

Candidate supervisor's information summary form

Name and surname, degree, title: Domenica Farci, PhD in Biochemistry, Dr	
Discipline/ disciplines of science	Biological Sciences
Professional development (degrees and titles) in chronological order	<p>2023, Assistant Professor. Dept. of Life and Environmental Sciences (DISVA), University of Cagliari, Cagliari (Italy). Professorship for the Structural Biology, Master's Degree in Cellular and Molecular Biology, Faculty of Biology and Pharmacy, and for the Plant Physiology, Master's Degree in Preservation and Management of Natural Resources and of the Environment, Faculty of Biology and Pharmacy, University of Cagliari, Italy.</p> <p>2022, Visiting scientist - Independent Postdoctoral research position. Umeå University, Department of Chemistry, (Sweden). Project: "<i>The Dark side of the light: how plants protect themselves against strong light</i>". Funded by the Carl Tryggers Foundation for Scientific Research.</p> <p>2018-2021, Postdoctoral research position. Warsaw University of Life Science (SGGW), Warsaw (Poland). <u>Project 1</u>: "<i>Structural and functional characterisation of StpA the main S-layer protein of Deinococcus radiodurans</i>". Funded by the SONATA-BIS 7 program (grant Nr PRO-2017/26/E/NZ1/00344). <u>Project 2</u>: "<i>Explanation of the complex architecture of the S-layer of D. radiodurans: structural analysis of the Type IV piliation system</i>". Funded by the HARMONIA 10 program (grant Nr 2018/30/M/NZ1/00284). <u>Project 3</u>: "<i>Structural insights into the assembly of the Nucleocapsid protein of SARS-CoV-2</i>". Funded by NAWA, Poland (grant Nr PPN/GIN/2020/1/00028/DEC/1).</p> <p>01/10/2017-31/08/2018, Visiting scientist - Independent Postdoctoral research position. Department of Life and Environmental Sciences, University of Cagliari, Cagliari (Italy). Funded by the L'Oréal-UNESCO fellowship for Women in Science (Italy, 2017). Project: "<i>Functional and structural characterisation of the main S-layer protein DR_2577 of Deinococcus radiodurans</i>".</p> <p>01/08/2017-01/02/2018, Visiting scientist - Postdoctoral research position. Max Planck Institute CAESAR, Laboratory of Electron Microscopy, Bonn (Germany).</p> <p>01/08/2014-31/07/2017, Ph.D. degree in Biochemistry. Universität zu Köln, Köln (Germany). PhD student research fellowship and research done by at Max Planck Institute CAESAR, Laboratory of Electron Microscopy, Bonn (Germany). Project: "<i>Cryo-Electron Tomography and Subtomogram averaging analysis on the spatial organization of a chemoreceptor guanylate cyclase in the flagellum of <i>Arbacia punctulata</i> sperm</i>".</p>
Most important publications/patens over the last 3 years (maximum 10)	<p>Fantuzzi A, Haniewicz P, Farci D, Loi MC, Park K, Büchel C, Bochtler M, Rutherford AW, Piano D. 2023. Bicarbonate activation of the monomeric Photosystem II-PsbS/Psb27 complex. <i>Plant Physiol.</i> doi: 10.1093/plphys/kiad275.</p> <p>Farci D, Graça AT, Iesu L, de Sanctis D, Piano D. 2023. The SDBC is active in quenching oxidative conditions and bridges the cell envelope layers in <i>Deinococcus radiodurans</i>. <i>J Biol Chem.</i> 299(1):102784. doi: 10.1016/j.jbc.2022.102784.</p> <p>Farci D, Haniewicz P, Piano D. 2022. The structured organization of <i>Deinococcus radiodurans</i>' cell envelope. <i>Proc Natl Acad Sci U S A.</i> doi: 10.1073/pnas.2209111119.</p> <p>Farci D, Haniewicz P, de Sanctis D, Iesu L, Kereiche S, Winterhalter M, Piano D. 2022. The cryo-EM structure of the S-layer deinoxanthin-binding complex of <i>Deinococcus radiodurans</i> informs properties of its environmental interactions. <i>J Biol Chem.</i> doi: 10.1016/j.jbc.2022.102031.</p> <p>Bag P, Schröder WP, Jansson S, Farci D. 2021. Solubilisation method for isolation of Photosynthetic mega- and super-complexes from conifer thylakoids. <i>Bio-protocol.</i> doi: 10.21769/BioProtoc.4144.</p> <p>Farci D, Kereiche S, Pangeri S, Haniewicz P, Bodrenko IV, Ceccarelli M, Winterhalter M, Piano D. 2021. Structural analysis of the architecture and in situ localization of the main S-layer complex in <i>Deinococcus radiodurans</i>. <i>Structure – Cell Press.</i> 12:S0969-2126(21)00249-5. doi: 10.1016/j.str.2021.06.014.</p> <p>Farci D, Haniewicz P, Cocco E, De Agostini A, Cortis P, Kusaka M, Loi MC, Piano D.</p>

	<p>2020. The impact of fruit etiolation on quality of seeds in tobacco. <i>Front Plant Sci.</i> doi: 10.3389/fpls.2020.563971</p> <p>Farci D, Aksoyoglu MA, Farci SF, Bafna JA, Bodrenko I, Ceccarelli M, Kirkpatrick J, Winterhalter M, Kereiche S, Piano D. 2020. Structural insights into the main S-layer unit of <i>Deinococcus radiodurans</i> reveal a massive protein complex with porin-like features. <i>J Biol Chem.</i> 295: 4224-4236. doi: 10.1074/jbc.RA119.012174.</p> <p>De Agostini A, Caltagirone C, Caredda A, Ciatelli A, Cogoni A, Farci D, Guarino F, Garau A, Labra M, Lussu M, Piano D, Sanna C, Tommasi N, Vacca A, Cortis P. 2020. Heavy metal tolerance of orchid populations growing on abandoned mine tailings: a case study in Sardinia island (Italy). <i>Ecotoxicol Environ Saf.</i> 189:110018. doi: 10.1016/j.ecoenv.2019.110018.</p> <p>Patent WO2021019275A1 (EP4003567; US20220259128; CN114401775). PCT International Application PCT/IB2019/056397, "Isolation of chromoplastid carotenoids from fruits" (02.2021).</p>
Experience in work with doctoral students in chronological order	<p>2023, Co-supervision of one Ph.D. student University of Cagliari, (Italy). the Ph.D. student will defend in October 2023.</p> <p>2022, Supervision of one Ph.D. student during training activities under the Erasmus+ program at Umeå University (Sweden).</p>
Project/grants achievements (from the last 10 years)	<p>2023, NCN grant SONATA 18 (No. DEC-2022/47/D/NZ1/00126) "<i>Functional and structural studies of cyanobacterial biomineralization and its global impact</i>". Warsaw University of Life Science (SGGW), Warsaw (Poland).</p> <p>2022, Postdoctoral Research Fellowship funded the Carl Tryggers Foundation for Scientific Research. "<i>The Dark side of the light: how plants protect themselves against strong light</i>". Department of Chemistry, Umeå University, Umeå (Sweden).</p> <p>2018-2021, Postdoctoral research position. Warsaw University of Life Science (SGGW), Warsaw (Poland). <u>Project 1:</u> "<i>Structural and functional characterisation of StpA the main S-layer protein of Deinococcus radiodurans</i>". Funded by the SONATA-BIS 7 program (grant Nr PRO-2017/26/E/NZ1/00344).</p> <p><u>Project 2:</u> "<i>Explanation of the complex architecture of the S-layer of D. radiodurans: structural analysis of the Type IV piliation system</i>". Funded by the HARMONIA 10 program (grant Nr 2018/30/M/NZ1/00284).</p> <p><u>Project 3:</u> "<i>Structural insights into the assembly of the Nucleocapsid protein of SARS-CoV-2</i>". Funded by Granty interwencyjne NAWA, Poland (grant Nr PPN/GIN/2020/1/00028/DEC/1).</p> <p>2017-2018, L'Oréal-UNESCO Fellowship for Women in Science (National recipient for Italy, 2017) - "<i>Functional and structural characterisation of the main S-layer protein DR_2577 of Deinococcus radiodurans</i>". Department of Life and Environmental Sciences, University of Cagliari, Cagliari (Italy).</p>
Topic – research problem – for which the candidate supervisor seeks a doctoral student	<p>Cyanobacterial-mediated biomineralization of CO₂ into calcium carbonate is a process contributing to the carbon biogeochemical cycle by connecting the atmospheric and non-atmospheric reservoirs of inorganic carbon. While photosynthetic carbon fixation is well understood, details of this alternative inorganic process of carbon fixation remain to be elucidated. The involvement of the outermost-proteinaceous layer (Surface layer) of the cyanobacterial cell envelope appears to be crucial. The project aims at identifying the mechanisms laying at the base of this peculiar microbial process and the evolutive reasons explaining the functional and metabolic advantages of this biological trait. The project proposal will allow identifying the molecular bases for the primary role of nucleation played by the cell envelope and in particular by its surface layer (S-layer), a specialized structure for which a clear function is frequently not assigned. The proposal will focus on four study cases which are representing two freshwater and two marine cyanobacteria and are all reported for their biomineralization properties. While biomineralization will be assayed <i>in vivo</i> on cells and <i>in situ</i> on isolated cell envelopes, the proteins involved in it will be isolated and biochemically, functionally, and structurally characterized.</p>
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