



Dra. Cecilia Susana Demergasso Semenzato

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- Profesora Titular y Directora del Centro de Biotecnología “Profesor Alberto Ruiz”, UCN.
- Bioquímica, PhD en Microbiología, Universidad de Buenos Aires, Argentina.
- Bachiller en Teología, Universidad Católica Argentina.

### **Líneas de investigación:**

Desarrollo de aproximaciones moleculares y de cultivo para el estudio de la biodiversidad y la bioprospección en el Desierto de Atacama y otros ambientes regionales extremos y desarrollo de productos y procesos biotecnológicos para biomedicina, minería, para la industria de la construcción y la industria cosmetológica de la mano de la riqueza de la microbiota del territorio. Astrobiología asociada a marcos geológicos regionales análogos a Marte. Estudio del rol de los microorganismos en la distribución regional de factores ambientales de riesgo.

Biochemyst, PhD in Microbiology, Universidad de Buenos Aires, Argentina. Bachelor in Theology, Universidad Católica Argentina.

Research line: Development of molecular and cultivation approaches for the study of biodiversity and bioprospecting in the Atacama Desert and other extreme regional environments, and development of biotechnological products and processes for biomedicine, mining, for the construction industry and dermo cosmetics of the hand of the richness of the microbiota of the territory. Astrobiology associated with regional geological frameworks analogous to Mars. Study of the role of microorganisms in the regional distribution of environmental risk factors.

### **Proyectos de investigación:**

1. Project number: NODOSLN0014, Nodo del Desierto de Atacama: laboratorio natural de la adaptabilidad, la resiliencia, y una ventana para mirar el espacio, el origen y el futuro (2022-2023). Directora.
2. Project number: FONDEF IT20I0073, “Desarrollar un prototipo de aplicación industrial de un proceso biotecnológico para la producción nacional de reactivo sulfidizante NaHS



mediante H<sub>2</sub>S biogénico, prototipo caracterizado y validado a escala piloto en entorno relevante” (2021- 2023). Co.Researcher.

3. FIC-R BIP-40013423-0, “Bionano-minerales para la producción de drogas anticancerígenas en la Región de Antofagasta” (2020-2022). Directora.
4. Hacia un observatorio de diversidad microbiana del Norte de Chile. BHP Minerals Americas (2019-2020). Directora.
5. Project number: CONICYT MEC80180111, “Modelos de metabolismos que permiten mantener poblaciones microbianas activas asociadas a facies salinas de ocurrencia única en el Desierto de Atacama y el Altiplano Chileno” (2018-2020). Directora.
6. Project number: FONDECYT Postdoc 3190821, “Microbial-mineral interactions from saline basins in Northern Chile: Implications for the precipitation of gypsum and other evaporites” (2019-2022). Investigador patrocinante.
7. Project number: FONDEF ID17I10236, “Development of a biotechnological product to repair cracks in concrete” (2017-2019). Co-researcher.
8. Project number: FONDEF ID16I10332, “Development of a biotechnological process for sulfate removal from intermediate industrial hydrometallurgy process solutions” (2017-2019). Directora.
9. Project number: FONDEF IT16M100045, “Technology for industrial data, based on knowledge management, for supporting the making decision process in industrial bioleaching processes” (2017-2019). Directora.
10. BHP Minerals Americas 32002137, “Mapa de diversidad microbiana del Norte de Chile” (2015-2018). Directora.
11. NASA Astrobiology Institute Grant No. NNX15BB01A, “Changing Planetary Environment and the Fingerprints of Life” (2016-2020). Co-researcher

### **Publicaciones:**

1. Acosta Grinok Mauricio, Susana Vázquez, Guiliani Nicolás, Sabrina Marín, Demergasso Cecilia. Looking for the mechanism of arsenate respiration in an arsenate-dependent growing culture of *Fusibacter* sp. strain 3D3, independent of ArrAB. bioRxiv 2022.06.08.495031; doi: <https://doi.org/10.1101/2022.06.08.495031>.
2. Oehlert AM; Suosaari EP; Kong T; Piggot AM; Maizel D; Lascu I; Demergasso C; Chong G; Reid (2022). Physical, chemical, and microbial feedbacks controlling brine geochemistry and lake morphology in polyextreme salar environments. *Science of the total environment* 836 (2022) 155378 .doi.org/10.1016/j.scitotenv.2022.155378.



3. Óscar Cabestrero, Cinthya Tebes-Cayo, Nancy W. Hinman 2 and Cecilia Demergasso (2022). Mineral Paragenesis Precipitating in Salt Flat Pools of Continental Environments Replicated in Microbial Mat Microcosms without Evaporation. Cabestrero, Ó.; Tebes-Cayo, C.; Hinman, N.W.; Demergasso, C. Mineral Paragenesis Precipitating in Salt Flat Pools of Continental Environments Replicated in Microbial Mat Microcosms without Evaporation. *Minerals* 2022, 12, 646. <https://doi.org/10.3390/min12050646>.
4. Hinman NW, Hofmann MH, Warren-Rhodes K, Phillips MS, Noffke N, Cabrol NA, Chong- Diaz G, Demergasso C, Tebes Cayo C, Cabestrero Arendá O, Bishop JL, Gulick VC, Summers D, Sobron P, McInenly M, Moersch J, Rodríguez C, Sarazzin P, Rhodes KL, Camila Javiera, Wettergreen D, Parro V, and the SETI NAI Team (2021). Surface Morphologies in a Mars- analog Ca-sulfate Salar, High Andes, Northern Chile. *Frontiers* (on review).
5. Sanchez-Garcia, L; Carrizo, D; Lezcano, MA; Moreno-Paz, M; Aeppli, C; García-Villadangos, M; Prieto-Ballesteros, O; Demergasso, C; Chong-Díaz, G; Parro, V (2021). Time-integrative multi-biomarker detection in Triassic-Jurassic rocks from the Atacama Desert: relevance for searching basic life beyond the Earth. *Astrobiology* 21, 11: 1-17. Doi.org/10.1089/ast.2020.2339.
6. R. P. Reid, A. M. Oehlert, E. P. Suosaari, C. Demergasso, G. Chong, L. V. Escudero, A. M. Piggot, I. Lascu & A. T. Palma (2021). Electrical conductivity as a driver of biological and geological spatial heterogeneity in the Puquios, Salar de Llamara, Atacama Desert, Chile. *Scientific Reports*, doi.org/10.1038/s41598-021-92105-2.
7. Sabrina Marín, Mayra Cortés , Mauricio Acosta , Karla Delgado , Camila Escuti , Diego Ayma and Cecilia Demergasso (2021). From Laboratory towards Industrial Operation: Biomarkers for Acidophilic Metabolic Activity in Bioleaching Systems. *Genes* 2021, 12, doi.org/10.3390/genes12040474.
8. Pueyo JJ; Demergasso C; Escudero L; Chong-Diaz G; Cortéz-Rivera P; Sanjurjo-Sánchez J; Carmona V; Giralt S (2021). On the origin of saline compounds in acidic salt flats (Central Andean Altiplano). *Chemical Geology Chem Geol*, 574, 120155. <https://doi.org/10.1016/j.chemgeo.2021.120155>.
9. Chong Diaz, Guillermo; Demergasso, Cecilia; Urrutia Meza, Javier and Vargas, Marina. Saline Domain of northern Chile and its industrial mineral deposits (2020). *BOLETIN DE LA SOCIEDAD GEOLOGICA MEXICANA*, 72 Número: 3 Número especial: SI Número de artículo: A020720.
10. Sabrina Marín , Oscar Cabestrero , Cecilia Demergasso , Sarah Olivares , Vicente Zetola, María Vera (2021). An indigenous bacterium with enhanced performance of microbially-induced Ca-carbonate biomineralization under extreme alkaline conditions for concrete and soil-improvement industries. *Acta Biomaterialia* 120:304-317.
11. Tilot VC, Cabrol, NA, Parro V, Fairen AG ; Ormond RFG, Moreno-Ostos, E. Lopez-Gonzalez N; Figueroa FA, Gallardo-Carreno I; Smith EW; Sobron P, Demergasso,



- C, Tambley C, Robidart J (2019). A Test in a High Altitude Lake of a Multi-Parametric Rapid Methodology for Assessing Life in Liquid Environments on Planetary Bodies: A Potential New Freshwater Polychaete Tubeworm Community. *FRONTIERS IN ENVIRONMENTAL SCIENCE* 7: 70. DOI: 10.3389/fenvs.2019.00070. ISI, Índice 3.63.
12. Cortes M, Marin S, Galleguillos P, Cautivo, D, Demergasso, C (2019). Validation of Genetic Markers Associated to Oxygen Availability in Low-Grade Copper Bioleaching Systems: An Industrial Application. *FRONTIERS IN MICROBIOLOGY* 10: 1841. DOI: 10.3389/fmicb.2019.01841. ISI, Índice 4.557.
10. Kimberley A. Warren-Rhodes, Kevin C. Lee, Stephen D. J. Archer, Nathalie Cabrol, Linda Ng-Boyle, David Wettergreen, Kris Zacny, Stephen B. Pointing, Guillermo Chong, Cecilia Demergasso, Greydon Foil, Christopher Gayle Tate, Trent Hare, Donnabella C. L (2019). Subsurface Microbial Habitats in an Extreme Desert Mars-Analog Environment. *FRONTIERS IN MICROBIOLOGY* 2019; 10: 69. doi: 10.3389/fmicb.2019.00069. ISI, Índice 4.557.
11. Parro, V., F. Puente-Sánchez, N. A. Cabrol, I. Gallardo-Carreño, M. Moreno-Paz, Y. Blanco, M. García-Villadangos, C. Tambley, V. Tilot, C. Thompson, E. Smith, P. Sobrón, C. Demergasso, A. Echeverría-Vega, M. Á. Fernández-Martínez, L. Whyte and A. G. Fairén (2019) Microbiology and nitrogen cycle in the benthic sediments of a glacial oligotrophic deep Andean lake as analogue of ancient martian lake-beds. *Frontiers in Microbiology*: 10.3389/fmicb.2019.00929. ISI, Índice 4.557 .
12. Demergasso C, Véliz R, Galleguillos P, Marín s, Acosta M, Zepeda V, Zeballos J, Henríquez F, Pizarro R, Bekios-Calfa J (2018). Decision support system for bioleaching processes. *Hydrometallurgy* 181: 113-122. DOI: 10.1016/j.hydromet.2018.08.009. ISI.
13. Galleguillos P, Grail BM, Hallberg KB, Johnson DB, Demergasso C (2018). Identification of trehalose as a compatible solute in different species of acidophilic bacteria. *Journal of Microbiology* 56(10):727-733. DOI: 10.1016/j.hydromet.2018.08.009. ISI.
14. Lorena Escudero, Nia Oetiker, Karem Gallardo, Cinthya Tebes-Cayo, Mariela Guajardo, Claudia Nuñez, Carol Davis-Belmar, J. J. Pueyo, Guillermo Chong-Díaz and Cecilia Demergasso (2018). A thiotrophic microbial community in an acidic brine lake in Northern Chile. *Antonie van Leeuwenhoek*. doi.org/10.1007/s10482-018-1087-8. ISI.
15. Parro, V; Blanco, Y; Puente-Sanchez, F; Rivas, LA; Moreno-Paz, M; Echeverria, A; Chong- Diaz, G; Demergasso, C; Cabrol, NA (2018). Biomarkers and Metabolic Patterns in the Sediments of Evolving Glacial Lakes as a Proxy for Planetary Lake Exploration. *Astrobiology*, 18 (5): 586-606. DOI: 10.1089/ast.2015.1342. ISI.



16. Alex Echeverría-Vega, Cecilia Susana Demergasso, Guillermo Chong, Antonio E. Serrano, Mariella Guajardo, Olga Encalada, Victor Parro, Yolanda Blanco, Luis Rivas, Mercedes Moreno-Paz, José Luque, Kevin C. Rose and Nathalie A. Cabrol. (2018). “Watershed-induced limnological and microbial status in two oligotrophic Andean lakes exposed to the same climatic scenario”. *Frontiers in Microbiology-Aquatic Microbiology* 9, 357, DOI: 10.3389/fmicb.2018.00357. ISI.
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18. Finstad, KM; Probst, AJ; Thomas, BC; Andersen, GL; Demergasso, C; Echeverria, A; Amundson, RG; Banfield, JF (2017). Microbial Community Structure and the Persistence of Cyanobacterial Populations in Salt Crusts of the Hyperarid Atacama Desert from Genome- Resolved Metagenomics. *Frontiers in Microbiology* 8: 1435. Doi: 10.3389/fmicb.2017.01435. ISI.