

PERSONAL INFORMATION

Alessia Irrera

TOP PUBLICATIONS,
CONFERENCE CONTRIBUTION
AND AWARDS

100 papers in impacted journal and 18 in not indexed ones. 6 chapters of book.

Google scholar: Hirsch h-index of 39; 4600 citations.

Scopus: Hirsch h-index of 33, 3.451 citations

2 with impact factor > 39

1 with impact =32.086.

1 with impact factor = 20.257;

1 with impact factor= 18.027.

1 with impact factor 17.521

3 with impact fact >12

Top 15 papers with impact factor

1) "Coherent backscattering of Raman light".

B. Fazio, A. Irrera, S. Pirotta, C. D'Andrea, S. Del Sorbo, M. J. Lo Faro, P. Gucciardi, M. A. Iati, R. Saija, M. Patrini, P. Musumeci, C. Vasi, D. Wiersma, M. Galli, F. Priolo.
Nature Photonics 11 (3), 170, 2017

2) "A new type of transparent and low cost counter-electrode based on platinum nanoparticles for dye-sensitized solar cells".

G. Calogero, P. Calandra, A. Irrera, A. Sinopoli, I. Citro, G. Di Marco.
Energy & Environmental Science, 4 (5), 1838-1844, 2011.

3) "Strongly Enhanced Light Trapping in a Two-dimensional Silicon Nanowire Random Fractal Array".

B. Fazio, P. Artoni, M.A. Iati, C. D'andrea, M. J. Lo Faro, S. Del Sorbo, S. Pirotta, P. Gucciardi, P. Musumeci, C. Vasi, R. Saija, M. Galli, F. Priolo, A. Irrera
Light: Science & Applications 5 (4), e16062, 2016.

4) "Optical Trapping, Optical Binding, and Rotational Dynamics of Silicon Nanowires in Counter-Propagating Beams".

M. G. Donato, O. Brzobohatý, S. H. Simpson, A. Irrera, A. A. Leonardi, M. J. Lo Faro, V. Svak, O. Maragò, P. Zemanek.
Nano Letters 19 (1), 342-352, 2019.

5) "Photonic torque microscopy of the nonconservative force field for optically trapped silicon nanowires".

A. Irrera, A. Magazzù, P. Artoni, S. H. Simpson, S. Hanna, P. H. Jones, F. Priolo, P. Gucciardi, O. Maragò.
Nano Letters 16 (7), 4181-4188, 2016.

6) "Size-Scaling in Optical Trapping of Silicon Nanowires".

A. Irrera, P. Artoni, R. Saija, P. G. Gucciardi, M. A. Iati, F. Borghese, P. Denti, F. Iacona, F. Priolo, O. M. Maragò.
Nano Letters, 11 (11), 4879-4884, 2011.

7) "Re-radiation Enhancement in Polarized Surface-Enhanced Resonant Raman Scattering of Randomly Oriented Molecules on Self-Organized Gold Nanowires".

B. Fazio, C. D'Andrea, F. Bonaccorso, A. Irrera, G. Calogero, C. Vasi, P. G. Gucciardi, M. Allegrini, A. Toma, D. Chiappe, C. Martella, F. Buatier de Mongeot.

ACS Nano, 5 (7), 5945-5956, 2011.

8) "Efficient luminescence and energy transfer in erbium silicate thin films".
M. Miritello, R. Lo Savio, F. Iacona, G. Franzò, A. Irrera, A. M. Piro, C. Bongiorno, F. Priolo.
Advanced Materials, 19 (12), 1582-1588, 2007.

9) "Visualization of Directional Beaming of Weakly Localized Raman from a Random Network of Silicon Nanowires"
Maria J Lo Faro, Giovanna Ruello, Antonio A Leonardi, Dario Morganti, Alessia Irrera, Francesco Priolo, Sylvain Gigan, Giorgio Volpe, Barbara Fazio.
Advanced Science 8 (14), 2100139, 2021

10) "Nanopatterning of silicon nanowires for enhancing visible photoluminescence".
E. F. Pecora, N. Lawrence, P. Gregg, J. Trevino, P. Artoni, A. Irrera, F. Priolo, L. Dal Negro.
Nanoscale 4 (9), 2863-2866, 2012.

11) "Ultrasensitive Label-and PCR-Free Genome Detection Based on Cooperative Hybridization of Silicon Nanowires Optical Biosensors".
A. A. Leonardi, M. J Lo Faro, S. Petralia, B. Fazio, P. Musumeci, S. Conoci, A. Irrera, F. Priolo.
ACS Sensors 3 (9), 1690-1697, 2018.

12) "New Generation of Ultrasensitive Label-Free Optical Si Nanowire-Based Biosensors".
A. Irrera, A. A. Leonardi, Alessio, C. Di Franco, M. J. Lo Faro, G. Palazzo, C. D'Andrea, K. Manoli, M. Kyriaki, G. Franzò, P. Musumeci, B. Fazio, L. Torsi, F. Priolo,
ACS Photonics, vol. 5, p. 471-479, 2018.

13) "SERS detection of Biomolecules at Physiological pH via aggregation of Gold Nanorods mediated by Optical Forces and Plasmonic Heating"
B. Fazio, C. D'Andrea, A. Foti, E. Messina, A. Irrera, M. G. Donato, V. Villari, N. Micali, O. M. Maragò, P. Gucciardi.
Scientific Reports 6, 26952, 2016.

14) "Role of the energy transfer in the optical properties of undoped and Er-doped interacting Si nanocrystals".
F. Priolo, G. Franzò, D. Pacifici, V. Vinciguerra, F. Iacona, A. Irrera.
Journal of Applied Physics, 89 (1), 264-272, 2001.

15) "Electroluminescence of silicon nanocrystals in MOS structures".
G. Franzò, A. Irrera, E. Ceretta Moreira, M. Miritello, F. Iacona, D. Sanfilippo, G. Di Stefano, P.G. Fallica, F. Priolo.
Applied Physics A, 74 (1), 1-5, 2002.

Editorial board of reviewed journal

1. Editorial Board of "SCIENTIFIC REPORTS", ISSN 2045-2322 (online), published by Springer Nature. <https://www.nature.com/srep/about/editorial-board>. Dal 03-02-2017.
2. Editorial Board of "Nanomaterials", ISSN 2045-2322 (online), published by (ISSN 2079-4991), published by MDPI. from 2019
3. Topics board of "Nanomaterials", ISSN 2045-2322 (online), published by MDPI. from 18/09/2019
4. Editorial Board of: "Journal of Materials Science: Materials in Electronics" ISSN: 0957-4522, (Print) 1573-482X (Online), published by Springer. From 2018
5. Editorial Board of "Molecules" (ISSN 1420-3049); published by MDPI. From 2019
6. Editorial Board of "Frontiers in Chemistry". From 2019.
- Guest Editor of 7 Special Issue on ISSN journals

Conference organizer

- The candidate was part of the Organizing Committee of the Congress "XV International Conference

on Ion Beam Modification of Materials (IBMM)", TAORMINA, 18-22 September 2006.

- The candidate was a member of the Organizing Committee of the International Congress "2nd International Conference on Enhanced Spectroscopies ICES 2015" Messina, 12-15 October 2015.

- Main organizer of Symposium G of the European Materials Research Society (EMRS) Conference 2018 Spring Meeting, Strasbourg: "Carrier transport, photonics and sensing in group IV-based nano devices", Organizers: Irrera Alessia, Arie RUZIN, Henry H. RADAMSON, Isabelle BERBEZIER. 18 June-22 June 2018.

- Main organizer of the V Symposium of the European Materials Research Society (EMRS) Conference 2020 Spring Meeting, Strasbourg: "Carrier transport, photonics and sensing in group IV-based nano devices", Organizers: Irrera Alessia, Arie RUZIN, Henry H. RADAMSON, Isabelle BERBEZIER 25-29 May 2020.

Invited talk

- INVITED TALK: European Materials Research Society (E-MRS) Spring Meeting 2008, Strasbourg (France), Symposium C "Frontiers in silicon-based photonics" EMRS. Invited: "Light emission from silicon nanostructures" 28/06/2008.

- INVITED TALK: Materials Research Society (MRS) Spring Meeting, San Francisco (USA) 2006, Symposium I "Silicon based Microphotonics" MRS. Invited: "Light emitting devices based on Silicon nanoclusters" 19/04/2006.

- INVITED TALK: LASERION2010, Schloß Ringberg, Tegernsee, Germany (2010), Invited: "Ion beam exposure to nanostructured surfaces" 9/07/2010.

- INVITED TALK: Materials Research Society (MRS) Full Meeting, Boston (USA) 2010, Symposium AA "Group Semiconductor Nanostructures and Applications" MRS. Invited: "Room Temperature Luminescence from Si Nanowires" 1/12/ 2010.

- INVITED TALK: Symposium on "QUANTUM INTERFERENCE" 4 March 2011 EPS YOUNG MINDS GROUP, Messina 2011, Invited: "Fano resonances in Si and Si nanostructures".

- INVITED TALK: European Materials Research Society (E-MRS) Spring Meeting 2013, Strasbourg (France), Symposium P "Functional Nanowires: Synthesis, Characterization and Applications" EMRS. Invited: "Silicon Nanowires: Synthesis, optical properties and photonic applications" 28/05/2013.

- INVITED TALK: European Microscopy of Semiconducting Materials (MSM-XIX), Murray Edwards College, Cambridge, UK. Invited: "Silicon Nanowires: Synthesis, structural properties and photonic applications" 29/03/2015.

- INVITED TALK: European Materials Research Society (E-MRS) Spring Meeting 2016, Lille (France), Symposium O "Group IV semiconductors at the nanoscale – towards applications in photonics, electronics and life sciences" E-MRS. Invited: "Fractal Silicon Nanowires Array: Optical Properties and Biosensing Applications"

- INVITED TALK: Symposium on Nanofabrication. Organized by EPS Young Minds Messina e OSA Messina Student Chapter. Messina. Invited: "Silicon Nanowires: Synthesis, Optical properties and Applications" 13 May 2016.

- INVITED TALK: Italian Physics Society (SIF) 2016, Padova-Italy, 26-30 September 2016. INVITED: "Silicon nanowires: synthesis, optical properties and biosensing applications".

- INVITED TALK: Nanoinnovation Roma (2021). Roma-Italy, 19-23 Settembre 2021. Invited: "New Generation Label-Free Optical Biosensors Based On Silicon Nanowires"

INVITED TALK: "Microelettronica per la salute" (2022), 12 Ottobre 2022 Roma. . Invited: "Optical Biosensors Based On Silicon Nanowires"

Honors and awards

1. 29 November 2019- Awarded with the "Grimaldi award " for the best work in physics

produced in the period 2014-2018 in a Sicilian University or a public research body operating in Sicily.

2. 2. 11 February 2005 – Awarded with the prize for young researchers by the Gioienna Academy in the "Materials Science" field.
3. 3. 30 September 2005 – Prize for the best oral communication in the field of matter physics at the XCI National Congress of the Italian Physical Society (SIF).

Actual Position

Research Director (Dirigente di Ricerca) of the URT LabSens DSFTM Messina CNR

Via S. d'Alcontres 31, Messina, Italy

Research director since 2022 at the research unit LABSENS of the National Research Council (CNR) inside the University of Messina where the candidate coordinates as manager several research project such as the Biophotonics Node the I-PHOQS National Infrastructure with a budget of 11.613.421,42 euros.

EDUCATION

PhD in Materials Science

2004

University of Catania, in collaboration with CNR-IMM
Via Santa Sofia 64, 95123 Catania (Italia)

Ph.D. Materials Science cum laude at the University of Catania with the thesis: "Light emitting devices based on silicon nanostructures". The thesis was carried out under the supervision of Prof. Francesco Priolo and Dr. Fabio Iacona.

2000

Master's Degree in Engineering of Materials

University of Messina
Via Santa Sofia 64, 95123 Catania (Italia)

Degree in Engineering of Materials at the University of Messina. Experimental Thesis: "Structural and optical properties of silicon nanocrystals" under the supervision of Prof. G. Neri, Dr. F. Iacona, Dr. G. Franzò. The thesis was carried out at the CNR-IMM of Catania and the Department of Physics and Astronomy of the University of Catania.

Other organisational / managerial skills

Supervisor of 8 Master's Degree thesis in Physics at the University of Catania and 6 PhD thesis in Physics or Materials Science at University of Catania

Laboratory Manager of

- Evaporation and Sputtering laboratory at CNR IPCF
- SEM and EDX laboratory at CNR IMM

Project responsibility:

- Head of the CNR IPCF Unit of the POR 1.1.5 Project code 08CT2611010109 title "InnoSensor-Development and development of advanced sensors for environmental applications based on innovative silicon technology platforms" for the 2014/2020 FESR Sicily P.O. the Cost for IPCF CNR is EURO 500,000.00.
- Head of the CNR IPCF Unit of the PON AES01_00459 Project entitled: "Development of technologies and advanced systems for car safety through ADAS-ADAS + platforms" in call No. 1735 / Ric. PNR 2015-2020. The cost for IPCF CNR is EURO 308,000.00.
- Head of the CNR IPCF Unit of the POR 1.1.5 Project project code CUP G69J18001340007 title "Seaview" for the 2014/2020 FESR Sicily P.O. the Cost for IPCF CNR is EURO 355,000.00
- Head of the CNR IPCF Unit of the PON AES01_00459 Project entitled: "TETI" in call No. 1735 / Ric. PNR 2015-2020. The cost for IPCF CNR is EURO 150,000.00.
- Head of the CNR IPCF Unit URT LABSENS DSFTM per il PRIN 2022 Titolo "Fractal nanostructures Surface-Enhanced Coherent Anti-Stokes Raman Scattering at ultimate sensitivity for next-generation biochemical sensing" PRIN 2022. Budget 95.000 euro

I-PHOQS National Infrastructure Node Manager:

Coordinator and manager of the BIOPHOTONICS NODE of the I-PHOQS infrastructure identification code IR0000016 financed through the PNRR, investment line 3.1, Participating in the Biophotonics infrastructure node: CNR LENS, Beyond Nano CNR, CUSBO polytechnic of Milan. The Biophotonics node, coordinated by Dr. Irrera has a budget of 11.613.421,42 euros.

Job-related skills

Nanotechnology and microscopy group lead, Project management, Editorial skills,
National qualification as full professor FIS02-b1 until 26/07/2024
National habilitation as engineer
Head of the Nanotechnology and microscopy Group, Project management, Editorial skills

ACTIVITY

One of the main points of her research is the design and fabrication of nanostructured materials for innovative applications in strategic fields such as sensors, environment, health, and energy. Dr. Irrera has a consolidated experience on the synthesis of new nanostructures with low-cost and industrially compatible techniques. In particular, she focuses her attention on converting some traditional techniques (physical and chemical) used for the deposition of thin films (chemical vapor deposition, sputtering, electron beam evaporation, chemical etching) to advanced tools for controlling the synthesis of a wide range of nanostructures (semiconductor, metals, oxides) with predetermined properties (electrical, mechanical, optical and structural). Another important point of her activity is also the study of multiple scattering phenomena in disordered nanostructured systems by controlling their morphology, which determine their performances in various application fields such as SERS. The use of these nanostructures has made possible the design of new devices, made with industrial techniques such as extremely sensitive label-free biomedical and environmental sensors, devices for light trapping and energy production, and so on.

Autorizzo al trattamento dei dati personali (According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV).

