

UNIVERSITÀ DEGLI STUDI DI MILANO

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per il gruppo scientifico-disciplinare 03/CHEM-06 - Fondamenti chimici delle tecnologie,
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Mauro Moglianetti

CURRICULUM VITAE

LinkedIn: <https://www.linkedin.com/in/mauromoglianetti/>

Google scholar: <https://scholar.google.com/citations?user=y-5uhZYAAAAJ&hl=en>.

ORCID: 0000-0003-0747-7963, Scopus H-index (June 2024): 19. Citations: 1228.

- **Education and key qualifications**

- | | |
|-------------------------|--|
| 01/10/2005 – 06/03/2010 | University of Oxford (United Kingdom)
DPhil (PhD) Degree in Physical Chemistry
Founded by SOCON RTN Marie Curie actions (<u>Grant agreement ID: 512331</u>, 2005-2008)
Supervisors: Dr. S. Titmuss and Prof. R.K.Thomas
Title: Polymer/surfactant mixture at the air-water and solid-water interfaces |
| 05/11/1996 – 23/10/2003 | University of Bologna (Italy)
Master's degree in chemistry (110/110) |

- **Current position**

- | | |
|----------------------|--|
| 15/07/2022 – current | Senior researcher/ Group leader
Italian Institute of Technology, IIT
Centre for Cultural heritage technology (CCHT), Venice (IT)
Main role and responsibilities: - Lead cutting-edge research initiatives, securing funding, and publishing high-impact papers. - Mentor and manage a diverse team, fostering innovation and collaborative excellence. - Drive strategic collaborations and maintain rigorous research standards. |
|----------------------|--|

- **Previous positions**

- | | |
|-------------------------|--|
| 01/01/2019 – 13/03/2023 | CEO and co-founder
HiQ-Nano startup company , Lecce and Genova (Italy)
Main role and responsibilities:
- Lead HiQ-Nano's strategic vision, focusing on the transfer of lab innovations into marketable applications.
- Drive the company's growth through effective leadership, securing funding, and spearheading research and development efforts.
- Cultivate a culture of technological excellence and collaboration. |
| 01/12/2013 – 31/12/2020 | Senior postdoctoral scientist/ Team leader
Italian Institute of Technology, IIT , Lecce and Genova (IT).
(PI: Prof. Pier Paolo Pompa)
Main role and responsibilities:
- Develop and propel innovative ideas, transforming them into emerging technologies and innovations.
- Mentor young researchers and manage interdisciplinary collaborations to foster innovation and amplify research outcomes. |
| 15/03/2010 – 14/09/2013 | Postdoctoral scientist |

Massachusetts Institute of Technology, MIT (USA)

École polytechnique fédérale de Lausanne - EPFL (CH)

Materials science and Engineering Department (PI: Prof. F. Stellacci)

Main role and responsibilities:

- Conduct cutting-edge research, publish influential findings, and effectively collaborate in a multidisciplinary environment.

RESEARCH AND INNOVATION GRANTS

My proven ability to secure research funding from a variety of sources (national, EU grants and Venture Capitalist Funds) demonstrates the strength of my research activities and positions me as a competitive candidate for EU grant applications. Here's a breakdown of my accomplishments:

- €816K secured through prestigious EU Grants (ITN & RIA): Two major EU projects for HiQ-Nano: "SuperCol" (€261K, [Grant agreement 860914](#)) and "SbD4Nano" (€160K, [Grant agreement 862195](#)).
- €495K secured in innovation funding: As a Chief executive Officer and Chief Technology Officer of HiQ-Nano, I secured venture capital investment (€350K, [Progress Tech Transfer](#)), Invitalia grant (€45K), and participation in a distinguished accelerator program ([Qatar Sports tech, Start-up Bootcamp](#): US\$150K).
- €300K equivalent in beamtime allocation in research infrastructure: The high calibre of my research has garnered access to valuable X-ray and neutron beamtime facilities, further demonstrating its potential impact.
- I achieved 'seal of excellence' scores (>90%) for both an MSCA fellowship and an EU ITN project (conceived, organized, and submitted).

PUBLICATIONS

[§] Role as corresponding author

- 1) Galvagno, E.; Tartaglia, E.; Stratigaki, M.; Tossi, C.; Marasco, L.; Menegazzo, F.; Zanardi, C.; Omenetto, F.; Coletti, C.; Traviglia, A.; Moglianetti, M. [§] Present Status and Perspectives of Graphene and Graphene-related Materials in Cultural Heritage. *Advanced Functional Materials* **2024**, *34* (13), 2313043, doi: 10.1002/adfm.202313043.
- 2) De Luca, E.; Pedone, D.; Scarsi, A.; Marotta, R.; Catalano, F.; Debellis, D.; Cursi, L.; Grimaldi, B.; Moglianetti, M.; [§] Pompa, P. P., Platinum Nanozyme Probes for Cellular Imaging by Electron Microscopy. *Small Science* **2024**, 2400085, doi: 10.1002/smssc.202400085.
- 3) Zappia, M. I.; Mastronardi, V.; Bellani, S.; Zuo, Y.; Bianca, G.; Gabatel, L.; Gentile, M.; Bagheri, A.; Beydaghi, H.; Drago, F., Graphene vs. carbon black supports for Pt nanoparticles: Towards next-generation cathodes for advanced alkaline electrolyzers. *Electrochimica Acta* **2023**, *462*, 142696, doi: 10.1016/j.electacta.2023.142696.
- 4) Nelli, D.; Mastronardi, V.; Brescia, R.; Pompa, P. P.; Moglianetti, M. [§]; Ferrando, R., Hydrogen Promotes the Growth of Platinum Pyramidal Nanocrystals by Size-Dependent Symmetry Breaking. *Nano Letters* **2023**, *23* (7), 2644-2650, doi: 10.1021/acs.nanolett.2c04982.
- 5) Mazzotta, E.; Di Giulio, T.; Mastronardi, V.; Brescia, R.; Pompa, P. P.; Moglianetti, M. [§]; Malitesta, C., Nanozymes based on octahedral platinum nanocrystals with {111} surface facets: glucose oxidase mimicking activity in electrochemical sensors. *Microchimica Acta* **2023**, *190* (10), 425, doi: 10.1007/s00604-023-05992-9.
- 6) Guidetti, G.; Zanini, R.; Franceschin, G.; Moglianetti, M.; Kim, T.; Cohan, N.; Chan, L.; Treadgold, J.; Traviglia, A.; Omenetto, F. G., Photonic crystals built by time in ancient Roman glass. *Proceedings of the National Academy of Sciences* **2023**, *120* (39), e2311583120, doi: 10.1073/pnas.2311583120.
- 7) Mastronardi, V.; Magliocca, E.; Gullon, J. S.; Brescia, R.; Pompa, P. P.; Miller, T. S.; Moglianetti, M. [§] Ultrasmall, Coating-Free, Pyramidal Platinum Nanoparticles for High Stability Fuel Cell Oxygen Reduction. *ACS Applied Materials & Interfaces* **2022**, DOI:10.1021/acsami.2c07738, doi: 10.1021/acsami.2c07738.

- 8) Mastronardi, V.; Kim, J.; Veronesi, M.; Pomili, T.; Berti, F.; Udayan, G.; Brescia, R.; Diercks, J. S.; Herranz, J.; Bandiera, T.; Moglianetti, M.[§] Green chemistry and first-principles theory enhance catalysis: synthesis and 6-fold catalytic activity increase of sub-5 nm Pd and Pt@Pd nanocubes. *Nanoscale* **2022**, *14* (28), 10155, doi: 10.1039/d2nr02278h.
- 9) Moglianetti, M.; [§] Pedone, D.; Morerio, P.; Scarsi, A.; Donati, P.; Bustreo, M.; Del Bue, A.; Pompa, P. P. Nanocatalyst-Enabled Physically Unclonable Functions as Smart Anticounterfeiting Tags with AI-Aided Smartphone Authentication. *ACS Applied Materials & Interfaces* **2022**, doi:10.1021/acsami.2c02995.
- 10) Ragusa, E.; Mastronardi, V.; Pedone, D.; Moglianetti, M.; Pompa, P. P.; Zunino, R.; Gastaldo, P., *Cham*, **2023**; p 95, doi: 10.1007/978-3-031-16281-7_10
- 11) Ragusa, E.; Zunino, R.; Mastronardi, V.; Moglianetti, M.; Pompa, P. P.; Gastaldo, P. Design of a Quantitative Readout in a Point-of-Care Device for Cisplatin Detection. *IEEE Sensors Letters* **2022**, *6* (11), 1, doi: 10.1109/LSENS.2022.3219628.
- 12) Mastronardi, V.; Moglianetti, M.; Ragusa, E.; Zunino, R.; Pompa, P. P. From a Chemotherapeutic Drug to a High-Performance Nanocatalyst: A Fast Colorimetric Test for Cisplatin Detection at ppb Level. *Biosensors* **2022**, *12* (6), 375, doi: 10.3390/bios12060375.
- 13) Perrelli, A.; Fatehbasharad, P.; Benedetti, V.; Ferraris, C.; Fontanella, M.; De Luca, E.; Moglianetti, M.; Battaglia, L.; Retta, S. F. Towards precision nanomedicine for cerebrovascular diseases with emphasis on Cerebral Cavernous Malformation (CCM). *Expert Opinion on Drug Delivery* **2021**, *18* (7), 849, doi: 10.1080/17425247.2021.1873273.
- 14) Mazzotta, E.; Di Giulio, T.; Mastronardi, V.; Pompa, P. P.; Moglianetti, M.; Malitesta, C. Bare Platinum Nanoparticles Deposited on Glassy Carbon Electrodes for Electrocatalytic Detection of Hydrogen Peroxide. *ACS Applied Nano Materials* **2021**, *4* (8), 7650, doi: 10.1021/acsanm.1c00754.
- 15) Hornberger, E.; Mastronardi, V.; Brescia, R.; Pompa, P. P.; Klingenhof, M.; Dionigi, F.; Moglianetti, M.; Strasser, P. Seed-Mediated Synthesis and Catalytic ORR Reactivity of Facet-Stable, Monodisperse Platinum Nano-Octahedra. *ACS Applied Energy Materials* **2021**, *4* (9), 9542, doi: 10.1021/acsaeem.1c01696.
- 16) Moglianetti, M. [§]; Pedone, D.; Udayan, G.; Retta, S. F.; Debellis, D.; Marotta, R.; Turco, A.; Rella, S.; Malitesta, C.; Bonacucina, G.; De Luca, E.; Pompa, P. P. Intracellular Antioxidant Activity of Biocompatible Citrate-Capped Palladium Nanozymes. *Nanomaterials* **2020**, *10* (1). <https://doi.org/10.3390/nano10010099>, doi: 10.3390/nano10010099.
- 17) Pedone, D.; Moglianetti, M. [§]; Lettieri, M.; Marrazza, G.; Pompa, P. P. Platinum Nanozyme-Enabled Colorimetric Determination of Total Antioxidant Level in Saliva. *Anal. Chem.* **2020**, *92* (13), 8660–8664, doi: 10.1021/acs.analchem.0c01824.
- 18) Mastronardi, V.; Udayan, G.; Cibecchini, G.; Brescia, R.; A. Fichthorn, K.; Paolo Pompa, P.; Moglianetti, M. [§] Synthesis of Citrate-Coated Penta-Twinning Palladium Nanorods and Ultrathin Nanowires with a Tunable Aspect Ratio. *ACS Appl. Mater. Interfaces* **2020**, *12* (44), 49935–49944. <https://doi.org/10.1021/acsami.0c11597>, doi: 10.1021/acsami.0c11597.
- 19) Franco-Ulloa, S.; Tatulli, G.; Bore, S. L.; Moglianetti, M.; Pompa, P. P.; Cascella, M.; De Vivo, M. Dispersion State Phase Diagram of Citrate-Coated Metallic Nanoparticles in Saline Solutions. *Nat. Commun.* **2020**, *11* (1), 1–10, doi: 10.1038/s41467-020-19164-3.
- 20) Donati, P.; Moglianetti, M.; Veronesi, M.; Prato, M.; Tatulli, G.; Bandiera, T.; Pompa, P. P. Nanocatalyst/Nanoplasmon-Enabled Detection of Organic Mercury: A One-Minute Visual Test. *Angew. Chemie Int. Ed.* **2019**, *58* (30), 10285–10289, doi: 10.1002/anie.201905669.
- 21) Turco, A.; Moglianetti, M. [§] (shared first author); Corvaglia, S.; Rella, S.; Catelani, T.; Marotta, R.; Malitesta, C.; Pompa, P. P. Sputtering-Enabled Intracellular X-Ray Photoelectron Spectroscopy: A Versatile Method to Analyze the Biological Fate of Metal Nanoparticles. *ACS Nano* **2018**, *12* (8), 7731–7740, doi: 10.1021/acs.nano.8b01612.
- 22) Gatto, F.; Moglianetti, M.; Pompa, P. P.; Bardi, G. Platinum Nanoparticles Decrease Reactive Oxygen Species and Modulate Gene Expression without Alteration of Immune Responses in THP-1 Monocytes. *Nanomaterials* **2018**, *8* (6), 392, doi: 10.3390/nano8060392.
- 23) De Luca, E.; Pedone, D.; Moglianetti, M.; Pulcini, D.; Perrelli, A.; Retta, S. F.; Pompa, P. P. Multifunctional Platinum@BSA-Rapamycin Nanocarriers for the Combinatorial Therapy of Cerebral

- Cavernous Malformation. *ACS Omega* **2018**, 3 (11), 15389–15398. <https://doi.org/10.1021/acsomega.8b01653>.
- 24) Moglianetti, M. [§]; Solla-Gullón, J.; Donati, P.; Pedone, D.; Debellis, D.; Sibillano, T.; Brescia, R.; Giannini, C.; Montiel, V.; Feliu, J. M.; Pompa, P. P. Citrate-Coated, Size-Tunable Octahedral Platinum Nanocrystals: A Novel Route for Advanced Electrocatalysts. *ACS Appl. Mater. Interfaces* **2018**, 10 (48), 41608–41617. <https://doi.org/10.1021/acsomega.8b01653>.
 - 25) Gatto, F.; Cagliani, R.; Catelani, T.; Guarnieri, D.; Moglianetti, M.; Pompa, P.; Bardi, G. PMA-Induced THP-1 Macrophage Differentiation Is Not Impaired by Citrate-Coated Platinum Nanoparticles. *Nanomaterials* **2017**, 7 (10), 332. <https://doi.org/10.3390/nano7100332>.
 - 26) Pedone, D.; Moglianetti, M.; De Luca, E.; Bardi, G.; Pompa, P. P. Platinum Nanoparticles in Nanobiomedicine. *Chemical Society Reviews*. Royal Society of Chemistry August 21, 2017, pp 4951–4975. <https://doi.org/10.1039/c7cs00152e>.
 - 27) Guarnieri, D.; Melone, P.; Moglianetti, M.; Marotta, R.; Netti, P. A.; Pompa, P. P. Particle Size Affects the Cytosolic Delivery of Membranotropic Peptide-Functionalized Platinum Nanozymes. *Nanoscale* **2017**, 9 (31), 11288–11296. <https://doi.org/10.1039/c7nr02350b>.
 - 28) Moglianetti, M. [§]; De Luca, E.; Pedone, D.; Marotta, R.; Catelani, T.; Sartori, B.; Amenitsch, H.; Retta, S. F.; Pompa, P. P. Platinum Nanozymes Recover Cellular ROS Homeostasis in an Oxidative Stress-Mediated Disease Model. *Nanoscale* **2016**, 8 (6), 3739–3752. <https://doi.org/10.1039/c5nr08358c>.
 - 29) Reguera, J.; Ponomarev, E.; Geue, T.; Stellacci, F.; Bresme, F.; Moglianetti, M. [§] Contact Angle and Adsorption Energies of Nanoparticles at the Air–Liquid Interface Determined by Neutron Reflectivity and Molecular Dynamics. *Nanoscale* **2015**, 7 (13), 5665–5673, doi: 10.1039/c5nr00620a.
 - 30) Moglianetti, M. [§]; Ponomarev, E.; Szybowski, M.; Stellacci, F.; Reguera, J. Co-Precipitation of Oppositely Charged Nanoparticles: The Case of Mixed Ligand Nanoparticles. *J. Phys. D. Appl. Phys.* **2015**, 48 (43), 434001, doi: 10.1088/0022-3727/48/43/434001.
 - 31) Moglianetti, M.; Ong, Q. K.; Reguera, J.; Harkness, K. M.; Mameli, M.; Radulescu, A.; Kohlbrecher, J.; Jud, C.; Svergun, D. I.; Stellacci, F. Scanning Tunneling Microscopy and Small Angle Neutron Scattering Study of Mixed Monolayer Protected Gold Nanoparticles in Organic Solvents. *Chem. Sci.* **2014**, 5 (3), 1232–1240, doi: 10.1039/c3sc52595c.
 - 32) Ong, Q. K.; Reguera, J.; Silva, P. J.; Moglianetti, M.; Harkness, K.; Longobardi, M.; Mali, K. S.; Renner, C.; De Feyter, S.; Stellacci, F. High-Resolution Scanning Tunneling Microscopy Characterization of Mixed Monolayer Protected Gold Nanoparticles. *ACS Nano* **2013**, 7 (10), 8529–8539, doi: 10.1021/nn402414b.
 - 33) Moglianetti, M.; Webster, J. R. P.; Edmondson, S.; Armes, S. P.; Titmuss, S. A Neutron Reflectivity Study of Surfactant Self-Assembly in Weak Polyelectrolyte Brushes at the Sapphire–Water Interface. *Langmuir* **2011**, 27 (8), 4489–4496, doi: 10.1021/la200211x.
 - 34) Moglianetti, M.; Webster, J. R. P.; Edmondson, S.; Armes, S. P.; Titmuss, S. Neutron Reflectivity Study of the Structure of PH-Responsive Polymer Brushes Grown from a Macroinitiator at the Sapphire–Water Interface. *Langmuir* **2010**, 26 (15), 12684–12689, doi: 10.1021/la101550w.
 - 35) Moglianetti, M.; Campbell, R. A.; Nylander, T.; Varga, I.; Mohanty, B.; Claesson, P. M.; Makuška, R.; Titmuss, S. Interaction of Sodium Dodecyl Sulfate and High Charge Density Comb Polymers at the Silica/Water Interface. *Soft Matter* **2009**, 5 (19), 3646–3656, doi: 10.1039/b905270d.
 - 36) Moglianetti, M. Polymer Surfactant Mixtures Confined at the Air/Water and Solid/Water Interfaces. Oxford University 2009.
 - 37) Moglianetti, M.; Li, P.; Malet, F. L. G.; Armes, S. P.; Thomas, R. K.; Titmuss, S. Interaction of Polymer and Surfactant at the Air–Water Interface: Poly (2-(Dimethylamino) Ethyl Methacrylate) and Sodium Dodecyl Sulfate. *Langmuir* **2008**, 24 (22), 12892–12898, doi: 10.1021/la8020468

NATIONAL SCIENTIFIC HABILITATION (ASN): Physical chemistry, General and Inorganic chemistry, Chemical foundations of technologies, and Applied Physics.

INVITED SEMINARS AT ACADEMIC INSTITUTIONS AND RESEARCH CENTERS

- 1) University Roma Sapienza, Chemistry department, Seminar, 6th Nov. 2023
- 2) Paul Scherrer Institute (PSI), Centre for energy and environmental science, seminar, 10th July 2023

- 3) Delft University, Department Radiation Science and Technology, 30th Mar 2023
- 4) Verona University, Seminar at Biotech dept., 21th April 2023
- 5) Ca' Foscari University of Venice, Seminar at DSMN/ DAIS dept., 22nd March 2023
- 6) Novo Nordisk, Copenhagen, Non-viral delivery system dept, 21st June 2022
- 7) Workshop Polimi, Venice, CCHT presentation, 26th Sept. 2022
- 8) University College London, UCL, Chemical Engineering Department, Seminar, 24th June 2022
- 9) University College London, UCL, Chemical Engineering Department, Industry Lecture series, 21st March 2022
- 10) University College London, UCL, Chemical Engineering Department, Industry Lecture series, 23rd March 2021
- 11) Kaneka pharma, presentation to the antioxidants dept., 11th Feb. 2021
- 12) Giuliani spa, Milan, talk with R&D dept. and CEO, 26th March 2019
- 13) Menarini spa, Florence, marketing division, talk, 8th Jan. 2019
- 14) Zambon spa, Milan, talk with R&D dept. and CEO, 29 Mar. 2019
- 15) University College London, UCL, Chemical Engineering Department, 16th July 2018
- 16) Constellium, Aluminium multinational company, Grenoble (FR), 2013
- 17) IBM, Zurich (CH), 2012
- 18) Debiopharm, Martigny (CH), 2011
- 19) ESRF (European Synchrotron), November 2010
- 20) LMU University, Munich (Germany), February 2009
- 21) Lund University, Lund (Sweden), October 2008

PARTICIPATION TO INTERNATIONAL CONFERENCES

- 1) Oral presentation at ACS Fall 2019 National Meeting & Exposition in San Diego, CA, August 25 - 29, 2019. PAPER ID: 3198342, PAPER TITLE: Citrate-coated, size-tunable octahedral platinum nanocrystals: Novel route for advanced electrocatalysts, DIVISION: Division of Colloid and Surface Chemistry, SESSION: Nanomaterials.
- 2) Poster presentation at ACS Fall 2019 National Meeting & Exposition in San Diego, CA, August 25 - 29, 2019. Title: "Palladium nanoparticles as ROS scavengers".
- 3) Oral presentation at ACS Fall 2019 National Meeting & Exposition in San Diego, CA, August 25 - 29, 2019. PAPER ID: 3198346, PAPER TITLE: Sputtering-enabled intracellular X-ray photoelectron spectroscopy (SEI-XPS): New lab-based technique to investigate the biological fate of metal nanoparticles, DIVISION: Division of Colloid and Surface Chemistry, SESSION: Biomaterials & Biointerfaces..
- 4) Oral Presentation at the 256th ACS National Meeting in Boston, MA, August 19-23, 2018. PAPER ID: 2985041, PAPER TITLE: Highly engineered platinum nanoparticles as multifunctional active nanocarriers integrating the function of high-performance antioxidant drugs, DIVISION: Division of Colloid and Surface Chemistry. SESSION: Nanomedicines.
- 5) Oral Presentation at the CLINAM Conference in Basel, CH, June 26-29, 2016. PAPER ID: 2985041, PAPER TITLE: "Biocompatible Platinum Nanoparticles Restore Physiological Ros Homeostasis In A Real Experimental Model Of A Human Cerebrovascular Disease". Present in the Conference proceedings available at: "<https://clinam.org/wp-content/uploads/2021/10/low-res-Clinam-Proceedings-2016-complete.pdf>"
- 6) Poster presentation at 2014 MRS Spring Meeting & Exhibit April 21-25, 2014 in San Francisco, USA. Title: "Small Angle Neutron Scattering as a new technique to characterize nanodomains on Mixed Monolayer Protected Gold Nanoparticles" ID: # 1867928
- 7) Gordon Conference, Noble metal Nanoparticles, Mount Holyoke College MA, USA, June 2012, Poster contribution
- 8) Gordon Conference, Noble metal Nanoparticles, Mount Holyoke College MA, USA, June 2010, Poster contribution
- 9) FMR-II workshop, Burg Rothenfels, Germany, June 2009, Poster contribution
- 10) M4 Colloids, Bath University, Bath, UK, July 2008, Poster contribution
- 11) Marie Curie Research Training Network SOCON Meeting, Durham, UK, September 2008, oral contribution
- 12) "Surfaces and Interfaces in Soft Matter and Biology - The Impact and Future of Neutron Reflectivity"

- in honour of Bob Thomas, ILL, Grenoble, France, May 2008, oral contribution
- 13) Marie Curie Research Training Network SOCON Meeting, Stockholm, Sweden, September 2007, oral contribution
 - 14) 81st ACS Colloid and Surface Science Symposia, University of Delaware, Newark, USA, June 2007, oral contribution
 - 15) Marie Curie Research Training Network SOCON Meeting, Budapest, Hungary, Sept. 2006, oral contribution
 - 16) 56th annual Nobel Laureate Lindau Meeting, Lindau, Germany, June 2006, oral contribution
 - 17) Summer School of the Marie Curie Research Training Network SOCON- Self-Organisation under Confinement, Orsay, France, June 2006, oral contribution

OTHER CONTRIBUTIONS TO THE RESEARCH COMMUNITY

Verified peer reviewer: 25 (link to [ORCID](#), plus dozen non claimed). Main Journals and relative number of review activities: ACS applied materials & interfaces (6) ACS nano (2), ACS sustainable chemistry & engineering (2) Advanced materials (1) Biosensors & bioelectronics (1) Nanoscale horizons (1) Nature communications (1) Sensors and actuators (1) Small (1).

Recruitment committees: I have actively participated in several recruitment committees, contributing to the selection and evaluation processes for both postdoctoral fellows and PhD candidates.

TEACHING EXPERIENCE

- Supervision of 14 master students for their master thesis
 - Lucia Pavone, Univ. Camerino
 - Paolo Donati, Univ. Camerino,
 - Giulia Corradini, Univ. Camerino
 - Costanza Fabbracci, Univ. Camerino
 - Daniele Pulcini, Univ. Camerino
 - Tania Pomili, Univ. Camerino
 - Alberto Pagliarini, Univ. Camerino
 - Diego Bompreszi, Univ. Camerino
 - Maxime Szybowski, Materials Engineering, EPFL, Lausanne
 - Evgeniy Ponomarev, Materials Engineering, EPFL, Lausanne
 - Yannick Baumgartner, Materials Engineering, EPFL, Lausanne
 - Douglas Watson, Materials Engineering, EPFL, Lausanne
 - Marie-Claude Bay, Materials Engineering, EPFL, Lausanne
 - Martin Hofmann, Materials Engineering, EPFL, Lausanne
- Co-supervisor of 3 PhD students. PhD students supervised and related doctoral cycles:
 - PhD student Deborah Pedone, Doctor of Philosophy in Materials and Structural Engineering and Nanotechnology (XXX Cycle), Università del Salento and IIT, Coordinator Prof. Alfonso Maffezzoli, Tutor Dr. Pier Paolo Pompa, Co-Tutors Dr. Mauro Moglianetti
 - PhD student Gayatri Udayan
Doctor of Philosophy in Materials and Structural Engineering and Nanotechnology (XXXI Cycle), Università del Salento and IIT, Coordinator Prof. Alfonso Maffezzoli, Tutor Dr. Pier Paolo Pompa, Co-Tutors Dr. Mauro Moglianetti, Dr. Paola Valentini
 - PhD student Valentina Mastronardi, XXXIII CYCLE PhD COURSE IN SCIENCE AND TECHNOLOGIES OF CHEMISTRY AND MATERIALS, Coordinator: Renata Riva, Università di Genova and IIT, Tutor Dr. Pier Paolo Pompa, Co-Tutors Dr. Mauro Moglianetti

Dates: 01-10-2014 to 31-01-2021

- Undergraduate course for materials engineering at EPFL as tutor
- Teaching assistant at Physical Chemistry Experiments Module for undergraduate students

NAMES AND ADDRESSES OF REFERENCES

Francesco Stellacci, Professor at EPFL (CH), email: francesco.stellacci@epfl.ch

Robert K. Thomas, FRS, Emeritus Professor at Oxford University, robert.thomas@chem.ox.ac.uk

Pier Paolo Pompa, PI/ director at Italian Institute of Technology, Pierpaolo.Pompa@iit.it

ADDITIONAL WORK EXPERIENCES

March 2022 National Research Council (CNR)

– July 2022 • Fixed-term Researcher position. CNR, ISMN

Research areas: Nanomaterials for Lab-on-a-chip.

2009 - 2010 Ludwig Maximilian University, LMU, Physics Department, Munich
Forschungs-Neutronenquelle Heinz Maier-Leibnitz, FMR II

- Research assistant, Physics Department/ Refsans

2005 - 2009 University of Oxford

- Student representative, Wolfson college (Oxford), Finance committee
- Teaching assistant of Physical Chemistry Experiments Module for undergraduate students

2004 - 2005 University of Ancona (Physics Department)

- Research Assistant in the field of protein folding/unfolding by Small angle X-ray and Neutron scattering.

Jan. 2004 – “Biochem” Laboratory srl (Bologna)

June 2004 • Chemical Analyst

LANGUAGE SKILLS

Italian

Native

English:

Fluent, C2

French:

Intermediate level, B2/C1

German:

Beginner level

ARTIFICIAL INTELLIGENCE and IT SKILLS

- AI and machine learning application in diagnostics and anticounterfeiting
- Extensive knowledge of Microsoft Office, EndNote, Igor Pro
- Programming experience: Pascal, Turbopascal, Basic, Igor Pro (C-like programming language)

BUSINESS MANAGEMENT AND ADMINISTRATION

- Startup business management and administration, innovation management, product management,

- legal tools for biotech startups
- Fundraising and investors relations
- Market analysis, marketing, social media and marketplace analysis

RESEARCH ACHIEVEMENTS

1. Harnessing the Multifaceted Potential of Pt Nanoparticles for advanced and portable sensors

I have pioneered the use of Pt nanoparticles (PtNPs) as versatile nanomaterials for sensors in electrochemical applications. I developed size-tunable citrate-coated PtNPs for hydrogen peroxide detection, that achieves superior surface cleanliness and, as a consequence, high sensitivity (Moglianetti, M. (corresponding author) *ACS Applied Nano Materials* **2021**, 4 (8), 7650-7662, DOI: 10.1021/acsanm.1c00754). Additionally, I discovered that {111} Pt NP surface facets, coupled with a size comparable to natural enzymes and an easy-to-remove citrate coating, have high affinity for glucose, comparable to the enzyme itself (Moglianetti, M. (corresponding author) et al. *Microchimica Acta* **2023**, 190 (10), 425, DOI: 10.1007/s00604-023-05992-9).

In instrument-free applications, I introduced a fast, accurate method for assessing total antioxidant capacity (TAC) using PtNPs (Moglianetti, M. (corresponding author) et al., Platinum Nanozyme-Enabled Colorimetric Determination of Total Antioxidant Level in Saliva. *Analytical Chemistry* **2020**, 92 (13), 8660-8664, DOI: 10.1021/acs.analchem.0c01824).

Leveraging the ability of Pt NPs to act as nanozyme, I also developed a rapid point-of-care detection of cisplatin with high specificity, readable with the naked eye or a smartphone by simply using cisplatin to produce Pt NPs (Moglianetti, M. (co-author), et al., *Biosensors* **2022**, 12 (6), 375, DOI: 10.3390/bios12060375). These innovations highlight my ability to create practical, user-friendly solutions for point-of-care applications.

My expertise in this area underscores my potential to further develop advanced sensors for complex environments.

2. Leading the discovery, development, and commercialization of the first nanozyme-based antioxidant test for point-of-care applications.

- Research and Innovation: I have invented and patented (detailed at point 5) a novel user-friendly test kit based on the scientific discovery of Pt nanozyme ability to replace peroxidase enzyme.

- Technology Transfer: I have successfully transitioned the research from the lab to market by co-founding HiQ-Nano, a startup focused on commercializing iBlue.

- Leadership: I have served as CEO of HiQ-Nano, managing the legal, financial, and technical aspects of bringing iBlue to market.

- Funding: I have raised a total of €561K from venture capitalists (Progress Tech Transfer) and \$150K from a Qatari accelerator program (Qatar Sports tech, Start-up Bootcamp) to support development and commercialization. I have also raised €15,477 from Kickstarter campaign (<https://www.kickstarter.com/projects/1738998150/lelolab>).

- Collaboration with one of the most prestigious design houses in Milan (Atellani srl, <https://atellani.com/>). Collaboration with the most important agency for pharmaceutical marketing (Wellcare, <https://www.wellcare.it/>).

- Market launch: I have launched the product to market with a TRL of 9 with a marketplace (www.ibluelab.com) and mobile app, empowering early adopters with a new point-of-care device.

- Impact: I have developed a portable, user-friendly, and cost-effective solution for antioxidant testing (key biomarker for oxidative stress), addressing limitations of current methods and enabling everyday use at home without the need for specialized personnel.

- Prestigious recognitions: 1st innovation prize in the most important fair for pharmaceutical companies (<https://www.cosmofarma.com/it/edizione-2018/start-up-village-2018/start-up-vincitrici-2018/>)

- Advanced negotiation for licensing with major pharmaceutical companies (Abbott, Zambon, Menarini, Giuliani, Kaneka).

This achievement demonstrates my ability to translate scientific research into a commercially viable product coupled with my strong leadership and entrepreneurial skills in funding and navigating the technology transfer process.

3. Pioneering Shape-Controlled Synthesis of Ultra-Small Pt and Pd Nanoparticles for High-Performance Catalysis

As both a leader and hands-on researcher, I spearheaded a team of scientists to develop groundbreaking methods for synthesizing ultra-small platinum (Pt) and palladium (Pd) nanoparticles with precisely controlled shapes, defined surface facets and citrate coating (without the use of surfactants and polymers). Under my direction, we achieved significant advancements in nanomaterial synthesis. I was also able to understand the mechanism behind the controlled growth of the nanomaterials with DFT simulations (Moglianetti, M. (last author and corresponding) et al., *Nanoscale* **2022**, 14 (28), 10155, DOI: [10.1039/D2NR02278H](https://doi.org/10.1039/D2NR02278H)). Moglianetti, M. et al. (first author and corresponding), *ACS Applied Mat. & Interfaces* **2018**, 10 (48), 41608, DOI: [10.1021/acsami.8b11774](https://doi.org/10.1021/acsami.8b11774). Moglianetti, M. (last author and corresponding), *ACS Applied Mat. & Interfaces* **2022**, 14 (32), 36570, DOI: [10.1021/acsami.2c07738](https://doi.org/10.1021/acsami.2c07738). Moglianetti, M. (corresponding author) et al. *Nano Letters* **2023**, 23 (7), 2644-2650, DOI: [10.1021/acs.nanolett.2c04982](https://doi.org/10.1021/acs.nanolett.2c04982). Moglianetti, M. (last author and corresponding) et al., *ACS Applied Mat. & Interfaces* **2020**, 12 (44), 49935, DOI: [10.1021/acsami.0c11597](https://doi.org/10.1021/acsami.0c11597)).

- Novelty: Unique morphologies—pyramidal Pt nanoparticles, octahedral Pt nanoparticles, ultra-thin penta-twinned Pd nanorods/nanowires and ultra-small cubes, characterized by their remarkable size (below 10 nm), were produced at scale without compromising in quality, only using citrate as surface coating (great advantage in catalytic applications as it can be easily removed).

- Sustainable and scalable synthesis with unprecedented control: I led the development of protocols distinguished by their simplicity and environmental friendliness, utilizing readily available, non-toxic reagents and water as the solvent, which eliminated the need for polymers or surfactants and enhanced scalability through microwave technology, achieving precise control over particle size and shape with a high percentage of desired surface facets- {111} for Pt and {100} for Pd, particularly active in catalytic applications.

- Enhanced performance: Under my guidance, my team demonstrated that the resulting Pt and Pd nanomaterials exhibited significantly improved performance in critical catalytic applications. Pt catalysts showed superior stability in hydrogen fuel cell environments.

As the leader of this project, I not only guided the scientific direction and strategy but also actively contributed to the research, ensuring rigorous experimental design and execution. My dual role as a leader and hands-on researcher was pivotal in driving this innovative work forward, fostering a collaborative environment that encouraged creativity and precision.

4. Developing Advanced Techniques for In-Depth Analysis of Complex Surface Properties and Self-Assembly Behaviour of Nanoparticles

This section emphasizes my leadership role in the development and application of innovative techniques, leveraging large-scale facilities such as synchrotrons and neutron sources, as well as laboratory-based X-ray machines, to investigate the rich properties and the self-assembly behaviour of nanoparticles.

- New Method to Illuminate Surface Coating Structure: As the main researcher, I spearheaded an important project to reveal for the first time the arrangement of ligand molecules on gold nanoparticles in solution with small-angle neutron scattering (Moglianetti, M. (first author) et al., *Chemical Science* **2014**, 5 (3), 1232-1240, DOI: [10.1039/C3SC52595C](https://doi.org/10.1039/C3SC52595C)). This advancement has paved the way for the development of a valid method to characterize complex nanomaterials in solution, resulting in subsequent important publications published by my postdoc supervisor (Stellacci et al. *Angewandte Chemie International Edition* **2022**, 61 (43), e202209751, DOI: [10.1002/anie.202209751](https://doi.org/10.1002/anie.202209751), *Nature Communications* **2018**, 9 (1), 1343, DOI: [10.1038/s41467-018-03699-7](https://doi.org/10.1038/s41467-018-03699-7)).

- Unveiling Complex Behaviour of Nanoparticles at the Interface. Understanding how nanoparticles (NPs) interact with surfaces is crucial for controlling their properties. My research pioneered an innovative method using neutron reflectivity (NR) to directly measure the contact angles of NPs at liquid interfaces. (Moglianetti, M., (last name and corresponding author) et al. *Nanoscale* **2015**, 7 (13), 5665-5673, DOI: [10.1039/C5NR00620A](https://doi.org/10.1039/C5NR00620A)). This in-situ approach overcomes the limitations of existing methods and allows for the quantification of adsorption and interfacial energy.

- Nanotoxicology Meets Advanced Physico-Chemical Methods for Unveiling the Fate of Nanoparticles Inside Cells. Leading a team of researchers, I developed a novel method – sputtering-enabled intracellular X-ray

photoelectron spectroscopy (XPS) – to study the behaviour of metallic nanoparticles within cells (Moglianetti, M. (first author and corresponding) et al. *ACS nano* **2018**, *12* (8), 7731-7740, DOI: 10.1021/acsnano.8b01612). This approach provides valuable information on internalization, stability, oxidation state, and vertical distribution within the cell, all without the need for complex preprocessing steps. By comparing the response of silver and platinum nanoparticles to the harsh endosomal cellular compartments, my team observed a stark difference in their fate within cellular environment.

5. Innovation Across Disciplines: Forging a Strong Patent Portfolio

- Spearheading Innovation: My leadership in research and development has resulted in a robust portfolio of patents for the IIT. This achievement showcases my ability to translate scientific discoveries into practical applications with significant commercial potential.

- i. Method for the synthesis of metal nanoparticles in aqueous environment without the use of shape directing agents ([WO 2017/103807, Granted in EU EP 3389905, US 16/062143, CN 108430676, JP 2019500499](#)).
- ii. Method for determining the antioxidant power of a biological sample and the related kit ([WO 2018/172904 \(Granted in EU EP 3602037, HK 40023813, US 16/495200, CN 110402389, JP 2020514731\)](#)).
- iii. Method for imaging a biological sample and corresponding probe ([WO 2019/021336, granted in EU EP 3658912, US 16/774419, CN 111226115, JP 2020528557](#)).
- iv. Method for determining the antioxidant capacity of a biological sample and related kit (patent protecting novel class of nonozymes with peroxidase-like activity) ([WO 2019/175749, Granted in EU EP 3765844](#)).
- v. Method for the synthesis of mesoporous platinum nanoparticles in an aqueous environment ([WO 2020/212839, Granted in EU EP 3956086](#)).
- vi. Process for the production of ultra-small Pt nanocrystals with high percentage of {111} surface domains ([WO 2021/094891, Granted in IT 201900020697](#), Seeking protection in EU, US and China).
- vii. Anti-counterfeiting method and kit for the implementation of such method, ([Granted in IT 202000015460](#)).
- viii. Two recent patent applications on antimicrobial properties of noble metal nanoparticles in a biopolymer matrix (102024000014119) and a novel method to produce dendritic fibrous silica nanoparticles (102024000011590).

- Championing Multidisciplinary Innovation: My inventions demonstrate a clear breadth, encompassing diverse fields such as nanomaterial synthesis (WO-2017103807, WO-2021094891), biological sample analysis (WO-2018172904, WO2019175749), and even anti-counterfeiting methods (IT1020200015460). This highlights my versatility and ability to identify patentable solutions across disciplines, fostering a spirit of innovation within the IIT.

6. Pioneering 2D materials for metal artifacts conservation

My scientific supervision of a PhD project has culminated in the development of an innovative method for safeguarding ancient metal artifacts. This method leverages the amphiphilic nature of GO to drive the self-assembly of graphene oxide (GO) at the air-water interface on a Langmuir-Blodgett trough before being transferred onto metal substrates. Initial testing on copper oxide surfaces, designed to mimic the characteristics of ancient metals, shows promising results. A single layer of GO provides significant corrosion protection compared to bare metal, while minimizing the aesthetic impact compared to traditional conservation methods. This research paves the way for further development and potential application in the field of cultural heritage preservation.

Furthering the exploration of graphene-based materials, I have authored and led the publication of a critical review article titled "Graphene and graphene-based materials in Cultural Heritage," published in *Advanced Functional Materials*. (Moglianetti, M. (last and corresponding author) et al., *Advanced Functional Materials* **2024**, *34* (13), 2313043, DOI: [10.1002/adfm.202313043](#)). This review delves into the exciting potential of these materials for protecting cultural artifacts. While analysing the strengths of graphene and related materials (GRMs) in areas like anti-corrosion, anti-fading, and consolidation properties, the article also critically examines their limitations. By exploring both the possibilities and challenges of GRMs, this review aims to guide the development of stable and long-lasting solutions for cultural heritage preservation.

7. Pioneering Platinum Nanoparticles for Bionanomedicine

I have established Pt nanoparticles (Pt NPs) as highly effective antioxidant enzymes, surpassing natural enzymes and enduring harsh cellular environments. By successfully using Pt NPs to reduce

ROS levels in a Cerebral Cavernous Malformation model, I showcased their significant therapeutic potential. Additionally, I authored a highly cited review on Pt NPs' properties and their potential in treating oxidative stress-related diseases, cementing my expertise in this field. Building on this foundation, I developed a nanocarrier combining Pt NPs' antioxidant activity with rapamycin's autophagy-stimulating property, effectively addressing cellular dysfunctions in CCM and suggesting broader therapeutic applications (Moglianetti, M. (first and corresponding) et al., *Nanoscale* **2016**, 8 (6), 3739-3752, DOI: [10.1039/C5NR08358C](https://doi.org/10.1039/C5NR08358C), Moglianetti, M. (co-author in the following papers) et al., *Chemical Society Reviews* **2017**, 46 (16), 4951-4975, DOI: [10.1039/C7CS00152E](https://doi.org/10.1039/C7CS00152E), *ACS Omega* **2018**, 3 (11), 15389-15398, DOI: [10.1021/acsomega.8b01653](https://doi.org/10.1021/acsomega.8b01653), *Nanoscale* **2017**, 9 (31), 11288-11296, DOI: [10.1039/C7NR02350B](https://doi.org/10.1039/C7NR02350B)).

For transmission electron microscopy (TEM), I innovatively harnessed the peroxidase-mimicking activity of Pt nanozymes to significantly amplify the TEM signal inside cellular structures. This advanced technique facilitates the high-resolution visualization of ultra-small 3 nm Pt particles at extremely low magnification levels, establishing a new benchmark in cellular imaging. It not only exceeds the capabilities of conventional methods but also offers precision in tracking proteins and antibodies, surpassing established gold standards in the field (Moglianetti, M. (corresponding) et al., *Small Science*, **2024**, 2400085, DOI: [10.1002/smssc.202400085](https://doi.org/10.1002/smssc.202400085)). My pioneering research positions me strongly for future applications of nanomaterials in complex environments, such as the preservation of frescoes, highlighting my expertise in nanomaterial design, delivery in highly complex environment, and innovative applications in diverse fields.

8. Innovative Anticounterfeit Solutions Using Pt Nanocatalysts and Artificial Intelligence

I have addressed the global counterfeiting problem, which causes over \$1 trillion in losses and significant health risks. By thinking outside the box, I pioneered a unique, easy and naked-eye approach combining nanotechnology, chemistry, and artificial intelligence. I developed platinum nanocatalyst-enabled visual tags with Physically Unclonable Functions (PUFs), offering extraordinary encoding capabilities ($>10^3$ 300), fast ON/OFF readout (1 minute), and full reversibility for multiple on-site authentications. I also created an AI-aided algorithm for accurate, smartphone-based PUF authentications (Moglianetti, M., (first and corresponding) et al., *ACS Applied Mat. & Interfaces* **2022**, 14 (22), 25898-25906, DOI: [10.1021/acsaami.2c02995](https://doi.org/10.1021/acsaami.2c02995)). My innovative solution showcases my ability to leverage AI and advanced materials to solve real-world problems, positioning me as an innovator in various aspects of science and technologies.

9. Publications: 35 papers. Scopus H-index (June 2024): 19. Citations: 1228. Papers with higher impact: Nature Comm. (1) PNAS (1) Adv. Functional Materials (1) ACS Nano (2) Nano Letters (1) Angew. Chem. Int. Ed. (1) Chem. Soc. Rev. (1) Chem Sci (1) ACS Applied materials and interfaces (4) Nanoscale (3) Small science (1) ACS AEM (1).

Covers numbers: 5. Number of papers highlighted by the press: 2 (New Scientist, Le Monde and La Repubblica).

10. Proficiency in Multidisciplinary, Interdisciplinary, and Cross-Sectorial Research and Innovation.

I have cultivated a robust multidisciplinary, interdisciplinary, and cross-sectorial expertise through intensive training in important laboratories, across a spectrum of scientific domains, and within innovative startup ecosystems. My expertise encompasses a diverse range of areas including physical chemistry, neutron scattering, nanochemistry, bio-nano interactions, and machine learning. This extensive training has endowed me with a deep and broad knowledge base. Although interdisciplinary research initially encounters challenges such as lower impact metrics and funding difficulties, substantial evidence now demonstrates its long-term advantages. Indeed, multidisciplinary scientists ultimately outperform their specialized counterparts in terms of funding achievements and breakthrough innovations (*Commun Phys* **4**, 263 (2021), DOI: [10.1038/s42005-021-00769-z](https://doi.org/10.1038/s42005-021-00769-z)). With this comprehensive approach and a solid track record of achievements, I am prepared to conduct pioneering research and drive innovation.

INTERNATIONAL FELLOWSHIPS

Fellowship given by Ludwig Maximilian University, Physics Department, Munich and by Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II), Refsans beamline. During the fellowship, I have worked at the setup of the neutron reflectivity machine and have done extensive training of several students. The postdoc was funded by important German institutions and was highly competitive worldwide as Munich is a renowned hub for important science. LMU is one of the most prestigious university in Germany.

Dates: 01-06-2009 to 01-02-2010

The candidate has co-supervised more than 7 master students for their master thesis at EPFL.
List of students and their university.

Maxime Szybowski, Materials Engineering, EPFL, Lausanne
Evgeniy Ponomarev, Materials Engineering, EPFL, Lausanne
Yannick Baumgartner, Materials Engineering, EPFL, Lausanne
Douglas Watson, Materials Engineering, EPFL, Lausanne
Marie-Claude Bay, Materials Engineering, EPFL, Lausanne
Martin Hofmann, Materials Engineering, EPFL, Lausanne

Dates: 01-01-2010 to 01-01-2013

Massachusetts Institute of Technology, MIT (USA)/ Ecole polytechnique federale de Lausanne - EPFL (CH)

- Postdoctoral position. Materials Science and Engineering Department (Stellacci group)
Research topics: nanoparticles synthesis and characterization by scattering techniques (SAXS, SANS, NR). Post-Doctoral Research: The postdoctoral work at MIT and EPFL in the research group of Prof Francesco Stellacci responded to the desire of a big challenge as it implied to move forward from the PhD background towards nanotechnology and materials engineering. The research involved the synthesis of noble metal nanoparticles covered by different thiolated molecules and their characterization with innovative techniques.

My main aim was to apply my knowledge of neutron scattering to establish an ensemble technique for the first characterization of the presence of nanodomains on nanoparticles surface beyond Scanning Tunnelling Microscopy. Small Angle X-ray Scattering and Small Angle Neutron Scattering (SAXS and SANS) proved successful to tackle this problem. Also, Neutron Reflectivity was successfully applied for the in-situ measurement of the contact angles of nanoparticles adsorbed at fluid interfaces.

Dates: 15-03-2010 to 01-12-2013

PRIZES AND RECOGNITIONS

Cosmofarma Exhibition 2018. First prize at the Startup Village for the antioxidants test kit technology. Menarini SPA has endorsed the project.

Marzotto prize 2019. Semifinal for the antioxidants test kit technology.

Press coverage in important national and international newspapers such La Repubblica, Secolo XIX and the Gulf Times.

BHeroes semifinalist at 2019 edition (<https://www.bheroes.it/>).

EIT Health semifinalist edition 2020

(https://startups.eithealth.eu/companies/f/income_streams/anyof_commission/industries/anyof_marketing_wellness%20beauty/technologies/anyof_nanotech_virtual%20reality_artificial%20intelligen

ce_deep%20tech_mobile%20app_machine%20learning_hardware?showGrid=true&showMap=false).

Dates: 01-01-2018 to now

HiQ-Nano was selected to present his case study at University College of London (UCL).
<https://www.ucl.ac.uk/chemicalengineering/news/2021/mar/nanotechnology-practice-industry-lecture-series>. The event was highlighted in several media.

Dates: 29-03-2021 to 29-03-2021

TECHNOLOGY TRANSFER

I am the first inventor of 4 patents and the co-inventor of 3 others as listed below. Two of them are the basis of the iBlue project that is now available on the market (please visit the marketplace at www.ibluelab.com).

I am also the first inventor of a patent application (just submitted) regarding antiviral activity against COVID-19 of a new polymer-surfactant mixture and its application for antiviral face-masks that is raising strong interest from investors.

WO-2017103807-A1 Method for the synthesis of metal nanoparticles in aqueous environment without the use of shape directing agents, IIT, Mauro Moglianetti, Pier Paolo Pompa 15/12/15

WO-2018172904-A1 Method for determining the antioxidant capacity of a biological sample and related kit, IIT, Mauro Moglianetti, Pier Paolo Pompa 21/03/17

WO-2019021336-A1 Method for imaging a biological sample and corresponding probe, IIT, Roberto Marotta, Tiziano Catelani, Mauro Moglianetti, Elisa De Luca, Pier Paolo Pompa 28/07/17

WO2019175749A1 Method for determining the antioxidant capacity of a biological sample and related kit, IIT, Deborah Pedone, Mauro Moglianetti, Pier Paolo Pompa 13/03/18

WO-2021094891-A1 Process for the production of ultra-small Pt nanocrystals with high percentage of {111} surface domains, IIT, Valentina Mastronardi, Mauro Moglianetti, Pier Paolo Pompa 11/11/19

WO-2020212839-A1 Process for the synthesis of mesoporous platinum nanoparticles in an aqueous environment, IIT, Mauro Moglianetti, Deborah Pedone, Pier Paolo Pompa 17/04/19

IT102020000015460 Metodo anticontraffazione e kit per l'attuazione di tale metodo, IIT, Mauro Moglianetti, Deborah Pedone, Pier Paolo Pompa 26/06/20

I have co-founded HiQ-Nano, a start-up company from the Italian Institute of Technology - IIT, born with the goal to develop innovative ideas and out-of-the-box approaches in the field of point-of-care diagnostics, home testing, and colorimetric assays. Following an extensive R&D process, the company has launched a new test kit for a healthy lifestyle, iBlue.

As clearly established in the scientific literature, antioxidants level is a major indicator of a healthy lifestyle and it is an important biomarker.

Imbalance in the levels of antioxidants (oxidative and reductive stress, respectively) has been clearly correlated to several diseases dramatically increasing in western societies (cancer, neurodegenerative and cardiovascular diseases) and to premature ageing. Therefore, the measurement of the antioxidants amount is crucial to maintain a perfect balance within the organism. However, traditional antioxidant tests involve multiple steps, require expensive reagents and instrumentation, and need to be used under controlled conditions. As a consequence, they are expensive and not portable.

iBlue is the first easy-to-use, portable, at-home kit that enables to measure the Total Antioxidants Status (TAS) of the organism, in only 5 minutes (www.ibluelab.com). The technology behind iBlue is based on platinum nanoparticles and two patent applications have been deposited. iBlue has

completed the R&D stage and is in market test stage. Furthermore, several tests, products and innovation, based on the nanoparticles technology, are in the pipeline.

Role and contribution to the startup: As a CEO, I have driven the innovation process and the go-to-market strategy. More in details, I have co-invented, patented and designed the iBlue concept, the first test to use nanozymes for a commercial user-oriented product. I have also managed the legal and financial process necessary to run the business. This has also allowed me to have a direct control of all the innovation pipeline and to deal with the issues associated.

The interest of the stakeholders, companies and consumers has allowed the company to move forward with the development. We have successfully raised money through an Italian venture capitalism fund, Progress tech transfer (€350K). Moreover, the Qatar Sportstech/ StartupBootCamp accelerator backed us with another investment (\$150K).

HiQ-Nano has also secured major funding from European research projects to further contribute to the application of nanomaterials in the bio-nano sector. More in details, Supercol, ITN European grant, has been granted to HiQ-nano for an amount equal to €261K (for the period 2020-2024), together with SbD4Nano, another competitive European grant (Sum: €160K for the period 2019-2022).

iBlue project (www.ibluelab.com and app available from Apple store and Android store: ibluelab)

The idea behind iBlue started after years of research in the field of nanomaterials for nanomedicine and nanodiagnosics. In particular, the candidate has dedicated his research interest on new enzymatic nanomaterials able to mimic natural enzymes, reaching high-level publications and international reputation in the field. From this world-class scientific expertise, the candidate filed two patents (n. 102017000030715 and 102018000003475, see below for details) and have started a strong development process that has led to a new product, iBlue. Following early adopters suggestion, the group has already implemented various changes from the first prototypes, including brand and packaging.

The project was named Lelolab at the beginning to recall a little lab in the name.

The packaging included two tests and the cost was doubled. Moreover, the color-strip provided has been coupled with a numeric code to meet customer's expectation.

At the moment, iBlue is not just a laboratory prototype, it is a ready-to-market product, and is on the stage of early field trials and market tests. The Technology Readiness Level (TRL) is 9. iBlue has a marketplace and an app. Please visit www.ibluelab.com.

As a general trend, diagnostics is urged to move from specialized laboratories to point-of-care and portable technologies to meet the challenges of health care time and cost management. Also for testing antioxidant activity, traditional methods are based on the use of instrumentation and, hence, they are not portable and require specialized personnel. Moreover, the majority of them are based on enzyme-based fluorimetric or colorimetric reactions. As a consequence, they are expensive and require laboratory settings/environment, expensive reagents, and special storage conditions. To solve this issue, nanomaterials have been proposed as enzyme alternatives, as they present many advantages, including easy and cost-effective production and purification, stability, high catalytic activity even at extreme conditions, and affinity to enzymatic substrates.

For the first time in the market, iBlue takes advantages of nanotechnology to create a portable and easy-to-use kit to evaluate antioxidants levels.

Uniqueness of iBlue

iBlue can overcome all the limitations of current technologies. It presents several advantages, including:

1. Portability (the test does not require specialized equipment)
2. Stability (iBlue is stable under normal room-temperature conditions)
3. Ease of quantification (the color change can be quantified visually with the naked eye)
4. Analysis is a simple process, requiring only addition of a sample
5. The method is sensitive, with performance characteristics comparable with conventional assays

6. Eco-friendly, non-toxic and non-harmful solutions
7. Potential applications for detection in remote locations and developing countries.

Data

18/10/2024

Luogo

Venezia