

**Laura Bruno** is research scientist in General Botany at the Laboratory of Biology of Algae (LBA) and Aggregate Professor at the Department of Biology of the University of Rome "Tor Vergata". Since 2012 she is the responsible of the LBA. In 2017 obtained the National Scientific Qualification at the level of Associate Professor in Botany.

She obtained the Ph.D in Evolution Biology and Ecology in 2004 by studies on the biodiversity and ecology of filamentous cyanobacteria isolated from photosynthetic biofilms present in Roman hypogea. Since 2004 she has been teaching Systematic of Phytobenthos, Plant evolution, Botany and Plant biotechnology applied to the Cultural Heritage. She is supervisor of bachelor, master and Ph.D students.

Main research activity focused on:

-Characterization of epilithic cyanobacterial strains and biofilms biodeteriorating cultural heritages in indoor and outdoor environments, acclimation and adaptation to different light conditions, systematics and phylogeny.

-Development of non-invasive and non-destructive techniques against biological colonization as conservation strategies of Cultural Heritages.

-Selection and characterization of cyanobacteria and microalgae as potential producers of biodiesel and other valuable compounds; optimization of culture conditions in order to improve the production of biomass and lipid content; biotechnological applications of microalgal biomass in the field of energy, environment, nutraceutical and nanotechnologies; diatom frustule photonics for random lasing and dye trapping applications.

-Studies for microalgae application for the bioremediation of wastewaters by removal of nitrogen, phosphorous and heavy metals

#### **Involvement in recent scientific projects:**

-PI in the project '*Green Technologies: Water Cleanup Of Pollutants With Plants And Microalgae And Recycling Of Biomass For Renewable Energy Production*' ('Mission Sustainability2017', University of Rome Tor Vergata Grant);

-responsible of the OU of Roma Tor Vergata in the project '*The evolution of phytochelatin synthase from cyanobacteria to basal tracheophytes: the control of iron homeostasis and other metal micronutrients is a primeval and ubiquitous function of the enzyme?*' (PRIN2015, Italian Ministry of University and Research);

-one of the principal investigator in the project 'PHANTOM – PHotonics ApplicatiON in diaTOM frustules' (Uncovering Excellence 2014, University of Rome 'Tor Vergata' Grant);

-coordinator of the Scientific International Collaboration between University of Rome "Tor Vergata" and Fakin Mohan University, (India) in the fields 'Biotechnology and nanotechnology for Cultural Heritage';

-scientific responsible of the Italian project for the transfer of knowledge from research centers to SMEs: 'DICO-BEN, Diodes for the control of Cultural Heritage';

-Scientific responsible of the Unit Roma 2 in the frame of the project '*Technologies for the production of biofuels from plant biomasses*' between Italian Universities CUIA (Consorzio Universitario Italiano per l'Argentina) and Argentine Universities (Patagonia, Sur)

-participant in the project '*Utilization of last generation biofuels in diesel engines*' (Italian Ministry of University and Research- PRIN2009) and responsible of the biological aspects of the project.

Knowledge transfer: since 2009 to present she is the promoter and Member of Board Directors of the University Spinoff AlgaRes srl.

## Contact

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## Publication 2009-2018

1. Fontanini D, Andreucci A, Ruffini Castiglione M, Basile A, Sorbo S, Petraglia A, Degola F, Bellini E, **Bruno L**, Varotto C, Sanità di Toppi L (2018). The phytochelatin synthase from *Nitella mucronata* (Charophyta) plays a role in the homeostatic control of iron(II)/(III). *Plant Physiology and Biochemistry* 127: 88-96 <https://doi.org/10.1016/j.plaphy.2018.03.014>
2. L. Rugnini, G. Costa, R. Congestri, S. Antonaroli, L. Sanità di Toppi, **L. Bruno** 2018. Phosphorus and metal removal combined with lipid production by the green microalga *Desmodesmus* sp.: An integrated approach. *Plant Physiology and Biochemistry* 125:45-51. [doi.org/10.1016/j.plaphy.2018.01.032](https://doi.org/10.1016/j.plaphy.2018.01.032)
3. **Bruno L**, Valle V (2017). Effect of white and monochromatic lights on cyanobacteria and biofilms from Roman Catacombs. *International Biodeterioration and Biodegradation, International Biodeterioration & Biodegradation* 123:286-295 DOI 10.1016/j.ibiod.2017.07.013
4. L. Rugnini, G. Costa, R. Congestri, **L. Bruno** 2017 Testing of two different strains of green microalgae for Cu and Ni removal from aqueous media. *Science of Total Environment*, (601-602), 959–967. <http://dx.doi.org/10.1016/j.scitotenv.2017.05.222>
5. Ruffolo SA, De Leo F, Ricca M, Arcudi A, Silvestri C, **Bruno L**, Urzì C, La Russa MF 2017 Medium-term in situ experiment by using organic biocides and titanium dioxide for the mitigation of microbial colonization on stone surfaces. *International Biodeterioration and Biodegradation*, 123: 17-26.
6. Etemadi-Khah Atefeh, Ahmad Ali Pourbabae, Mostafa Noroozi, Hossein Ali Alikhani & **Laura Bruno** 2017 Biodiversity of isolated cyanobacteria from desert soils in Iran. *Geomicrobiology Journal*, 784-794. <http://dx.doi.org/10.1080/01490451.2016.1271064>
7. Gouveia L, Oliveira AC, Congestri R, **Bruno L**, Soares AT, Menezes RS, Filho NRA, Tzovenis I 2017. Biodiesel from microalgae. In: L Gouveia, R Muñoz, C González (eds.) '*Microalgae-Based Biofuels and Bioproducts*' Elsevier, Woodhead Publishing, 235-258 ISBN: 978-0-08-101023-5
8. De Angelis R, Melino S, Proposito P, Casalboni M, Lamastra FR, Nanni F, **Bruno L**, Congestri R 2016. The diatom *Staurosirella pinnata* for photoactive material production. *PLOS ONE* 11(11): E0165571. DOI:10.1371/journal.pone.0165571

9. Urzi C, De Leo F, Krakova L, Pangallo D, **Bruno L** 2016. Effects of biocide treatments on the biofilm community in Domitilla's catacombs in Rome. *Science of Total Environment*. Volume 572, 1 December 2016, Pages 252–262 doi.org/10.1016/j.scitotenv.2016.07.195
10. Gismondi A, Di Pippo F, **Bruno L**, Antonaroli S, Congestri R (2016): Phosphorus removal coupled to bioenergy production by three cyanobacterial isolates in a biofilm dynamic growth system., *International Journal of Phytoremediation*, 18(9) 869-876, DOI: 10.1080/15226514.2016.1156640
11. De Matteis F, Proposito P, Francini R, De Angelis R, Mochi F, Melino S, Congestri R, **Bruno L**, Casalboni M 2017. Photonic application of diatom frustules. *Materials Science Forum*, 879: 419-423
12. Federica Marano, Federico Di Rita, Maria Rita Palombo, Neil T.W. Ellwood, **Laura Bruno** (2016). A first report of biodeterioration caused by cyanobacterial biofilms of exposed fossil bones: a case study of the Middle Pleistocene site of La Polledrara di Cecanibbio (Rome, Italy). *International Biodeterioration & Biodegradation*, 106: 67-74. DOI 10.1016/j.ibiod.2015.10.004 2.131 5Y
13. L. Krakova, F. De Leo, **L. Bruno**, D. Pangallo and C. Urzi. 2015. Complex bacterial diversity in the white biofilms of St. Callistus Catacombs in Rome evidenced by different investigation strategies. *Environmental Microbiology* 17 (5):1738-1752. DOI: 10.1111/1462-2920.12626
14. **Bruno L**, Ficorella I, Valentini F, Quici L, Keshari N, Adhikary SP. 2014. Characterization of phototrophic biofilms deteriorating Indian stone monuments, their response to heat stress and development of a non-invasive remediation strategy. In: M.A. Rogerio-Candelera (ed). Science, Technology and Cultural Heritage. CRC Press/Balkema, The Netherlands, pp.205-210, ISBN 978-1-138-02744-2
15. Hsieh P, Pedersen JZ, **Bruno L**. 2014 Photoinhibition of Cyanobacteria and its Application in Cultural Heritage Conservation. *Photochemistry and Photobiology*,90:533-543.
16. **Bruno L**, Bellezza S, De Leo F, Urzi C. 2014. A study for monitoring and conservation in the Roman Catacombs of St. Callistus and Domitilla, Rome (Italy). In Saiz-Jimenez C. (Ed.), The Conservation of Subterranean Cultural Heritage. CRC Press, Taylor & Francis Group, pp. 37-44, ISBN 978-1-138-02694-0
17. **Bruno L**, Quici L, Ficorella I, Valentini F. 2014. NanoGraphene Oxide: a new material for a non-invasive and non-destructive strategy to remove biofilms from rock surfaces. In Saiz-Jimenez C. (Ed.), The Conservation of Subterranean Cultural Heritage. CRC Press, Taylor & Francis Group, London pp.125-130, ISBN 978-1-138-02694-0
18. Clara Urzi, Filomena De Leo, **Laura Bruno**, Domenico Pangallo, Lucia Kracova 2014. New species description, biomineralization processes and biocleaning applications of Roman catacombs-living bacteria. In Saiz-Jimenez C. (Ed.), The Conservation of Subterranean Cultural Heritage. CRC Press, Taylor & Francis Group London, pp. 65-72, ISBN 978-1-138-02694-0
19. Di Pippo F, Ellwood NTW, Gismondi A, **Bruno L**, Rossi F, Magni P, De Philippis R. 2013. Characterization of exopolysaccharides produced by seven biofilm-forming cyanobacterial strains for biotechnological applications. *J Appl Phycol*, 25:1697–1708, DOI 10.1007/s10811-013-0028-1,
20. Urzi C, De Leo F, Pangallo D, Krakova L, Hsieh P, **Bruno L** (2012). Chemoorganotrophic community in the Ocean's Cubiculum at the St. Callistus Catacombs (Rome): ten years of monitoring.. In: Proceedings of the International Congress: Science and Technologies for the Conservation of Cultural Heritage. Santiago de Compostela, Spain, October 2-5
21. **Bruno L.**, Di Pippo F, Antonaroli S, Gismondi A, Valentini C, Albertano P. 2012. 'Characterization for biofilm-forming cyanobacteria for biomass and lipid production. *Journal Applied Microbiology* 113:1052–1064, PMID: 22845917. DOI: 10.1111/j.1365-2672.2012.05416.

22. Rossi F., Micheletti E., **Bruno L.**, Adhikary S.P., Albertano P., De Philippis R., 2012. Characteristics and role of the exocellular polysaccharides produced by five cyanobacteria isolated from phototrophic biofilms growing on stone monuments. *Biofouling: The Journal of Bioadhesion and Biofilm Research*, 28 (2): 215-224.
23. Caroppo C., Albertano P., **Bruno L.**, Montinari M., Rizzi M., Vigliotta G., Pagliara P., 2012. Identification and characterization of a new *Halomicronema* species (Cyanobacteria) isolated from the Mediterranean marine sponge *Petrosia ficiformis* (Porifera) *Fottea* 12 (2): 315-326. Congestri R, **Bruno L.**, Albertano P 2012 - Le microalghe bentoniche del Pozzo del Merro In: M. Giardini (Ed) SANT'ANGELO ROMANO (Monti Cornicolani, Roma) Un territorio ricco di storia e natura, 279-282.
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26. Urzi C., De Leo F., **Bruno L.**, Zammit G., Krakova L., Pangallo D., Albertano P., 2010. Methodological approaches to the control of phototrophic biofilms colonizing subterranean sites in the Mediterranean area. In: Ferrari A. (ed.) Proceedings of the 4<sup>th</sup> International Congress on 'Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin'. Vol II session B, pp. 265-271, Grafica Elettronica srl, Napoli ISBN978-88-96680-32-2.
27. Palozzi R., Caramanna G., Albertano P., Congestri R., **Bruno L.**, Romano A., Giganti M.G., Zenobi R., Costanzo C., Valente G., Polani D., Vecchio M., Vinci M., Sbordoni V. 2010. The underwater exploration of the Merro sinkhole and the associated diving physiological and psychological effects. *Underwater Technology* 29: 1-10.
28. Moro L., Rascio N., La Rocca N., Sciuto K., Albertano P., **Bruno L.**, Andreoli C., 2010. Polyphasic characterization of a thermo-tolerant filamentous cyanobacterium isolated from the Euganean thermal muds (Padua, Italy). *European Journal of Phycology* 45:143-154.
29. Urzì C., De Leo F., **Bruno L.**, Pangallo D., Albertano P. 2010. 'How to control biodeterioration of cultural heritage? a methodological approach for the diagnosis and treatment of affected monuments'. – In: Proceedings of the Works of Art and Conservation Science Today Congress. p.O1, Thessaloniki, Greece.
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31. **Bruno L.**, Romano E., Bellezza S., Urzì C., Albertano P., 2010. Confocal microscopy and diagnosis of biodeterioration caused by phototrophic biofilms. In: L. Campanella, C. Piccioli (eds) Diagnosis for the conservation and valorization of cultural heritage, pp. 152-157, De Vittoria srl, Napoli, ISBN 978-88-86208-66-6
32. **Bruno L.**, Billi D., Bellezza S., Albertano P., 2009. Cytomorphological and genetic characterization of troglomorphic *Leptolyngbya* strains isolated from Roman hypogea. *Applied and Environmental Microbiology* 75: 608-617.