

## CV Nicoletta La Rocca

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### CURRENT POSITION

**Nicoletta La Rocca** is currently **Associate Professor in Plant Physiology (05/A2)** at the Department of Biology, University of Padova, where she teaches bachelor's and master's degrees courses in Geobotany, Plant Biotic Interactions, Plant Ecophysiology and Remote Sensing of Environments.  
**Habitation for Full Professorship in Plant Physiology (05/A2)** obtained on 11-12-2023.

### PAST POSITIONS

**2000 – 2017 Researcher in Plant Physiology** at Dept. of Biology, University of Padova, Italy.

**2000 – 2001 PostDoc** (funded by PNRA). Project title: "Taxonomic and physiological surveys on Antarctic microalgae". Lab. of Phycology. Dept. of Biology, University of Padova, Italy.

**1999 – 2000 Guest Researcher** for 5 months. Research Project concerning: "Chlorophyll precursors analysis and their role in the regulation of photosynthesis related gene expression". Lab. of Phytochemistry, Botanical Institute, LMU, Munich, Germany.

**1997 – 2000 Ph.D. in Evolutionary Biology.** Thesis title: "Light stress and photodamaging effects on the photosynthetic apparatus of angiosperms". Lab. of Plant Physiology, Dept. of Biology, University of Padova, Italy.

### RESEARCH ACTIVITIES

**Nicoletta La Rocca** has 30 years of experience in the ecophysiology of plants and microorganisms from extreme environments. In this field she has contributed to the discovery and characterization of 10 new species of cyanobacteria and microalgae and to the study of the responses of photosynthetic organisms to abiotic stress.

She now coordinates a multidisciplinary research group working in the laboratories of the Biology Department. The group involves biologists, chemists, engineers and astrophysicists and is focused on the astro-biotechnology research field.

The main interests are:

- 1) **Basic research in astrobiology.** Design, realization and optimization of experimental setups to cultivate photosynthetic organisms under simulated extreme terrestrial or non-terrestrial conditions. Principal aim is to study their growth, biochemical and transcriptomic features, gas exchange rates and impact on oxic or anoxic atmospheres when exposed to different simulated star spectra (M- and G-types). The biological data will feed mathematical models to predict the vegetation cover potential as well as surface and atmospheric biosignatures of exoplanets, to better interpret observations coming from future space explorations.
- 2) **Characterization of extremophiles and their BLSS or biotechnological applications.** Exploration of the biodiversity and adaptability to abiotic stresses of photosynthetic organisms from extreme environments. This is obtained through their Isolation, characterization and screening of the best growth conditions leading to higher biomass production (potentially edible) and synthesis of valuable compounds as well as to elevated O<sub>2</sub> release and CO<sub>2</sub> sequestration, for biotechnological purposes and for supporting human space exploration beyond Low Earth Orbit and life in Moon and Mars outposts.

## RESEARCH GRANTS AND PROJECT COORDINATIONS (since 2019)

### 1) For basic research in astrobiology:

**2025-2027** PI of the WP “FaRLiP cyanobacteria” within the EXTREMOON project “Investigating the responses of terrestrial EXTREmophiles and their molecules in MOON environment”. The project was positively selected by ESA for the Reserve Pool of Science Activities for the Moon: A SciSpacE Announcement of Opportunity and is funded by the Italian Space Agency (ASI) for ground-based experiments.

**2023 - 2026** PI of the WP “Photosynthesis of desert and hydrothermal cyanobacteria under simulated planetary conditions” within the ASTERIA project “Adaptability of cyanobacteria from extreme environments to stellar ultraviolet radiation”, funded by the Italian Space Agency (ASI)

**2019 - 2023** PI of the WP “Cyanobacteria responses to simulated M-star lights” within the Italian Space Agency (ASI) project LIFE IN SPACE “Origin, presence, persistence of life in space: from molecules to extremophiles” just ended. <http://www.lifeinspace.it>

**2018 - 2019** PI Seed Research Grant DiBio, UNIPD ‘Molecular and physiological responses of cyanobacteria to simulated extraterrestrial atmospheres and stars irradiations’

### 2) For characterization of extremophiles and their BLSS or biotechnological applications:

**2023 - 2025** Co-I of the Project “Extending the red limit of oxygenic photosynthesis: basic principles and implications for future applications” funded by PRIN 2022

**2022 - 2025** Co-I of the Spoke 3 research team, of the Natural Biodiversity Future Center, funded by PNRR

**2021 - 2024** PI of the project “Shedding light on anti-inflammatory and antioxidant origin and function of biomolecules from therapeutic thermal muds of the Euganean District” funded by the Centro Studi Pietro D’Abano

**2016 - 2019** PI Centro Studi Termali Pietro D’Abano Research Contract “Characterization of Euganean Thermal mud microflora and analysis of bioactive compounds produced by cyanobacteria”

In the past, she has been Co-I in several PRIN (3) and PNRA (5) projects and PI of research projects (3) funded by private companies to select and optimize the growth of microorganism’s cultures for production of high values compounds.

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- **EANA** (European Astrobiology Network Association)
- **EAI** (European Astrobiology Institute)
- **SIA** (Società Italiana di Astrobiologia)
- **CISAS** (Interdepartmental Centre of Space Activities and Studies - UNIPD)
- **SIBV** (Italian Society of Plant Biology)
- **CONISMA** (National Inter-university Consortium for Marine Sciences)
- **Padova Botanical Garden** research team

## EVENTS ORGANIZATION AND OUTREACH ACTIVITIES

She has been involved in several outreach activities in the field of Space Science. Of note are:

- **Member of the SOC of the VIII Congress of the Italian Society of Astrobiology.** Messina, Italy (11 -13 June 2025).
- **Member of the LOC of the Second European Congress on Photosynthesis Research ePS2.** Padova, Italy (25 -28 June 2024).

- **Collaborator in the realization of the exhibition “Lo Spazio di Padova. Scienze, tecnologia, arte e storia”,** as part of the 800 years UNIPD Events (Galleria Cavour, Padova (3-15 September 2022)).
- **Member of the SOC of the scientific event “800 years of the University of Padua in Space”** (7-9 September 2022).
- **Collaborator in the realization of the exhibition "Meteorites: journey from deep space to Earth",** Padova (1 October - 30 November 2021).
- **Responsible for the dissemination of results of the National Astrobiology Program funded by ASI** (2019 – 2023), coordinating and contributing to the realization of the Life in Space website <https://www.lifeinspace.it/>
- **Collaborator in the realization of the exhibition "XTREME: Living in extreme environments",** Trieste (29 August - 11 October 2020), as part of the SCIENCE IN THE actions CITY of the European Science Open Forum – (ESOF 2020)
- **Member of the LOC “XI Congress of the Italian Society of Plant Biology and 114th Congress of the Italian Botanical Society (VI International Plant Science Conference).** Padova, Italy (4- 6 Sept 2019)

### SCIENTIFIC PRODUCTION AND BIBLIOMETRIC INDICATORS (August 2025)

Nicoletta La Rocca published 92 research articles in International Peer Reviewed Journals.

8 Book Chapters, 18 papers in Congress Proceedings.

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Google Scholar Citations 4461, H-index 38

SCOPUS Citations 3025, H-index 31

### SELECTED ARTICLES from the last 8 years, relevant for the ASTRO-BIOTECH field

1. RM Zampieri, E Bizzotto, S Campanaro, F Caldara, **N La Rocca** (2025). *Kovackia euganea* sp. nov. (Leptolyngbyaceae, Cyanobacteria), a new chlorophyll *f* producing cyanobacterium from the Euganean Thermal District (Italy). *Frontiers in Microbiology*, 16, 1545008
2. M Minio, M Battistuzzi, A Norici, **N La Rocca**, C Pagliano, C Gerotto (2025). Effects of sulfate limitation on photosynthesis and cell composition of unicellular marine microalgae of different phylogenies. *Physiologia Plantarum* 177 (4), e70401
3. M Caichiolo, RM Zampieri, F Terrin, A Tesoriere, F Caldara, **N La Rocca**, L Dalla Valle (2025). Anti-inflammatory pathways modulated by microbial polysaccharides from Euganean thermal muds in Zebrafish. *Antioxidants* 14 (7), 878
4. G di Stefano, M Battistuzzi, N La Rocca, VM Selinger, DJ Nürnberg, D Billi (2024). Far-red light photoacclimation in a desert Chroococciopsis strain with a reduced FaRLiP gene cluster and expression of its chlorophyll *f* synthase in space-resistant isolates. *Frontiers in Microbiology* 15, 1450575
5. E Liistro, M Battistuzzi, L Cocola, R Claudi, L Poletto, **N La Rocca** (2024). *Synechococcus* sp. PCC7335 responses to far-red enriched spectra and anoxic/microoxic atmospheres: potential for astrobiotechnological applications. *Plant Physiology and Biochemistry*, 213, 108793
6. **N La Rocca**, I Moro, M Battistuzzi, N Rascio (2024). Cyanobacteria and microalgae responses to different light regimes and CO<sub>2</sub> availability. In: *Handbook of Photosynthesis*, Pessaraki Ed. CRC Press, Taylor and Francis. 296
7. I Moro, **N La Rocca**, M Battistuzzi, N Rascio (2024). Photosynthetic apparatus in cyanobacteria and microalgae. In: *Handbook of Photosynthesis*, Pessaraki Ed. CRC Press, Taylor and Francis. 258

8. Caichiolo M, Zampieri RM, AAdessi A, Ciani M, Caldara F, Dalla Valle L, **La Rocca N.** (2024). Microbial polysaccharides extracted from different mature muds of the Euganean Thermal District show similar anti-inflammatory activity *in vivo*. *International Journal of Molecular Sciences* 25(9), 4999.
9. M Battistuzzi, MS Morlino, L Cocola, L Trainotti, L Treu, S Campanaro, R Claudi, L Poletto, **N La Rocca** (2024). Transcriptomic and photosynthetic analyses of *Synechocystis* sp. PCC6803 and *Chlorogloeopsis fritschii* sp. PCC6912 exposed to an M-dwarf spectrum under an anoxic atmosphere. *Frontiers in Plant Science*, 14, 1322052.
10. M Battistuzzi, L Cocola, R Claudi, AC Pozzer, A Segalla, D Simionato, T Morosinotto, L Poletto, **N La Rocca** (2023). Oxygenic photosynthetic responses of cyanobacteria exposed under an M-dwarf starlight simulator: Implications for exoplanet's habitability. *Frontiers in Plant Science* 14, 1070359
11. M Battistuzzi, L Cocola, E Liistro, R Claudi, L Poletto, **N La Rocca** (2023). Growth and photosynthetic efficiency of microalgae and plants with different levels of complexity exposed to a simulated M-dwarf starlight. *Life* 13 (8), 1641
12. RM Zampieri, F Caldara, **N La Rocca** (2023). Assessment of optimal growth conditions for biomass and exopolysaccharides production in the thermotolerant cyanobacterium *Phormidium* sp. ETS-05. *Journal of Applied Phycology*, 1-13
13. RM Zampieri, A Adessi, F Caldara, R De Philippis, L Dalla Valle, **N La Rocca** (2022). In vivo anti-inflammatory and antioxidant effects of microbial polysaccharides extracted from Euganean therapeutic muds. *International Journal of Biological Macromolecules* 209, 1710-1719
14. I Moro, MA Fuiano, N Rascio, R De Philippis, **N La Rocca** (2021). Phylogenetic, morphological and biochemical studies on *Thermospirulina andreolii* gen. & sp. nov. (Cyanophyta) from the Euganean Thermal District (Italy). *Phycologia* 60 (5), 487-496
15. R Claudi, E Alei, M Battistuzzi, L Cocola, MS Erculiani, AC Pozzer, B Salasnich, D Simionato, V Squicciarini, L Poletto, **N La Rocca** (2021). Super-earths, M dwarfs, and photosynthetic organisms: habitability in the lab. *Life* 11 (1), 10
16. N Fattore, S Savio, AM Vera-Vives, M Battistuzzi, I Moro, **N La Rocca**, T Morosinotto (2021). Acclimation of photosynthetic apparatus in the mesophilic red alga *Dixonella giordanoi*. *Physiologia Plantarum* 173 (3), 805-817
17. S Onofri, N Balucani, V Barone, P Benedetti, D Billi, A Balbi, JR Brucato, B Cobucci-Ponzano, G Costanzo, **N La Rocca**, M Moracci, R Saladino, G Vladilo (2020). The Italian National project of Astrobiology Life in space – Origin, Presence, Persistence of life in Space, from molecules to extremophiles. *Astrobiology*. 20 (5): 580-582.
18. B Gris, L Treu, RM Zampieri, F Caldara, C Romualdi, S Campanaro, **N La Rocca** (2020). Microbiota of the therapeutic euganean thermal muds with a focus on the main cyanobacteria species. *Microorganisms* 8 (10), 1590
19. M Battistuzzi, L Cocola, B Salasnich, MS Erculiani, E Alei, T Morosinotto, R Claudi, L Poletto, **N La Rocca** (2020). A new remote sensing-based system for the monitoring and analysis of growth and gas exchange rates of photosynthetic microorganisms under simulated non-terrestrial conditions. *Frontiers in Plant Science*, 182
20. B Salasnich, R Claudi, E Alei, D Barbisan, A Baruffolo, L Cocola, Ms Erculiani, **N La Rocca**, E Pace, L Poletto, N Trivellin (2018). Control software for the Multi-Channel Led starlight simulator. *Proc. SPIE 10707, Software and Cyberinfrastructure for Astronomy V*, 107071I (6 July 2018)
21. V. Larosa, A. Meneghesso, **N. La Rocca**, J Steinbec, M Hippler, I Szabo, T Morosinotto (2018). Mitochondria affects photosynthetic electron transport and photo-sensitivity in a green alga. *Plant Physiology*. 176: 2305–2314

22. E Sforza, C Calvaruso, **N La Rocca**, A Bertucco (2018). Luxury uptake of phosphorus in *Nannochloropsis salina*: Effect of P concentration and light on P uptake in batch and continuous cultures. *Biochemical Engineering Journal* 134, 69-79
23. B Gris, E Sforza, T Morosinotto, A Bertucco, **N La Rocca** (2017). Influence of light and temperature on growth and high-value molecules productivity from *Cyanobacterium aponinum*. *Journal of Applied Phycology* 29, 1781-1790
24. K Sciuto, LA Lewis, E Verleyen, I Moro, **N La Rocca** (2015). *Chodatodesmus australis* sp. nov. (Scenedesmaceae, Chlorophyta) from Antarctica, with the emended description of the genus *Chodatodesmus*, and circumscription of *Flechtenia rotunda* gen. et sp. nov. *Journal of Phycology*, 51 (6), 1172-1188
25. **N. La Rocca**, K Sciuto, A. Meneghesso, I. Moro, N Rascio, T Morosinotto (2015). Photosynthesis in extreme environments: responses to different light regimes in the Antarctic alga *Koliella antarctica*. *Physiologia Plantarum* 153: 654-67.