3RD LATAMHUB

Young Frontiers of Astrobiology

Seeds of Life

Saturday, 31 January 2026

Online via Zoom

Registration

https://bit.ly/3LatAmHUB

NoRCEL

THE NoRCEL INSTITUTE

3rd NoRCEL's Latin American Hub Colloquium, LatAmHub 2026

« *Young Frontiers of Astrobiology. Seeds of Life:*

Chemical Origins, Extreme Life, and Cosmic Habitability »

The 3rd Latin American Hub Colloquium (LatAmHUB), hosted by The NoRCEL Institute, brings together a new generation of Latin American researchers to explore life across scales — from molecules to worlds. From the chemical beginnings on early Earth to the self-organisation of living systems and the habitability of distant planets, this online event highlights innovative approaches to understanding the origin, maintenance, and potential distribution of life in the Universe.

Five distinguished emerging scientists will present their latest research spanning astrobiology, prebiotic chemistry, space biology, extreme life, and planetary habitability. Participants will encounter pioneering studies on enhancing seed resistance to cosmic radiation for long-term space missions, simulations of prebiotic amino acid synthesis linking Titan's chemistry to early Earth, analyses of circumstellar habitable zones and ultraviolet radiation, investigations into extremophilic organisms such as tardigrades and their remarkable tolerance to radiation and other harsh environments, as well as reflections on the development of astrobiology in Latin America.

Designed as a supportive and inclusive platform, LatAmHUB showcases young voices at the forefront of astrobiology, offering a unique opportunity to engage with cutting-edge science while celebrating the creativity, diversity, and innovation emerging from Latin America. The colloquium is conducted entirely in English, to encourage global cooperation and knowledge exchange while remaining firmly rooted in a Latin American perspective.

Join us for an inspiring, interactive, and visually engaging online experience that highlights the curiosity, expertise, and creativity of the next generation of astrobiologists. Discover how emerging research from our region advances knowledge of life across scales and worlds, and witness the growth of Latin America's vibrant scientific community on a global stage.

The NoRCEL Institute's executive team

Miryam Palacios-Pérez. Theoretical Biology Group (TBG), IIBo; National Autonomous University of Mexico, UNAM; Mexico.
Head of Latin American Hub and *President of The NoRCEL Institute*.

Oleg Kotsyurbenko. Yugra State University, Khanty-Mansiysk, Russia.
Vice President.

Alejandro Heredia-Barbero. Institute of Nuclear Sciences; National Autonomous University of Mexico, UNAM; Mexico.
CEO.

Sohan Jheeta. The NoRCEL Institute; Leeds, UK.
Founder, Chairman, and Editor-in-Chief.

Deepnil Ray. DAV Public School, Asansol.
Deputy CEO and *Social Media Manager*.

Kathy McGrath. UK. *Administrator*.

Phani Chandra Samala. Amrita Vishwa Vidyapeetham, Coimbatore, India.
Associate Editor.

Martin Dominik. School of Physics & Astronomy, Physics and Astronomy Department at the University of St Andrews, Scotland, UK.
Former President.

Elias Chatzitheodoridis. Mineralogy-Petrology at the National Technical University of Athens (NTUA), Greece.
Former CEO.

Margarita Safonova. Birla Institute of Fundamental Research, Bangalore, India.
Associate Contributor.

Please note that hours are provided in Central Mexican Time (CST in Mexico City), which is GMT/UTC –6 (please be sure to check the corresponding time in your location https://www.worldtimebuddy.com).

TIME	SPEAKER	LECTURE/ACTIVITY
08:30	NoRCEL	**ZOOM opening**
09:00-09:30	**Sohan Jheeta**	**Presentation of The NoRCEL Institute**
09:30-09:45	**Miryam Palacios-Pérez**	**Presentation of the Latin American Hub**
09:45-09:55	**Deepnil Ray**	**Indications about the 3E magazine and Social Media**
09:55-10:00	----------	**Time cushion/buffer**
10:00-10:30	**Sulem Celina Calderón García**	**Genetic engineering of seeds to enhance their radiation resistance for long-term space missions.**
10:30-10:45		**Q&A**
10:45-11:15	**Ismael Acosta Servetto**	**On Experiences of Astrobiology in Uruguay.**
11:15-11:30		**Q&A**
11:30-12:20	----------	**Refreshments**
12:20-12:30	**All participants**	**Photo booth (taken by Deepnil Ray & Kathy McGrath)**
12:30-13:00	**Karina R. Ortiz Leyra**	**Prebiotic Amino Acid Synthesis Simulated: Connecting Titan's Chemistry to Early Earth.**
13:00-13:15		**Q&A**
13:15-13:45	**Erick de Carvalho Sampaio**	**Circumstellar Habitable Zone and Ultraviolet Radiation: Concepts, Limits, and Astrobiological Relevance.**
13:45-14:00		**Q&A**
14:00-14:30	**Luis Alberto Allccahuaman-Huauya**	**Astrobiology of Tardigrades: Assessing Their Potential for Life in Extreme Conditions.**
14:30-14:45		**Q&A**
14:45-14:50	**All participants**	**Photo booth / Time cushion**
14:50-15:00	**Oleg Kotsyurbenko**	**Closing words from vice-President**
15:00-15:15	**Alejandro Heredia-Barbero**	**Closing words from CEO**
15:15-15:55	**All participants**	**Feedback**
15:55-16:00	**NoRCEL**	Close meeting
16:00	NoRCEL	ZOOM closing

Colloquium Lectures at « *Young Frontiers of Astrobiology. Seeds of Life* »

Sulem Celina Calderón-García

Plant Biotechnology, Centre for Research and Advanced Studies (CINVESTAV), National Polytechnic Institute (IPN). Mexico

«Genetic Engineering of Seeds to Enhance their Radiation Resistance for Long-Term Space Missions»

The challenges of resupplying astronauts' food supplies during long-term missions requires a deeper understanding of how the harsh outer space conditions could affect the survival of seeds and plants on board a spacecraft. In particular, ionizing radiation, being the most lethal factor, has been demonstrated to accelerate seed ageing, induce mutations and increase disease susceptibility. It has also been proposed to trigger premature germination and could produce flavourless mature plants.

Furthermore, transit time will greatly increase the exposure to this harmful factor, posing a highly significant risk for the in situ sustainable agriculture planned for Mars and other future deep-space destinations. To mitigate this negative prospect, we propose harnessing survival mechanisms from extremophiles by hypothesizing that the transgenic expression of the proteins responsible for this unusual resistance will enhance seed viability against constant and prolonged exposure to galactic cosmic rays and solar particle events. This strategy could later be transferred to edible crops, providing a genetic countermeasure for sustainable space agriculture and long-term food autonomy.

Sulem Celina Calderón-García has a bachelor's degree in marine biology from the Technological Institute of Boca del Río, Veracruz in Mexico. She completed her thesis as an associate student at the Institute of Astronomy of the National Autonomous University of México (UNAM); it was based on the study of sporopollenin, a molecule that forms part of the cell walls of plant spores, as a potential contaminant in Mars regolith research.

Currently, Sulem is a master student in Plant Biotechnology at the Centre for Research and Advanced Studies (CINVESTAV) of the National Polytechnic Institute (IPN). She leads a genetic engineering project focused on the analysis of diverse strategies for crop preservation in space, as part of the Plant Defense Physiology Group of Dr John Paul Délano Frier, in collaboration with the Joint Institute for Nuclear Research (Russia), Toyo University (Japan), the Takasaki Institute for Advanced Quantum Science at the National Institutes for Quantum Science and Technology (Japan), and the Institute of Nuclear Sciences (ICN) of the National Autonomous University of Mexico (UNAM). She served as the 2024 Student Representative of the Mexican Astrobiology Society (SOMA). She also participated as a student in the Mexican Astrobiology School in 2022; in 2024 she was part of the organising committee. Additionally, Sulem Celina is a member of the Institute of Astrobiology of Colombia.

Ismael Acosta Servetto

Programa para el Desarrollo de las Ciencias Básicas (PEDECIBA);
Biophysics and Systems Biology Section, Institute of Biology,
University of the Republic, Montevideo. Uruguay

« *EXPERIENCES OF ASTROBIOLOGY IN URUGUAY* »

Astrobiology, which investigates the origin, evolution and presence of life in the Universe, stands as an interdisciplinary field with enormous potential, arousing growing interest in classrooms. Astrobiology in Uruguay is an unexplored field but one with high potential for development. At this meeting, we invite you to share some experiences in both research and education in the field of Astronomy and Astrobiology in Uruguay.

Ismael Acosta Servetto is a Bachelor of Biological Sciences, Master student in Biophysics in the Basic Sciences Development Programme (PEDECIBA), advanced student in the bachelor's degree in Astronomy at the Faculty of Sciences of the University of the Republic, Montevideo, Uruguay.

Since 2021, lecturer and researcher in the Biophysics and Systems Biology Section of the Institute of Biology at the same faculty. Lecturer in Physics and Astronomy at the San Ignacio School in Montevideo. Since 2019, member of the Blue Marble Space Institute of Science (BMSIS) and since 2021, member of the Origin of Life and Early Career Network (OoLEN).

Some lines of Ismael's research include: (1) search for organic remains in Precambrian and extreme environments, (2) replication of autocatalytic molecules in in silico mathematical models, and (3) effects of space weather on life on Earth, with an emphasis on extinction events.

Karina R. Ortiz Leyra

Laboratorio de Evolución Química, Departamento de Química de Radiaciones y Radioquímica, Instituto de Ciencias Nucleares (ICN), UNAM. México

« *Prebiotic Amino Acid Synthesis Simulated: Connecting Titan's Chemistry to Early Earth* »

Explore Titan's potential as a prebiotic laboratory involves simulating the interaction of glycine oligomers (1- to 6-glycine) and acetonitrile with calcium carbonate. Using computational simulations and experimental techniques, which demonstrate stable peptide synthesis under conditions analogous to both Titan and early Earth. The results suggest convergent molecular evolution could be occurring on Titan, where similar physicochemical pathways might lead to complex organic compounds essential for life.

Karina Ortiz Leyra holds a bachelor's degree in Earth Sciences from the National Autonomous University of Mexico (UNAM), with a specialization in Space Sciences.

She currently conducts her research at the UNAM's Institute of Nuclear Sciences, focusing on characterizing the origins of life on primitive Earth through comparative studies with evolutionary analogues such as Titan, the largest natural satellite of Saturn.
Karina is an active member of the scientific community, holding affiliations as a Fellow Member of The NoRCEL Institute, an Affiliated Member of Sigma Xi, and a member of the Mexican Society for Astrobiology (SOMA). Her track record includes distinguished participation in national and international academic events, including the XIII Astrobiology Congress 2025 (Morelos, Mexico) and the 1st Colombian Symposium on Astrochemistry 2024 (Bogotá, Colombia). She was also selected to compete in the prestigious IFoRE Student Research Awards 2025 (USA), organized by the scientific society Sigma Xi. Her work has been disseminated through publications in specialized journals, with an article in the eSPECTRA journal (2025) and another currently under editorial review.
Committed to scientific outreach, she has worked as an editor and content creator for digital platforms such as "Aleph Ciencias" and "CurioCiencia," and has been an invited speaker at various science communication events and academic symposia in her field. She complements this work as a mentor in the "Programa Jóvenes hacia la Investigación," whose team received a nomination for best poster from UNAM's General Directorate for Science Outreach. Additionally, Karina Ortiz Leyra has teaching experience as a professor at the UNAM's National School of Earth Sciences.

Erick de Carvalho Sampaio
Biological Sciences, Federal Institute of Education, Science and Technology of Ceará (IFCE).
Brazil

« *Circumstellar Habitable Zone and Ultraviolet Radiation: concepts, limits, and astrobiological relevance*»

The study of planetary habitability requires the integration of astrophysical, chemical, and biological criteria to evaluate environments capable of sustaining liquid water and prebiotic chemistry. This talk presents a conceptual and computational overview of circumstellar habitable zone (CHZ) and ultraviolet (UV) radiation models applied to rocky exoplanets, particularly those orbiting M-dwarf stars. The aim is to introduce the fundamental coefficients, thermal balance equations, and astrobiological limits affected by stellar UV flux, highlighting its dual role as both a destructive and potentially catalytic agent for biomolecule formation, such as nucleic acids and proteins, in early Earth-like scenarios. UV radiation is discussed in the context of prebiotic chemistry, DNA/RNA stability, and possible implications also for the emergence of FUCA and LUCA analogous conditions. The presentation includes a brief methodological description based on the computational simulation used in the speaker's undergraduate research, where equilibrium temperature and habitable limits were modelled. Understanding the interaction between CHZ boundaries, stellar type, and UV radiation exposure is crucial for refining target selection in future astrobiology missions and for interpreting biosignature-compatible planetary environments.

Erick de Carvalho Sampaio is an undergraduate student in Biological Sciences at the Federal Institute of Education, Science and Technology of Ceará (IFCE), currently in the 8th semester. His academic interests include planetary habitability modelling, radiative equilibrium temperature simulations, and astrobiological environments such as alkaline hydrothermal vents. He has been developing and improving a Python-based algorithm to simulate habitable zones and radiative equilibrium temperatures, initially focused on M-dwarf stars, with the goal to extend the model to other stellar types. Erick has taught short courses on astrobiology and the origins of life, presented scientific posters, and is a member of SBAstrobio and InSpace Group, and a graduate-school applicant at the University of São Paulo (USP).

Luis Alberto Allccahuaman-Huauya

Biomet. Química Bioinorgánica en Medicina y Medio Ambiente a través de Nuevos Materiales y Tecnología. Universidad Nacional de Ingeniería. Perú

« *Astrobiology of Tardigrades: Evaluation of Their Potential for Life under Extreme Conditions* »

Tardigrades are extremophilic micro-invertebrates that exhibit extraordinary tolerance to extreme environmental conditions, including ionizing radiation, desiccation, vacuum exposure, and extreme temperatures, making them organisms of significant interest in astrobiology. Their ability to enter cryptobiosis, a reversible state of metabolic suspension, enables them to survive under highly hostile conditions that are typically lethal to most forms of life. Evidence from space missions and laboratory-based experiments demonstrates that tardigrades display higher survival rates in the anhydrobiotic state, emphasizing the role of bioprotective mechanisms such as heat shock proteins, antioxidant enzymes, and the damage suppressor protein (Dsup), which collectively contribute to DNA protection and cellular stability under extreme stress. However, resistance varies among species, and the precise molecular pathways responsible for this tolerance remain incompletely characterized. In conclusion, tardigrades constitute valuable biological models for exploring the limits of life and assessing its potential persistence in extraterrestrial environments. Further integrated and multidisciplinary research is required to fully elucidate the molecular and biochemical mechanisms underlying their extreme resistance and to exploit their potential applications in biotechnology, medicine, and space exploration.

Luis Alberto Allccahuaman Huauya is a biologist, holding a bachelor's degree from Universidad Peruana Cayetano Heredia, and currently a master's student in Chemistry at the National University of Engineering (UNI).

He specializes in the study of tardigrades, covering processes from field sampling and taxonomic identification to the evaluation of their resistance to extreme conditions within the framework of astrobiology research.

He is an Associate Researcher at the Peruvian Association of Astrobiology, where he has led experimental projects and contributed to the publication of the first Peruvian study on tardigrade survival following exposure to the stratosphere. He has authored scientific publications in national and international journals, has experience as a scientific peer reviewer, has taught biology at the secondary education level, and is actively engaged in science communication and outreach in genetics, molecular biology, and astrobiology.

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