

Curriculum Vitae

Luca Burratti

PERSONAL INFORMATION

Nome: Luca Burratti
Nationality: Italian
Other Languages: English
E-Mail: luca.burratti@unicamillus.org
ORCID: 0000-0003-1515-3264
SCOPUS ID: 57201923762

EDUCATION AND TRAINING

09/2017- 02/2021 PhD in Industrial Engineering at the University of Rome Tor Vergata. Experimental thesis entitled: "Synthesis and characterization of metal nanostructures and their employment as optical sensors for heavy metal ions detection in water"
09/2014 – 02/2017 Master's degree in Materials Sciences and Technologies (LM-53) at the University of Rome Tor Vergata. Experimental thesis entitled: "Synthesis and optical characterization of photonic crystals for detection of Volatile Organic Compounds (VOCs)"
09/2009 – 02/2014 Bachelor's degree in Material Science (L-30) at the University of Rome Tor Vergata. Experimental thesis entitled: "Synthesis of Bragg Gratings to Increase the Efficiency of DSSC Solar Cells".
2009 Scientific High School Diploma, at Liceo Scientifico Statale "Paolo Ruffini" in Viterbo (VT), Italy.

SCIENTIFIC ACTIVITY

05/2025 – 06/2025 Research-fellowship at the National Institute for Nuclear Physics (INFN) Tor Vergata section, within the project Quantep. Research Program: optimization of temperature control system for optoelectronic devices.
03/2025 – 04/2025 Collaboration contract at the "National Interuniversity Consortium for Materials Science and Technology - INSTM", at the NeMO laboratory of the Department of Industrial Engineering of the University of Rome Tor Vergata. Research Program: Synthesis and characterization of metal oxides for the dyes and pesticides photodegradation as water contaminants.
02/2024 – 01/2025 Research-fellowship, at the Faculty of Technological Sciences and Innovation of the university "Universitas Mercatorum", Rome. Research title: 4D Printing of smart soft robotics - 4D Pr.o.
02/2023 – 01/2024 Research-fellowship, Department of Science, University of Roma Tre, Rome. Research Title: Synthesis and characterization of nanostructured systems for the removal of heavy metal ions – FACS project.
02/2022 – 01/2023 Research-fellowship, at the Department of Industrial Engineering, University of Rome Tor Vergata. Research title: Synthesis and characterization of nanostructured systems for the removal of heavy metal ions – FACS project.
12/2021 - 01/2022 Scholarship of the "Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali - INSTM", at the NeMO laboratory of the

- Department of Industrial Engineering of the University of Rome Tor Vergata. Research Program: Synthesis and characterization of hydrogel-based matrices containing noble metal nanostructures (Ag/Au) for the purification of water from pollutants such as heavy metals.
- 12/2020 – 11/2021 Research-fellowship, at the Department of Industrial Engineering, University of Rome Tor Vergata. Research title: Synthesis and characterization of nanostructured systems for the detection of heavy metal ions.
- 11/2019 – 02/2020 Mobility period abroad within the PhD course, at the IAB laboratories (institute for the advancement of bioscience), Site Santé, Allée des Alpes, 38700, La Tronche, Grenoble, France.

SKILLS

- Synthesis of nanomaterials such as nanoparticles or nanoclusters of silver and gold by chemical reduction. Synthesis of metal oxides through co-precipitation methods in aqueous solution. Synthesis of photonic crystals for the detection of volatile organic compounds (VOCs). Synthesis of optical devices based on nanomaterials for the detection of water pollutants, such as heavy metal ions. Use of these nanomaterials as filtering agents of water from heavy metals, dyes and plant protection products.
- Characterization of nanomaterials by spectroscopic techniques, such as UV-Vis/NIR absorption and photoluminescence. Determination of the quantum efficiency of solid or solution materials. Use of FTIR spectroscopy for the characterization of materials. These techniques are also used for the calibration of the optical sensors used. Characterization of materials from the surface point of view by different microscopies such as AFM, SEM and TEM.
- Expertise in the spectroscopic ellipsometry technique for the study and determination of the dielectric constant and refractive index of single or multi-state thin films, through theoretical models applied to experimental data.
- Expertise in photolithographic techniques for the production of optoelectronic devices, such as planar waveguides and channels.
- Expertise in three-dimensional printing with photo-polymerizable solutions and expertise in filament 3D printing.
- Excellent knowledge of the Office package (Word, Excel, Power Point) and the Internet.
- Knowledge of the C programming language and design and programming of devices using Arduino.

CONFERENCE PARTICIPATIONS

- 2024 **E-MRS 2024** (Spring Meeting of the European Materials Research Society) international conference on recent developments in materials science. Strasbourg, France, 27-31 May 2024. ORAL Presentation
- 2022 **Light: Its nature and its use**, PhD school, at Venice International University, Venice, Italy, May 2-6, 2022. ORAL presentation and POSTER presentation.
- LIMS 2022** (Light Imaging Microscopy Application Spectrums), national conference about light and its applications, at ENEA laboratories in Frascati, Italy, May 19-20, 2022, INVITED ORAL presentation.

- ICOP 2022**, Italian conference on photonics, at the University of Trento, Italy, June 15-17, 2022. ORAL presentation.
- 2021 **ECIS 2021**, International Conference on Chemical and Physical Aspects of Colloidal Systems. September 5-10, 2021, Athens, Greece. POSTER Presentation
- 2019 **Biophysiscs@Rome 2019**, International and multidisciplinary conference in biophysics. May 15-16, 2019, Rome, Italy. POSTER presentation.
- OpenReadings 2019**, International conference dedicated to young researchers in multiple research fields. March 19-23, 2019, Vilnius, Lithuania. ORAL presentation.
- PIERS 2019**, International conference on recent developments in electromagnetism. June 17-20, 2019, Rome, Italy. ORAL presentation.
- EUROMAT 2019**, International and multidisciplinary conference in research. September 1-5, 2019, Stockholm, Sweden. ORAL presentation.
- 2018 **LIMS 2018**, conference in the field of photonics, synthesis of innovative materials with particular optical properties and methods of investigation through the aid of light. May 17-18, 2018, Frascati, Italy. INVITED ORAL presentation.
- FOTONICA 2018**, international conference in the field of photonics, development of materials for telecommunications, methods of investigation through the aid of light and innovative materials for photonics. May 23-25, 2018, Lecce, Italy. POSTER presentation.
- THERMEC 2018**, international conference in the field of metallurgy. Technological innovations: new metal-based materials, investigation techniques for their characterization. July 8-13, 2018, Paris, France. POSTER presentation.
- NanoInnovation 2018**, international conference regarding nanotechnologies in many fields of science and technology. September 11–14, 2018, Rome, Italy. ORAL Presentation.
- 2017 **Biophysics@Rome 2017**, an international and multidisciplinary conference in biophysics. May 18-19, 2017, Rome, Italy. POSTER presentation.

TEACHING ACTIVITY

- A.A. 2024/2025 Professor of the Physics II of the Engineering Sciences course at the Department of Industrial Engineering of the University of Rome Tor Vergata.
- A.A. 2023/2024 Module of the course “Nanostructures and Nanomaterials” for PhD students in Industrial Engineering, of the homonymous department of the University of Rome Tor Vergata.
Module of the course “Optical Spectroscopy of Nanomaterials” for PhD students in Industrial Engineering, of the homonymous department of the University of Rome Tor Vergata.
- A.A. 2022/2023 Teaching as a non-tenured professor at the Department of Business Engineering for the course “Complements and exercises for General Physics II”.

Tutoring for the course “General Physics I” at the Faculty of Engineering of the University of Rome Tor Vergata.

A.A. 2021/2022 Teaching as a non-tenured professor at the Department of Business Engineering for the course “Complements and exercises for General Physics II”.

EDITORIAL ACTIVITY

- 03/2025 – in corso Topic Editor of the Special Issue: “Functionalized Materials for Environmental Applications” in the scientific journals: “Applied Sciences, Chemistry, Gels, Nanomaterials, Polymers, Environments and Materials” of the MDPI publisher.
- 03/2024 – in corso Guest Editor of the Special Issue: “Synthesis, Characterization and Application of Metal and Metal Oxide Nanomaterials” of the international scientific journal “International Journal of Molecular Sciences” of the MDPI publisher.
- 06/2024 – in corso Member of the “Topical Advisory Panel” for the “Materials Science” section of the international scientific journal “International Journal of Molecular Sciences” of MDPI publisher.
- 09/2023 – 02/2025 Guest Editor of the Special Issue: “Functionalized Gels for Environmental Applications 2nd Edition” of the international scientific journal “Gels” of MDPI publisher.
- 11/2023 – in corso Member of the “Topical Advisory Panel” for the “Gels Applications” section of the international scientific journal “Gels” of the MDPI publisher.
- 11/2021 – 09/2023 Guest Editor of the Special Issue: “Functionalized Gels for Environmental Applications” of the international scientific journal “Gels” of MDPI publisher.

PUBLICATIONS

- ❖ Yasmeen, S., Burratti, L., Duranti, L., Sgreccia, E., Agresti, A., & Proposito, P. (2025). Superior Photodegradation of Bentazon and Nile Blue and Their Binary Mixture Using Sol–Gel Synthesized TiO₂ Nanoparticles Under UV and Sunlight Sources. *Applied Sciences*, 15(4), 1899, ISSN: 20763417, doi: 10.3390/app15041899.
- ❖ Yasmeen, S., Burratti, L., Duranti, L., Agresti, A., & Proposito, P. (2024). Study of Photo-degradation of Bentazon Herbicide by Using ZnO-Sm₂O₃ Nanocomposite Under UV Light. *International Journal of Molecular Sciences*, 25(24), 13319, ISSN: 16616596, doi: 10.3390/ijms252413319.
- ❖ Burratti, L., Sgreccia, E., Bertalà, F., & Galiano, F. (2024). Metal nanostructures in polymeric matrices for optical detection and removal of heavy metal ions, pesticides and dyes from water. *Chemosphere*, 142636., ISSN: 00456535, doi: 10.1016/j.chemosphere.2024.142636.
- ❖ Sgreccia, E., Gallardo Gonzalez, F. S., Proposito, P., Burratti, L., Sisani, M., Bastianini, M., Knauth, P. & Di Vona, M. L. (2024). Heavy Metal Detection and Removal by Composite Carbon Quantum Dots/Ionomer Membranes. *Membranes*, 14(6), 134, ISSN: 20770375, doi: 10.3390/membranes14060134.
- ❖ Sgreccia E, Rogalska C, Gonzalez F S G, Proposito P, Burratti L, Knauth P, Di Vona M L (2024). Heavy metal decontamination by ion exchange polymers for water purification: counterintuitive cation removal by an anion exchange polymer. *Journal of Material Science*, vol. 59, p. 2776-2787, ISSN: 0022-2461, doi: 10.1007/s10853-024-09356-3.
- ❖ Bellingeri A, Bono N, Venditti I, Bertelà F, Burratti L, Faleri C, Protano G, Paccagnini E, Lupetti P, Candiani G, Corsi I. (2024). Capping drives the behavior, dissolution and (eco)toxicity of silver nanoparticles towards microorganisms and mammalian cells. *Environmental Science. Nano*, vol. 11, p. 2049-2060, ISSN: 2051-8153, doi: 10.1039/d4en00063c.

- ❖ Bellingeri A, Bertelà F, Burratti L, Calantropio A, Battocchio C, Lupetti P, Paccagnini E, Iucci G, Marsotto M, Proposito P, Corsi I, Venditti I. (2024). Detection of Fe(III) ion based on bifunctionalized silver nanoparticles: Sensitivity, selectivity and environmental safety. *Materials Chemistry and Physics*, vol. 313, 128671, ISSN: 0254-0584, doi: 10.1016/j.matchemphys.2023.128671.
- ❖ Burratti L, Bertelà F, Sisani M, Di Guida I, Battocchio C, Iucci G, Proposito P, Venditti I. (2024). Three-Dimensional Printed Filters Based on Poly(ethylene glycol) Diacrylate Hydrogels Doped with Silver Nanoparticles for Removing Hg(II) Ions from Water. *Polymers*, vol. 16, 1034, ISSN: 2073-4360, doi: 10.3390/polym16081034.
- ❖ Yasmeen S, Burratti L, Duranti L, Sgreccia E, Proposito P (2024). Photocatalytic Degradation of Organic Pollutants—Nile Blue, Methylene Blue, and Bentazon Herbicide—Using NiO- ZnO Nanocomposite. *Nanomaterials*, vol. 14, 470, ISSN: 2079-4991, doi: 10.3390/nano14050470.
- ❖ Bertelà, F., Bellingeri, A., Burratti, L., Proposito, P., Di Vona, M. L., Sgreccia, E., Corsi I, Marsotto M., Iucci G., Battocchio C., & Venditti, I. (2023). Hydrophilic silver nanoparticles for the treatment of water polluted by heavy metals. In *Journal of Physics: Conference Series* (Vol. 2579, No. 1, p. 012002). IOP Publishing.
- ❖ Burratti, L.; Sisani, M.; Di Guida, I.; De Matteis, F.; Francini, R.; Proposito, P. (2023). Poly(ethylene glycol) Diacrylate Hydrogels Doped with Silver Nanoparticles for Optical Sensing and Removing Hg(II) Ions from Water. *Chemosensors*, 11, 518, ISSN: 2227-9040, doi: 10.3390/chemosensors11100518.
- ❖ Burratti, L., Zannotti, M., Maranges, V., Giovannetti, R., Duranti, L., De Matteis, F., Francini, R. & Proposito, P. (2023). Poly(ethylene glycol) Diacrylate Hydrogel with Silver Nanoclusters for Water Pb (II) Ions Filtering. *Gels*, 9(2), 133, ISSN: 2310-2861, doi: 10.3390/gels9020133.
- ❖ Burratti, L., Maranges, V., Sisani, M., Naryyev, E., De Matteis, F., Francini, R., & Proposito, P. (2022). Determination of Pb(II) Ions in Water by Fluorescence Spectroscopy Based on Silver Nanoclusters. *Chemosensors*, 10(10), 385, ISSN: 2227-9040, doi: 10.3390/chemosensors10100385.
- ❖ Bertelà, F., Marsotto, M., Meneghini, C., Burratti, L., Maraloiu, V. A., Iucci, G., Venditti I., Proposito P., D'ezio V., Persichini T & Battocchio, C. (2021). Biocompatible Silver Nanoparticles: Study of the Chemical and Molecular Structure, and the Ability to Interact with Cadmium and Arsenic in Water and Biological Properties. *Nanomaterials*, 11(10), 2540, ISSN: 2079-4991, doi: 10.3390/nano11102540.
- ❖ Burratti, L., De Matteis, F., Francini, R., Lim, J., Scheu, C., & Proposito, P. (2021). Fluorescent Silver Nanoclusters Embedded in Hydrogel Matrix and Its Potential Use in Environmental Monitoring. *Applied Sciences*, 11(8), 3470, ISSN: 2076-3417, doi: 10.3390/app11083470.
- ❖ Burratti, L., Ciotta, E., De Matteis, F., & Proposito, P. (2021). Metal Nanostructures for Environmental Pollutant Detection Based on Fluorescence. *Nanomaterials*, 11(2), 276, ISSN: 2079-4991, doi: 10.3390/nano11020276.
- ❖ Schiesaro, I., Burratti, L., Meneghini, C., Fratoddi, I., Proposito, P., Lim, J., Scheu C., Venditti I., Iucci G & Battocchio, C. (2020). Hydrophilic Silver Nanoparticles for Hg(II) Detection in Water: Direct Evidence for Mercury–Silver Interaction. *The Journal of Physical Chemistry C*, 124(47), 25975-25983, ISSN: 1932-7447, doi: 10.1021/acs.jpcc.0c06951.
- ❖ Schiesaro, I.; Battocchio, C.; Venditti, I.; Proposito, P.; Burratti, L.; Centomo, P.; Meneghini, C. (2020). Structural characterization of 3d metal adsorbed AgNPs. *Phys. E Low-dimensional Syst. Nanostructures*, 114162, ISSN: 1386-9477, doi: 10.1016/j.physe.2020.114162.
- ❖ Proposito, P.; Burratti, L.; Venditti, I. (2020), Silver Nanoparticles as Colorimetric Sensors for Water Pollutants. *Chemosensors*, 8, 26, ISSN: 2227-9040, doi: 10.3390/chemosensors8020026.
- ❖ Bolli, E.; Mezzi, A.; Burratti, L.; Proposito, P.; Casciardi, S.; Kaciulis, S. (2020), X-ray and UV photoelectron spectroscopy of Ag nanoclusters. *Surf. Interface Anal.*, ISSN:0142-2421, doi:10.1002/sia.6783.

- ❖ Ciotta, E., Burratti, L., Proposito, P., Bolli, E., Kaciulis, S., Antonaroli, S., & Pizzoferrato, R. (2020). Two Different Acid Oxidation Syntheses to Open C60 Fullerene for Heavy Metal Detection. *Mater. Sci. Forum*, 16, 16, doi: 10.21741/9781644900710-3.
- ❖ Burratti L., Venditti I., Battocchio C., Casciardi S., Proposito P. Silver Nanoparticles with Different Thiol Functionalization: An Opposite Optical Behaviour in Presence of Hg(II), *Materials Research Proceedings*, Vol. 16, pp 6-15, 2020, doi:10.21741/9781644900710-2.
- ❖ Burratti, L.; Ciotta, E.; Bolli, E.; Kaciulis, S.; Casalboni, M.; De Matteis, F.; Garzón-Manjón, A.; Scheu, C.; Pizzoferrato, R.; Proposito, P. (2019), Fluorescence enhancement induced by the interaction of silver nanoclusters with lead ions in water. *Colloids Surfaces A: Physicochem. Eng. Asp.*, 579, ISSN: 0927-7757, doi:10.1016/j.colsurfa.2019.123634.
- ❖ Proposito, P.; Burratti L.; Bellingeri, A; Protano, G.; Faleri, C.; Corsi, I.; Battocchio, C.; Iucci, G.; Tortora, L.; Secchi, V.; Franchi, S.; Venditti, I. (2019) Bifunctionalized Silver Nanoparticles as Hg²⁺ Plasmonic Sensor in Water: Synthesis, Characterizations, and Ecosafety. *Nanomaterials*, 9, 1353, ISSN: 2079-4991, doi:10.3390/nano9101353.
- ❖ Burratti, L.; Ciotta, E.; Bolli, E.; Casalboni, M.; De Matteis, F.; Francini, R.; Casciardi, S.; Proposito, P. (2019), Synthesis of fluorescent silver nanoclusters with potential application for heavy metal ions detection in water. *In AIP Conference Proceedings*; 2145, 020007, doi:10.1063/1.5123568.
- ❖ Burratti, L.; Casalboni, M.; De Matteis, F.; Pizzoferrato, R.; Proposito, P. (2018), Polystyrene Opals Responsive to Methanol Vapors. *Materials*, 11, 1547, ISSN: 1996-1944, doi:10.3390/ma11091547.
- ❖ Mochi, F.; Burratti, L.; Fratoddi, I.; Venditti, I.; Battocchio, C.; Carlini, L.; Iucci, G.; Casalboni, M.; De Matteis, F.; Casciardi, S.; Nappini, S.; Pis, I.; Proposito, P. (2018), Plasmonic Sensor Based on Interaction between Silver Nanoparticles and Ni²⁺ or Co²⁺ in Water. *Nanomaterials*, 8, 488, ISSN: 2079-4991, doi:10.3390/nano8070488.
- ❖ Burratti, L.; De Matteis, F.; Casalboni, M.; Francini, R.; Pizzoferrato, R.; Proposito, P. (2018), Polystyrene photonic crystals as optical sensors for volatile organic compounds. *Mater. Chem. Phys.* 2018, 212, 274–281, ISSN: 0254-0584, doi:10.1016/j.matchemphys.2018.03.039.
- ❖ Burratti, L.; Casalboni, M.; De Matteis, F.; Mochi, F.; Francini, R.; Casciardi, S.; Bolli, E.; Proposito, P. (2018), Synthesis of fluorescent silver nanoclusters for environmental sensing applications. *In IET Conference Publications; Institution of Engineering and Technology*, 52-56, doi:10.1049/cp.2018.1661.
- ❖ Burratti, L.; Bolli, E.; Casalboni, M.; de Matteis, F.; Mochi, F.; Francini, R.; Casciardi, S.; Proposito, P. (2018), Synthesis of Fluorescent Ag Nanoclusters for Sensing and Imaging Applications. *Mater. Sci. Forum*, 941, 2243–2248, doi:10.4028/www.scientific.net/MSF.941.2243.
- ❖ Mochi, F.; De Matteis, F.; Proposito, P.; Burratti, L.; Francini, R.; Casalboni, M. (2018), One photon 3D polymerization via direct laser writing. *Mater. Sci. Forum*, 941, 2142–2147, doi:10.4028/www.scientific.net/MSF.941.2142.