 2008, Biochim.Biophys. Acta 2005). More recently, activities started on piezoelectric force microscopy for the investigation of ferroelectric and multiferroic materials.
 - **2005-now. UHV-STM and Wavefunction mapping** in quantum dots and nanoparticles by means of spatially resolved scanning tunneling spectroscopy using a low temperature UHV-STM. This work was carried out as a postdoc in the group of Prof. Roland Wiesendanger at the Institute of Applied Physics, University of Hamburg (one of the world leader groups in STM/STS). In particular, the correlation effects in the regime of few electrons in uncapped InAs quantum dots were investigated for the first time using this technique and the experimental results were explained in terms of many-body tunneling theory in collaboration with Prof. Molinari group in Modena (Nano Lett. 2007). The electronic structure of immobilized colloidal nanocrystals and the symmetry of the squared wavefunctions (WFs) corresponding to the different confined states resolved in the spectral density were also studied. An unprecedented, significant coupling with the environment was observed in combination with WF maps with clear s- and p-type character and charging energies decreasing when higher orbitals with broader WFs are occupied (Small 2009). The expertise acquired in Hamburg is now exploited in Lecce to study the electronic properties of molecules (mostly in the form of self assembled monolayers), nanoparticles and quantum dots (ChemPhysChem 2009, Nanoscale 2012a). This also led to a grant in a PRIN project on similar topics (Imaging METallorganic MOlecules: Scanning tunneling spectroscopy and many-body theory (MEMO), prot. 2012EFSHK4).

These activities are documented by patents and papers in international journals.

PROJECT GRANTS AND RESPONSABILITIES

Grants in competitive calls

1. **UE-FP6-NEST-STREP (2006-2010, Proposer and Coordinator): Spintronic Devices for Molecular Electronics (SpiDME), Grant Agreement No. 029002, EC funding 1.3M€ (Lecce 502k€). Partners:** University of Hamburg – Institute for Applied Physics; University of Nijmegen - Institute for Molecules and Materials; Trinity College Dublin – School of Physics.
2. **MAE-India (2008-2010, Proposer and Scientific Responsible): Spintronic devices for mass-scale electronic: High-relevance project for scientific and technological co-operation between Italy and India, Prot. 269/140343, Local Funding: 32k€.**
3. **MIUR-FIRB Project (2011-2014, Co-proposer and Responsible of Lecce Unit): Molecular nanomagnets on metallic and magnetic surfaces for applications in molecular spintronics: prot. RBAP117RWN, Total Funding: 1528 k€ (Lecce 240k€).**
4. **UE-FP7-ICT-CP (2012-2016, Co-Proposer and WP Leader): Molecular Architectures for QCA-inspired Boolean Networks (MolArNet), Grant No. 318516, EC funding: 2.76M€ (Lecce 653k€). Partners:** Alma Mater Studiorum-Università di Bologna, Université de Strasbourg, Technische Universitaet Dresden, Trinity College Dublin – School Of Physics, Stmicroelectronics Srl.
5. **UE-H2020-ICT (2017-2020, Responsible for Lecce Unit Node): Magnetic Diagnostic Assay for neurodegenerative diseases (MADIA), Grant No. 732678, EC funding:3.9M€ (Lecce 150 k€), Work programme topic addressed: ICT-03-2016 “SSI - Smart System Integration”.**
6. **UE-H2020-MSCA-NIGHT-2018 (2018-2019, Proposer and Coordinator): European Research Night - Apulia (ERN-Apulia), Grant No. 818783, EC funding: 171 k€ (UniSalento 30 k€, CNR 20 k€). Partners:** UniSalento, UniBA, PoliBA, UniFG, CNR, INFN, IIT, ENEA, IRCCS-DeBellis.
7. **MIUR-PRIN Project (2014-2016, National Coordinator): Imaging METallorganic MOlecules: Scanning tunneling spectroscopy and many-body theory (MEMO): prot. 2012EFCHK4, Total Funding: 150.836 € (Lecce 75.436 €).**
8. **MIUR-PRIN Project (2008-2010, Co-proposer and Vice-Responsible of Lecce Unit): Preparation and characterization of fluorinated layers and surfaces: prot. 2008KMP97E_005, Total Funding: 124 k€ (Lecce 47k€).**
9. **MIUR-PRIN Project (2005-2007, Staff scientist): Materiali fluorurati per il controllo dei fenomeni superficiali in sistemi micro- e nano-strutturati: prot. 2005035277_004, Total Funding: 347 k€.**
10. **MIUR-FIRB Project (2005-2011, Staff scientist): National Laboratory for Nanotechnology applied to Genomics and Post-Genomics (NG-Lab): prot. RBLA03ER38, Total Funding: 6.0 M€.**
11. **APQ-Ricerca Scientifica (2011-2013, Staff scientist): Progetto Reti di Laboratori Pubblici di Ricerca “Nano- Biotechnological methods for innovative Diagnostics and Therapy” (NaBiDiT), Project code 72, Total Funding: 2.2 M€ (Coordinator: Prof. R. Rinaldi).**
12. **P.O.N. Ricerca e competitività (2007-2013, Staff scientist): “Omics and Nanotechnologies applied to living being for disease diagnosis” (ONEV), Project Code: PONA3_00354, involved with Università del Salento, Total Funding: 10.6 M€ (Coordinator: Prof. F. P. Schena)**
13. **Call 2012 “5 per mille per la ricerca” – Università del Salento: Biochip magnetoresistivi per diagnostica (BioMag), Total Funding: 22.8k€.**
14. **Contamination Lab CLab@Salento (2017-2020, Project Chief): prot. CL16CWFNBS, Funding UniSalento: 300 k€ for creating a virtual and physical laboratory to develop and diffuse in the participants an entrepreneurial mindset and entrepreneurial awareness.**
15. **FISR-CIPE Project (2017-2020, Project Coordinator): Development of an innovative sensing platform for on-field analysis and monitoring (INNO-Sense), delibera CIPE n.78 del 07/08/2017, Total Funding 1.47 M€ (UniSalento: 441 k€), partners: CNR-Nanotec, Ospedale San Raffaele, Consorzio Optel.**

Grants from Industry (see research exploitation section)

Involvement in other Projects

16. **MIUR-FAR Project (2006-2010, Staff scientist):** Advanced micro- and nano-fabrication processes for the realization of devices and functional apparati for applications in electronics, photonics, micromechanics and biosensing (MICRO): *prot. MIUR-DM28486*, **Total Funding:** 2.9 M€.
17. **APQ-Ricerca Scientifica (2009-2012, Staff scientist):** Studio Preliminare di Materiali Nanocompositi per Applicazioni Aeronautiche (AEROCOMP), *prot. MIUR-DM48391*, **Total Funding:** 3.6 M€.
18. **P.O.N. Ricerca e competitività 2007-2013 (Staff scientist):** “Materials and processes BEYOND the NANO-scale (Beyond Nano), Project Code: **PONa3_00362**, involved with Consiglio Nazionale delle Ricerche – Istituto Nanoscienze, **Total Funding:** 17400 k€ (Coordinator: Prof. M. Inguscio)
19. **P.O.N. Ricerca e competitività 2007-2013 (Staff scientist):** Process and product innovations aimed at increasing food safety and at diversifying pork-based products (SAFEMEAT): Project Code: **PON01_01409** (Coordinator: Salumificio Dodaro S.p.A.)
20. **P.O.N. Ricerca e competitività 2007-2013: (Staff scientist):** Rigenerazione di tessuti nervosi ed osteocartilaginei mediante innovativi approcci di Tissue Engineering (RINOVATIS): Project code: **PON02_00563_3448479**, **Total Funding:** 9 M€ (DHITECH - Distretto Tecnologico High Tech Scarl)
21. **2006-2009: Italian Institute of Technology:** NNL-Lecce unit, Principal Investigator for the research line “Biodevices and biosensors arrays for electrochemical sensing and redox activity monitoring in cells”
22. **2002-2006: Nanospectra** (European Union RTN network project, Project Reference: HPRN-CT-2002-00320), Programme type: Fifth Framework Programme, Subprogramme Area: Research Training Networks, Contract type: Research network contracts, Programme Acronym: HUMAN POTENTIAL, Duration: 42 months; Project Funding: **1179000 EURO**; **Participants:** Paul-Drude-Institut für Festkoerperelektronik - Berlin, University of Hamburg - Institut für Angewandte Phzsik and Institut Für Physikalische Chemie–Hamburg, IBM Research - Science & Technology Department, University of Nottingham, Institut d'Electronique et de Microelectronique du Nord – Lille, Swiss Federal Institute of Technology Zürich.
Role: Post-doctorate researcher in Hamburg, Prof. Wiesendanger group

Collaborations on specific topics and proposals are active with: University of Hamburg – Institute for Applied Physics; Trinity College Dublin – School of Physics, IBM-Zurich, Kavli Institute of Nanoscience at Delft University of Technology, Inst. of Molecular Physics at Polish Academy of Science, Inst. Ciencia de Materials de Barcelona, INSA-Toulouse, University of Nijmegen - Institute for Molecules and Materials, INSTM-Florence, CNR-Nano-S³ Modena, CNRS-Thales, Indian Institute of Science Bangalore, Hebrew University of Jerusalem, Universität Regensburg, ETH-Zurich, Charité Universitätsmedizin Berlin, Agencia Estatal Consejo Superior de Investigaciones Científicas, University of Turin - Center for Experimental Research and Medical Studies, IRSSC San Giovanni Rotondo. Many proposals were submitted together in the last years.

MAJOR PRESENT AND PAST COLLABORATIONS

- Prof. R. Wiesendanger, University of Hamburg – Institute for Applied Physics, Hamburg, Germany;
- Prof. S. Sanvito, Trinity College Dublin – School of Physics, Dublin, Ireland;
- Prof. J. Fontcuberta, Inst. Ciencia de Materials de Barcelona, Barcelona, Spain,
- Prof. A. Rowan, University of Nijmegen - Institute for Molecules and Materials, Nijmegen, The Netherlands;
- Prof. R. Sessoli, INSTM-Florence, Firenze, Italy;
- Dr. M. Rontani and Dr. S. Corni, CNR-Nano-S3, Modena, Italy;
- Prof. D.D. Sarma, Indian Institute of Science, Bangalore, India;
- Prof. J.R. Galan-Mascaros, Institute Català d’Investigació Química, Tarragona, Spain;
- Prof. V. A. Dediu, Istituto per lo Studio dei Materiali Nanostrutturati, CNR-ISMN, Bologna, Italy.

RESEARCH EXPLOITATION

Grants from Industry

1. **Research contract from Ekuberg Pharma S.r.l. (2010-2012, Project leader)** for the development and optimization of dedicated biochips, **Funding:** 32.4 k€.
2. **Research contract from Sensichips (2013-2015, Project leader)** for the development of tools for CMOS Post-processing for sensing arrays, **Funding:** 10.0 k€.
3. **Research contract from Janssen Cilag spa (2016, Project responsible).**

PATENTS

1. *P.P. Pompa, L.L. del Mercato, A. Della Torre, R. Chiuri, F. Calabi, G. Maruccio, R. Cingolani, and R. Rinaldi, "A biomolecular field effect transistor comprising a polypeptide film, and a method for its manufacturing", Italian patent number TO2005A000830 (24-11-2005) , International Publication number WO 2007/060632 (31-05-2007).*
2. *G. Maruccio, E. Primiceri, P. Marzo, V. Arima, R. Krahn, T. Pellegrino, A. Della Torre, F. Calabi, R. Cingolani, R. Rinaldi, "Electrical transduction method and device for the detection of biorecognition events in biomolecular interaction processes for genome/proteome analysis", Italian patent number TO2007A000341 (15-5-2007), International Publication number WO 2008/139421 (20-11-2008).*
3. *R. Cingolani, G. Maruccio, P.P. Pompa, R. Rinaldi, S. Sabella, G. Vecchio, "Microdispositivo integrato per reazioni di amplificazione di acidi nucleici", Italian patent number: TO2008A000810 (01/05/2010).*
4. *D. Carati, M. S. Chiriaco, F. De Feo, G. Maruccio, M. Megha, A. Montanaro, E. Primiceri, and A. Tinelli, "Impedenziometric biochip useful for detecting infections of e.g. Candida Albicans and Streptococcus Agalactiae by drawing and analysis of vaginal fluid whose presence is detected via impedance variation measurable within special electrodes", Patent No. WO2015015456-A1., released to Ekuberg Pharma Srl*

Joint Laboratories Joint and Study Agreements

- **2014-2015:** Responsible for the Joint Lab among Sensichips SRL and CNR-Nano in Lecce (Italy) for the development of research activities of common interest in the field of advanced sensors, microfluidics and lab on a chip platforms.
- **From 2017:** Responsible for two Joint Study Agreements with IBM-Research Almaden for sensors, spintronics and biotech research.

INVITED LECTURES/PRESENTATIONS

1. **G. MARUCCIO**, P. Visconti, A. Biasco, A. Bramanti, A. Della Torre, P.P. Pompa, V. Frascerra, R. Cingolani and R. Rinaldi, G.W. Canters, G. Gottarelli, *Towards a bio/molecular electronics: concepts, results and perspectives*, Invited Lecture at the International Conference “European Materials Research Society – E-MRS 2004” (Strasbourg, France -24-28/05/2004)
2. **G. MARUCCIO**, *Mappatura Chimica di Superfici con Tecniche di Microscopia a Scansione*, Invited Lecture at the Dipartimento di Chimica, Materiali e Ingegneria Chimica “Giulio Natta” Politecnico di Milano (25/05/2004)
3. M. Rontani, E. Molinari, **G. MARUCCIO**, M. Janson, A. Schramm, C. Meyer, T. Matsui, C. Heyn, W. Hansen, and R. Wiesendanger, *Imaging correlated wave functions of few-electron quantum dots: Theory and STS experiments*, Invited Lecture at the 28th International Conference on the Physics of Semiconductors (Vienna, Austria, July 24-28, 2006)
4. **G. MARUCCIO**, *Biomolecular Electronics*, Invited Lecture at the Workshop on “New Perspectives in Bio-nanotechnology”, (Aula Magna del Politecnico-Lingotto, Via Nizza 230, Torino, 27 Settembre 2006)
5. C. Lekshmi Indira, P. Marzo, A. della Torre, L. Sanarica, E. Primiceri, R. Krahn, T. Pellegrino, V. Arima, R. Cingolani, R. Rinaldi, **G. MARUCCIO**, *International Conference on Nano and Microelectronics, ICONAME– 2008, Pondicherry Engineering College, Pillaichavady, Puducherry – 605014 (India, 3 – 5 January 2008)*
6. **G. MARUCCIO**, *Molecular electronics and nanospintronics*, Invited Lecture at Laboratory of Molecular Magnetism, Dipartimento di Chimica e UdR INSTM di Firenze Polo Scientifico, Sesto Fiorentino (Fi) – Italy (26-3-2009).
7. **G. MARUCCIO**, *Nanospintronics with magnetic nanoparticles and molecules*, Invited Lecture at CNR-Istituto Nanoscienze S3, Modena, Italy (16-3-2009)
8. **G. MARUCCIO**, *Applications of nanomaterials in nanoelectronics and biosensing*, 7th International Workshop on Functional and Nanostructured Materials (FNMA’2010), Malta, 16–20 July 2010.
9. **G. MARUCCIO**, *Nanoscale spin-devices based on magnetic nanoparticles and molecules*, International Conference on Physics of Emerging Functional Materials (PEFM-2010), Bhabha Atomic Research Center, Mumbai, India, September 22-24, 2010
10. **G. MARUCCIO**, *Nanoscale spin-devices based on magnetic nanoparticles and molecules*, Invited Lecture at Solid -State and Structural Chemistry Unit & Centre for Condensed Matter Theory, Indian Institute of Science, Bangalore, INDIA (27/09/2010)
11. **G. MARUCCIO**, *Multipurpose biochips with integrated microfluidic components*, Invited Lecture at Solid -State and Structural Chemistry Unit & Centre for Condensed Matter Theory, Indian Institute of Science, Bangalore, INDIA (27/09/2010)
12. **G. MARUCCIO**, *Towards atomic-scale electronics*, presentazione al Workshop DMD - Atom-based Nanotechnology, Arcetri, Firenze, Italy (19/1/2011).
13. **G. MARUCCIO**, *Multipurpose biochips - Toward on-chip medicine*, invited lecture (1h) at Center for Experimental Research and Medical Studies (CeRMS), San Giovanni Battista Hospital, Turin, Italy, 2 Department of Medicine and Experimental Oncology, University of Turin, Turin, Italy (31/1/2012)
14. **G. MARUCCIO**, *Multipurpose biochips - Toward on-chip medicine*, invited lecture (1h) within the PhD program in “Biologia dei Sistemi” at Dipartimento di Farmacia, Università di Salerno (14/3/2013).
15. **G. MARUCCIO**, *Spintronic Devices*, invited lecture (1h) at the Italian School of Magnetism, Pavia, Italy (5-10/2/2012)
16. **G. MARUCCIO**, *Spintronics & Nanomagnetism*, invited lecture (50 min, via Skype) for Scholars in nanomaterials/nanomagnetism at VIT University, Vellore, India (21/4/2012)
17. **G. MARUCCIO**, *Nanoscale spin-devices based on magnetic nanoparticles and molecules*, invited lecture (1h) at CNR-Spin-L’Aquila, Italy (4/9/2012).
18. **G. MARUCCIO**, *Spintronics and Lab on chip activities at CNR-Nano-Lecce*, invited lecture (1h) at Dipartimento di Fisica, Università di Perugia, Perugia, Italy (11/10/2013).

19. **G. MARUCCIO**, *Hybrid Spintronics: from nano- and molecular scale to microwave and quantum devices*, Plenary Lecture at the “International Conference on Magnetic Materials & Applications - ICMAGMA 2015”, VIT University, Vellore, Tamil Nadu -(2-4 Dec.2015), organized by the Magnetism Society Of India
20. **G. MARUCCIO**, *Hybrid Spintronics: from nano- and molecular scale to microwave and quantum devices*, invited lecture (1h) at *CNR-ISTEC, Faenza, Italy* (8/2/2018)
21. **G. MARUCCIO**, *Hybrid Spintronics: from nano- and molecular scale to microwave and quantum devices*, invited lecture (1h) at *CNR-IMEM, Parma, Italy* (9/2/2018)
22. **G. MARUCCIO**, *ERC nel Salento: Sinergie di Successo*, Invited Lecture at “ERC Week @ Federico II, Il Sud Italia per l’Europa”, Università degli Studi di Napoli Federico II, 6 Aprile 2017.
23. **G. MARUCCIO**, *participation at the round table on the Italian ecosystem of Innovation at NanoInnovation 2017*, Rome, 29 September 2017

PUBLICATIONS

CONTRIBUTIONS TO BOOKS AND ENCYCLOPEDIA (INVITED)

1. R. Rinaldi, **G. MARUCCIO**, A. Bramanti, P. Visconti, A. Biasco, V. Arima, S. D'Amico, R. Cingolani, *Nano-Bio Electronic Devices Based on DNA Bases and Proteins*, published by Springer as a chapter in the collective work entitled **Frontiers of Multifunctional Integrated Nanosystems**, ISBN: 1-4020-2173-9, August 2004 edited by Eugenia V. Buzaneva, Peter Scharff.
2. R. Rinaldi, **G. MARUCCIO**, A. Biasco, P. Pompa, A. Bramanti, V. Arima, P. Visconti, S. D'Amico, E. D'Amone, R. Cingolani, *Metalloprotein-based electronic devices*, published by Springer as chapter 2 (pp. 9-23) in the collective work entitled **Bionanotechnology – Proteins to devices**, ISBN: 978-1-4020-4375-8, 2006, edited by V. Renugopalakrishnan and Randolph V. Lewis.
3. R. Rinaldi, **G. MARUCCIO**, *Molecular Electronics*, published as a chapter in the collective work entitled **WILEY ENCYCLOPEDIA OF BIOMEDICAL ENGINEERING** (6-Volume Set, ISBN: 0-471-24967-X, Hardcover, 4152 pages, June 2006), edited by Metin Akay. **Both authors equally contributed to this work.**
4. R. Rinaldi, **G. MARUCCIO**, *Nanobioelectronics*, published by WILEY-VCH • Weinheim • Berlin as a chapter in the book entitled **Series on Nanotechnology for Life Sciences - Vol 4 (Nanodevices for Life Sciences)**, ISBN-10: 3-527-31384-2, ISBN-13: 978-3-527-31384-6, July 2006, approx 400pp with 175 figs) edited by Challa S.S.R. Kumar. **Both authors equally contributed to this work.**
5. **G. MARUCCIO**, A. Bramanti, *Nanoelectronic devices based on proteins*, published as a chapter in the book **Nanobioelectronics – for Electronics, Biology, and Medicine** edited by Andreas Offenhäusser and Ross Rinaldi (*Springer New York, 2009*; ISBN: 038709458X , ISBN-13: 9780387094588), pp. 139-166, DOI: 10.1007/978-0-387-09459-5_6. **Both authors equally contributed to this work.**
6. **G. MARUCCIO**, R. Wiesendanger, *Scanning Tunneling Spectroscopy of Semiconductor Quantum Dots and Nanocrystals*, published as a chapter in the book **Quantum Materials, Lateral Semiconductor Nanostructures, Hybrid Systems and Nanocrystals**, edited by Detlef Heitmann (Springer Berlin Heidelberg, 2010), pp. 183-216, DOI: 10.1007/978-3-642-10553-1_8.
7. S. Kumar, S. Karmakar, A. Bramanti, R. Rinaldi and **G. MARUCCIO**, (2011). *Nanofabrication for Molecular Scale Devices, Nanofabrication, Yoshitake Masuda (Ed.)*, ISBN: 978-953-307-912-7, InTech, Available from: <http://www.intechopen.com/articles/show/title/nanofabrication-for-molecular-scale-devices>
8. G. Montani, V. Arima, **G. MARUCCIO**, *The Tear Film Interaction with Contact Lenses*, published as a chapter in the book "Ocular Surface - Anatomy and Physiology, Disorders and Therapeutic Care ", edited by Science Publishers, Engield, New Hampshire 03478, USA

OTHER INVITED PUBLICATIONS

1. **G. MARUCCIO**, R. Cingolani, R. Rinaldi, *Projecting the nanoworld – Concepts, results and perspectives of Molecular Electronics*, Journal of Materials Chemistry 14, 542-554 (2004)
2. **G. MARUCCIO**, P. Visconti, A. Biasco, A. Bramanti, A. Della Torre, P.P. Pompa, V. Frascerra, V. Arima, E. D'Amone, R. Cingolani and R. Rinaldi, *Nano-scaled biomolecular field-effect transistors: prototypes and evaluations*, Electroanalysis, 16, 1853-1862 (2004, special issue dedicated to "Application of Field-Effect Transistors for Electroanalysis")
3. **G. MARUCCIO**, *Your views...: 'Nanotechnology'*, Chemistry Worlds, December 2005, Vol 2, no.12
4. **G. MARUCCIO**, *Spintronics at the Molecular Scale–Progresses and Opportunities*, Journal of Spintronics and Magnetic Nanomaterials, 1, 1–8 (2012)
5. **G. MARUCCIO**, *Protein transistors strike gold*, Nature Nanotechnology, 7, 147 (2012), news & views.

PUBLICATIONS ANALYSIS - ISI WEB OF KNOWLEDGE STATISTICS - 2019-03-15

Published Items found: [1-128] (contributions to books and encyclopaedias not included)

Times cited: 1700+ (according to WOS/Scopus database)

Average Citations per (main) Items: ≈13 (according to WOS)

h-index: 24

Among them, results on molecular electronics/spintronics, wavefunction mapping, nanomechanics, biochips and photonics were published in top journals such as

Nat. Mat.	(I.F. = 39.737)	Small	(I.F. = 8.643)
NanoLetters	(I.F. = 12.712)	Lab on a Chip	(I.F. = 6.045)
PNAS	(I.F. = 9.661)	Biosens. Bioelectron.	(I.F. = 7.780)
Advanced Materials	(I.F. = 19.791)	Nanoscale	(I.F. = 7.367)
ACS-Nano	(I.F. = 13.942)		

(I.F. = 2016 Impact Factor)

SCIENTIFIC PUBLICATIONS:**A) ISI-listed journals (peer reviewed)**

- [1] A. Paul, M. S. Chiriaco, E. Primiceri, D. N. Srivastava and G. Maruccio, *Picomolar detection of retinol binding protein 4 for early management of type II diabetes*, ***Biosensors and Bioelectronics* 2019**, Vol. 128, p. 122-128, **issn.** 0956-5663, <http://dx.doi.org/https://doi.org/10.1016/j.bios.2018.12.032>.
- [2] Z. Ameer, A. G. Monteduro, S. Rizzato, A. P. Caricato, M. Martino, I. C. Lekshmi, A. Hazarika, D. Choudhury, E. Mazzotta, C. Malitesta, V. Tasco, D. D. Sarma and G. Maruccio, *Dielectrical performance of high-k yttrium copper titanate thin films for electronic applications*, ***J. Mater. Sci.-Mater. Electron.* 2018**, Vol. 29, p. 7090-7098, **issn.** 0957-4522, <http://dx.doi.org/10.1007/s10854-018-8696-x>.
- [3] R. Assiro, A. P. Caricato, G. Chiodini, M. Corrado, M. De Feudis, C. Di Giulio, G. Fiore, L. Foggetta, E. Leonardi, M. Martino, G. Maruccio, A. G. Monteduro, F. Oliva, C. Pinto and S. Spagnolo, *Performance of the diamond active target prototype for the PADME experiment at the DA Phi NE BTF*, ***Nucl. Instrum. Methods Phys. Res. Sect. A-Accel. Spectrom. Dect. Assoc. Equip.* 2018**, Vol. 898, p. 105-110, **issn.** 0168-9002, <http://dx.doi.org/10.1016/j.nima.2018.04.062>.
- [4] M. S. Chiriaco, S. Rizzato, E. Primiceri, S. Spagnolo, A. G. Monteduro, F. Ferrara and G. Maruccio, *Optimization of SAW and EIS sensors suitable for environmental particulate monitoring*, ***Microelectron. Eng.* 2018**, Vol. 202, p. 31-36, **issn.** 0167-9317, <http://dx.doi.org/10.1016/j.mee.2018.10.008>.
- [5] M. S. Chiriaco, A. Luvisi, E. Primiceri, E. Sabella, L. De Bellis and G. Maruccio, *Development of a lab-on-a-chip method for rapid assay of Xylella fastidiosa subsp pauca strain CoDiRO*, ***Sci Rep* 2018**, Vol. 8, p., **issn.** 2045-2322, <http://dx.doi.org/10.1038/s41598-018-25747-4>.
- [6] M. S. Chiriaco, M. Bianco, A. Nigro, E. Primiceri, F. Ferrara, A. Romano, A. Quattrini, R. Furlan, V. Arima and G. Maruccio, *Lab-on-Chip for Exosomes and Microvesicles Detection and Characterization*, ***Sensors* 2018**, Vol. 18, p., **issn.** 1424-8220, <http://dx.doi.org/10.3390/s18103175>.
- [7] A. Leo, A. G. Monteduro, S. Rizzato, Z. Ameer, I. C. Lekshmi, A. Hazarika, D. Choudhury, D. D. Sarma and G. Maruccio, *RF and microwave dielectric response investigation of high-k yttrium copper titanate ceramic for electronic applications*, ***Microelectron. Eng.* 2018**, Vol. 194, p. 15-18, **issn.** 0167-9317, <http://dx.doi.org/10.1016/j.mee.2018.02.028>.
- [8] E. Mazzotta, A. Caroli, A. Pennetta, G. E. De Benedetto, E. Primiceri, A. G. Monteduro, G. Maruccio and C. Malitesta, *Facile synthesis of 3D flower-like Pt nanostructures on polypyrrole nanowire matrix for enhanced methanol oxidation*, ***Rsc Adv* 2018**, Vol. 8, p. 10367-10375, **issn.** 2046-2069, <http://dx.doi.org/10.1039/c7ra13269g>.
- [9] A. G. Monteduro, Z. Ameer, S. Rizzato, A. Leo, M. Martino, A. P. Caricato, V. Tasco, I. C. Lekshmi, A. Hazarika, D. Choudhury, E. Mazzotta, C. Malitesta, D. D. Sarma and G. Maruccio, "High-k YCTO thin films for electronics", ***2018 International Conference on IC Design & Technology (ICICDT) 2018***, Vol., p. 189-192, **issn.**, <http://dx.doi.org/10.1109/ICICDT.2018.8399788>.
- [10] E. Primiceri, M. S. Chiriaco and G. Maruccio, "Lab on chip for life science: From medical diagnostics to food quality control", ***2018 International Conference on IC Design & Technology (ICICDT) 2018***, Vol., p. 181-184, **issn.**, <http://dx.doi.org/10.1109/ICICDT.2018.8399786>.

- [11] E. Primiceri, M. S. Chiriaco, F. M. Notarangelo, A. Crocamo, D. Ardissino, M. Cereda, A. P. Bramanti, M. A. Bianchessi, G. Giannelli and G. Maruccio, *Key Enabling Technologies for Point-of-Care Diagnostics*, ***Sensors (Basel, Switzerland)* 2018**, Vol. 18, p., issn., <http://dx.doi.org/10.3390/s18113607>.
- [12] S. Rizzato, E. Primiceri, A. G. Monteduro, A. Colombelli, A. Leo, M. G. Manera, R. Rella and G. Maruccio, *Interaction-tailored organization of large-area colloidal assemblies*, ***Beilstein Journal of Nanotechnology* 2018**, Vol. 9, p. 1582-1593, issn., <http://dx.doi.org/10.3762/bjnano.9.150>.
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