Ilaria Carmela Rago

CURRICULUM VITÆ ET STUDIORUM

Education

• **2014-2017: Ph.D in Nanotechnology** at University of Trieste, obtained on 28 February 2018. Ph.D. Thesis title: “Tuning cellular functionality and mechanobiology via carbon nanotubes-based scaffolds”. Thesis Supervisor: Dr. Denis Scaini; Thesis Co-Supervisor: Prof. Loredana Casalis.
Research activity, conducted at Elettra – Sincrotrone Trieste, focused on the **synthesis, characterization** via electron microscopy (**SEM** and **TEM**), scanning probe microscopy (**AFM**) and spectroscopic techniques (**XPS, Raman**) of **carbon-based nanomaterials**, such as **carbon nanotubes** and **graphene,** controlling the route in a **micro- and nano-fabrication** context and evaluating their bio-related interaction in order to develop innovative biomaterials for tissue regeneration.

• **2013-2014:** ***post-lauream*** **fellowship** at the Department of Astronautical, Electrical and Energy Engineering (DIAEE) and at the CNIS (Research Center on Nanotechnology Applied to Engineering) of Sapienza University of Rome. Title of the project: “Data collection and processing for biochemical tests on graphene and ZnO nanostructures”.
Research activity related to the **synthesis**, **morphological/topographic** (**SEM, AFM**) **characterization of graphene** and **ZnO-based nanomaterials** and evaluation of the antibacterial properties of these nanostructures on both Gram-positive and Gram-negative bacteria by performing *in-vivo* and *in-vitro* viability experiments.

• **2012-2013: Master's Degree in Nanotechnology Engineering** at Sapienza University of Rome with full mark (110/110 cum laude). Master’s degree thesis title: “Antibacterial properties of graphene and ZnO-based nanostructures”. Supervisor: Prof.ssa Maria Sabrina Sarto.

Work Experience

• **01/09/2021-present: Postdoctoral Research Fellow** at the Amaldi Research Center of Sapienza University of Rome. **R&D activities on technologies and (nano)materials** within the project: "Development of detectors for astro-particles based on nano-structures", aimed at developing novel particle detectors based on these nanostructures. The R&D activity is carried out, through various national and international collaborations (**PTOLEMY, NanoUV, RD-MUCOL**), and is also related to the **additive manufacturing** of innovative materials within the INFN HAMMER (Hub for Additive Manufacturing Materials Engineering and Research) pole, for both nuclear physics studies and industrial applications.

• **01/09/2018-31/08/2021: Postdoctoral Research Fellow** at the Physics Department of Sapienza University of Rome. R&D activities within the project:" Carbon Nanotubes as anisotropic targets" involving: **CVD synthesis of highly aligned carbon nanostructures**, such as **Carbon Nanotubes (CNTs)**, on crystalline/amorphous surfaces; CNTs characterization via microscopic (**SEM**, **TEM**) and spectroscopic techniques (**XPS**, **Raman**); Advanced mechanical design for nuclear physics research by using the most advanced software tools for the mechanical design (Autodesk Inventor and COMSOL Multiphysics); Additive Manufacturing studies, for both pure nuclear physics mechanical task and applied research collaborative activities with private industries in the INFN HAMMER (Hub for Additive Manufacturing Materials Engineering and Research) facility.

•**06/11/2017-05/05/2018: Postdoctoral Research Fellow** at Elettra – Sincrotrone Trieste within the project "BioMec (Application of biomechanical technologies for supplementing the conventional methods in the hospital context)". R&D related to the **development of micro- and nano-structured substrates** and protocols for the standardization of **biomechanical measurements** of tumor tissue bioptic slices via **Atomic Force Microscopy (AFM)**. Data normalization strategies to compare healthy and diseased tissues on an absolute scale in order to develop an integrative approach allowing to correlate biomechanical properties of bioptic tissues with the degree of malignancy of the tumor, in the context of breast cancer.

Publications

[1] ***3D-printed pure copper: density and thermal treatments effects***

I. Rago, M. Iannone, F. Marra, M. P. Bracciale, L. Paglia, D. Orlandi, D. Cortis, V. Pettinacci, Accepted for publication on Lecture Notes in Mechanical Engineering (LNME), 2021

[2] ***Carbon nanostructures for directional light dark matter detection***

A. Apponi, G. Cavoto, C. Mariani, F. Pandolfi, **I. Rago**, A. Ruocco, C. Tully, F. Zhao, *Proceedings of Science*, 390, 648, 2021, https://doi.org/10.22323/1.390.0648

[3] ***Effects of the annealing of amorphous Ta_2O_5 coatings produced by ion beam sputtering concerning the effusion of argon and the chemical composition***

Paolone, E. Placidi; E. Stellino, M.G. Betti, E. Majorana, C. Mariani, A. Nucara, O. Palumbo, P. Postorino, **I. Rago**, F. Trequattrini, M. Granata, J. Teillon, D. Hofman, C. Michel, A. Lemaitre, N. Shcheblanov, G. Cagnoli, F. Ricci, *Journal of Non-Crystalline Solids*, 557, 120651, 2021, https://doi.org/10.1016/j.jnoncrysol.2021.120651

[4] ***Response of windowless silicon avalanche photo-diodes to electrons in the 90–900 eV range***

A. Apponi, G. Cavoto, M. Iannone, C. Mariani, F. Pandolfi, D. Paoloni, **I. Rago**, A. Ruocco, Journal of Instrumentation, 15(11), P11015, 2020, http://doi.org/10.1088/1748-0221/15/11/P11015

[5] ***Transparent carbon nanotubes promote the outgrowth of enthorino-dentate projections in lesioned organ slice cultures***

N. P. Pampaloni, **I. Rago**, I. Calaresu, L. Cozzarini, L. Casalis, A. Goldoni, L. Ballerini, D. Scaini, *Devel. Neurobiol*., 80(9-10), 316–331, 2020, https://doi.org/10.1002/dneu.22711

[6] ***Carbon nanotubes as anisotropic target for dark matter***

G. Cavoto, M. G. Betti, C. Mariani, F. Pandolfi1, A. D. Polosa, **I. Rago**, A. Ruocco, *J. Phys.: Conf. Ser.* , 1468 (1), 012232, 2020, https://doi.org/10.1088/1742-6596/1468/1/012232

[7] ***Neutrino physics with the PTOLEMY project: Active neutrino properties and the light sterile case***

M.G. Betti, (…) **I. Rago**, Y. Raitsess, M. Rajteriz, N. Rossie, I. Rucandioo, R. Santorellio, K. Schaeffnery, C.G. Tullyw, M. Vivianiv, F. Zhaow and K.M. Zurek, Journal of Cosmology and Astroparticle Physics, 7, 47, 2019, https://doi.org/10.1088/1475-7516/2019/07/047

[8] ***Carbon Nanotubes Directly Grown on Supporting Surfaces Demonstrate to Improve Neuronal Activity in Hippocampal Neuronal Networks***

I. Rago, R. Rauti, A. Pozzato, M. Cibinel, M. Dal Miglio, A. Goldoni, Denis Scaini, *Advanced Biosystems*, 3 (5), 1800286, 2019, https://doi.org/10.1002/adbi.201800286

[9] ***Interface phenomena between CdTe and ZnTe:Cu back contact***

A. Bosio, R. Ciprian, A. Lamperti, **I. Rago**; B. Ressel, G. Rosa, M. Stupar, E. Weschke, *Solar Energy*, 176, 186–193, 2018, https://doi.org/10.1016/j.solener.2018.10.035

[10] ***Atomic Force Microscopy analysis of extracellular vesicles***

P. Parisse, **I. Rago**, L. Ulloa Severino, F. Perissinotto, E. Ambrosetti, P. Paoletti, M. Ricci, A. P. Beltrami, D. Cesselli, L. Casalis, *European Biophysics Journal*, 46(8), 813–820, 2017, https://doi.org/10.1007/s00249-017-1252-4

[11] ***Polyhydroxyalkanoate/carbon nanotube nanocomposites: Flexible electrically conducting elastomers for neural applications***

C. Vallejo-Giraldo, E. Pugliese, A. Larrañaga, M. A Fernandez-Yague, J. J. Britton, A. Trotier, G. Tadayyon, A. Kelly, **I. Rago**, J.Ramon. Sarasua, E. Dowd, L.R Quinlan, A. Pandit, M.J.P. Biggs *Nanomedicine*, 11(19), 2547–2563, 2016, https://doi.org/10.2217/nnm-2016-0075

[12] ***Graphene Oxide Nanosheets Reshape Synaptic Function in Cultured Brain Networks***

R. Rauti, N. Lozano, V. León, D. Scaini, M. Musto, **I.Rago**, F. P. Ulloa Severino, A. Fabbro, L.Casalis, E. Vázquez, K. Kostarelos, M. Prato, L. Ballerini *ACS Nano*, 10(4), 2016, https://doi.org/10.1021/acsnano.6b00130

[13] ***Experimental setups for FEL-based four-wave mixing experiments at FERMI***

M. Zangrando, (…), **I. Rago**, L. Raimondi, R. Sauro, M. Scarcia, P. Sigalotti, M. Zaccaria, C. Masciovecchio, *Journal of Synchrotron Radiation*, 23(1), 2016, https://doi.org/10.1107/S1600577515021104

[14] ***Antimicrobial activity of graphene nanoplatelets against Streptococcus mutans***

I. Rago, A. Bregnocchi, E. Zanni, A.G. D'Aloia, F. De Angelis, M. Bossu, G. De Bellis, A. Polimeni, D. Uccelletti, M.S. Sarto, IEEE-NANO, 2015, http://doi.org/10.1109/NANO.2015.7388945

[15] ***Zinc Oxide Microrods and Nanorods: Differential Antibacterial Activity and their Mode of Action against Gram-positive Bacteria***

I.Rago, C. Chandraiahgari, M. P. Bracciale, G.De Bellis, E. Zanni, M. C. Guidi, D. Sali, A. Broggi, C. Palleschi, M. S. Sarto, D. Uccelletti, *RSC Adv.*, 4, 2014, https://doi.org/10.1039/C4RA08462D