



## UNDER THE SPOTLIGHT

### Greetings from the Director

[Giuliana Panieri](#)



Dear  
colleagues,

It has been two months since I began my role as Director of the ISP: an intense and energizing period of analysis and dialogue, during which I had the

pleasure of meeting many of you, listening to your ideas, reading your proposals, and gathering valuable suggestions to define a shared strategy for the future of the Institute.

I am truly pleased that we have initiated a continuous dialogue to keep everyone informed about the Institute's dynamics, opportunities, and decisions; to enhance our internal expertise; and to strengthen collaborations both nationally and internationally. My—our—goal is to consolidate

ISP as a centre of excellence in research across the three poles, focusing on scientific excellence, collaboration, and a positive, optimistic working environment.

Over the past months, we have reorganized the administration, promoted new synergies among research groups within the CNR, launched new projects, and worked to improve the condition of our facilities and the organization of our infrastructures, such as the mountain observatories and the Dirigibile Italia base. Your enthusiasm and professionalism are the beating heart of the Institute, and I am sincerely honoured to be part of it. I know—and I am confident—that together we will achieve great milestones!

In the coming months, we will continue to strengthen our administrative capacity and our scientific and societal impact, by improving both internal and external communication and creating new opportunities for growth for everyone.

Thank you for your commitment, for the passion you bring to your work every day, and for the support you are given me.

Giuliana

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officially concluded in December 2024, marking four years of dedicated efforts to strengthen European polar research. By creating an inclusive and sustainable platform, the project has enhanced collaboration, supported data-driven decision-making, and shaped the future of polar science.

Led by Carlo Barbante, professor at Ca' Foscari University of Venice and senior associate member of CNR-ISP, the Institute of Polar Sciences played a key role in the Research Prioritization Process—a structured approach to defining the most critical research topics for the coming decade. This process helps determine which themes and initiatives should be prioritized in future funding actions, shaping both European and global polar research agendas.



**REPORT**

**The EU-PolarNet2 project: Advancing European Polar Research**

[Chiara Venier](#) and the [International Relations Working Group](#)



The EU-funded H2020 EU-PolarNet2 project

Together with the [International Relations Working Group](#) of the Institute of Polar Sciences, we developed and implemented a transparent, inclusive methodology for prioritizing polar research topics. This approach built on previous efforts, such as the development of the White Papers and the Integrated European Polar



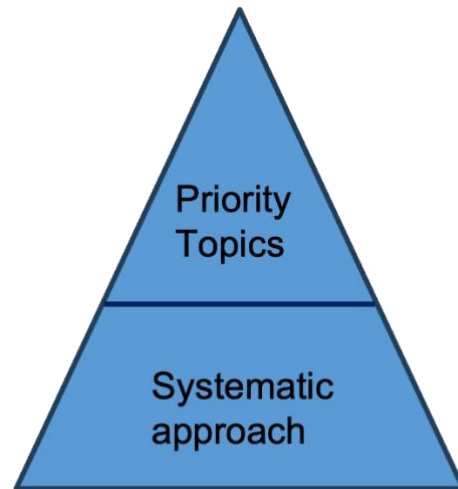
Research Programme (EPRP), ensuring a collaborative and well-informed process.

The project's findings are detailed in the report "[Identification report of critical future research needs in the Polar Regions](#)". A major milestone of this work was the Polar Expert Group (PEG) retreat, which identified 20 key research topics, grouped into four thematic areas. These priorities align with the European Polar Research Programme (EPRP) and are relevant to both Arctic and Antarctic research. The results are compiled in the [European Polar Research Priorities](#) document, serving as a reference for future scientific and policy decisions.

Following a bottom-up approach, these research priorities have already been integrated into national, European, and international discussions, influencing the agenda for the next International Polar Year (IPY). Additionally, the Research Prioritization Process contributed to the ICARP IV process, with the ISP team organizing and chairing a dedicated session at the Arctic Science Summit Week (ASSW24) in March 2024.

Although the EU-PolarNet2 project has come to an end, its impact will continue. One of its key

## FUNDING ACTIONS



## BOTTOM-UP INPUTS

legacies is the establishment of the European Polar Coordination Office ([EPCO](#)), which will ensure long-term collaboration and maintain Europe's leadership in polar research and international scientific cooperation.

The work of EU-PolarNet2 lives on, driving innovation, fostering collaboration, and shaping the future of polar science!



# NEWS FROM DIRIGIBILE ITALIA

## Mauro Mazzola

With the arrival of the Arctic spring, the 2025 scientific season is now fully underway at the Dirigibile Italia Station (although some activities had already begun in mid-January). Once again, this year, the Italian base will be at the heart of numerous multidisciplinary research projects, involving both Italian and international teams. The work will focus on key topics for understanding ongoing changes in the Arctic, and on a global scale, including studies of the atmosphere, cryosphere and permafrost dynamics, biogeochemical and hydrological processes, and the monitoring of pollutants and extreme ecosystems.



Starting in May, we'll be welcoming a new station leader: Leandro Nahuel Rotondo, coming from Argentina—more precisely, from Patagonia. Leandro is a biochemist and biologist

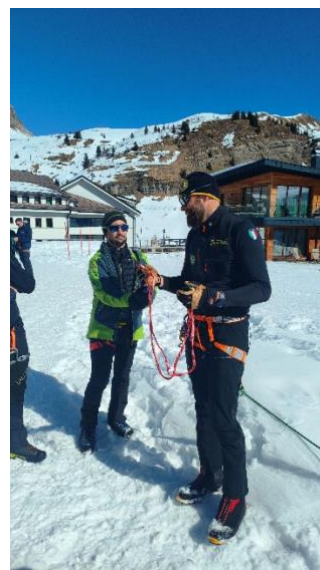
with extensive polar experience, having served as the scientific coordinator during a winter campaign at an Argentinian base in Antarctica. He will take over from Tessa, who we sincerely thank for her two years of service at the station. We wish her all the best in her future endeavors!

After two summer seasons during which we were supported locally by personnel from the Alpine School of the Guardia di Finanza, this year, for the first time, that support will extend to snow monitoring campaigns on glaciers around Ny-Ålesund during the spring period. In preparation for

these activities, a special training session for Arctic mission personnel was held from March 5th to 7th amid the snow and ice of the Alps. Organized by the



Institute of Polar Sciences of the National Research Council of Italy (CNR), in collaboration with the Health and Safety Unit and the Alpine School of the Guardia di Finanza, this first edition brought together 30 participants—researchers, technicians, PhD students, and collaborators from various Italian and



international institutions. The training took place at the Colbricon/Cimon Barracks at Passo Rolle (Trentino), an ideal setting to simulate Arctic conditions. A special thanks to the trainers and staff of the Alpine School for their professionalism and hospitality—their contribution was essential to the success

of this initiative. We hope this experience will become a regular appointment to prepare us for the challenges of the Arctic!



## RESEARCH HIGHLIGHTS

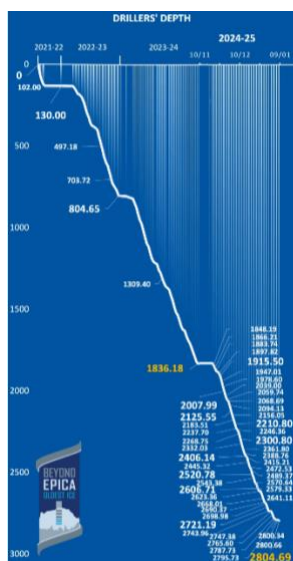
### 1 – Beyond EPICA Oldest Ice project: An Historic Record in Climate Science

[Chiara Venier](#) and the [Beyond EPICA Management Support Team](#)

We are enthusiastic to share the incredible progress of the Beyond EPICA Oldest Ice project, a unique endeavor, coordinated by our Institute of Polar Sciences, under the leadership of Carlo Barbante, professor at Ca' Foscari University of Venice and senior associate member of the CNR-ISP.

The project is funded by the European Commission under the Research and Innovation Action Programme with a budget of around €11 million for seven years of activity and around 20 million euros coming from national contributions. Together with the [Management and Support Team](#), we work daily and tirelessly to ensure smooth coordination and management of this ambitious project. Now, after years of dedication, we celebrate an historic milestone.

After six years of work and four drilling seasons, the international Beyond EPICA team—scientists and logistical experts from twelve institutions across ten European countries—[has successfully reached the Antarctic bedrock](#) at the Little Dome C site at 35 km from the Italian French Concordia Station and at an altitude of 3,200 meters above sea level with an average summer temperature of  $-35^{\circ}\text{C}$ .



For the first time, researchers have recovered a continuous ice core record extending beyond 1.2 million years, surpassing the previous 800,000-year limit set by the EPICA project (European Project for Ice Coring in Antarctica) two decades ago. This precious ice offers a unique window into past climate conditions,

including temperature and greenhouse gas concentrations over Earth's past glacial cycles.



The ice core extracted from the Little Dome C site in Antarctica, visible from the head of the drill. Credits: ©PNRA/IPEV

[Currently aboard the Laura Bassi research vessel](#), these ice cores will soon arrive in Trieste (April 22nd), before being transported to the Alfred Wegener Institute (AWI) in Bremerhaven, Germany for processing. From there, samples will be distributed to laboratories across Europe, with scientific analysis set to begin this autumn.

By studying this ice, scientists will gain critical insights into the Mid-Pleistocene Transition (MPT) - a pivotal period when the Earth's glacial cycles shifted from 41,000-year to the current 100,000-



Credits: ©PNRA/IPEV

year intervals. This success marks a fundamental step forward in climate science, providing new insights into past temperatures, greenhouse gas concentrations, and the evolution of Earth's climate system.

The project will conclude in May 2026, with a new field season scheduled between November 2025 and January 2026. During this phase, the team will focus on drilling the bedrock and conducting replicates, marking another significant step forward in climate research.

[Stay tuned for upcoming updates!](#)

## 2 - Microbial diversity, antibiotic resistance and pathogenicity: State of the Art in the Arctic environment of Svalbard

[Carmen Rizzo](#), [Gabiella Caruso](#), [Angelina Lo Giudice](#)

Microbial communities play a key role in the ecological dynamics of Arctic ecosystems and are very sensitive to climate change and pollution events. Moreover, the development of pathogenic bacteria and antibiotic resistance could threaten both ecosystems and human health, especially in sensitive areas such as the high Arctic. However, microbial variables are still not constantly monitored.

This is one of the themes of the [SESS Report 2024](#), the document presented during Polar Night Week 2024, an annual meeting organized by the Svalbard Integrated Arctic Earth Observing System ([SIOS](#)) at Svalbard University ([UNIS](#)) in Longyearbyen.



Chapter presentation at the Polar Night Week. Credits: Carmen Rizzo

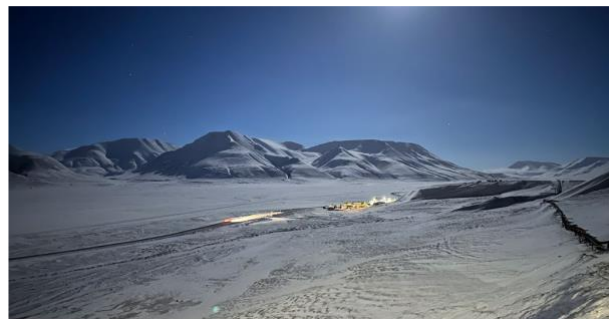
Among the contributions therein is the Chapter Microbial Communities as Sentinels of

Environmental Changes on Svalbard (MicroSIOS), which provides a detailed report of studies on microbial diversity, antibiotic resistance, and dispersal of pathogenic bacteria in Svalbard. The Chapter was produced through the collaboration of an international team of researchers from Italy, Norway, Poland, and UK. Besides being a comprehensive overview of the available data, the contribution provides important recommendations for the future and identifies a range of potential prokaryotic indicators proposed to assess the Good Environmental Status in future monitoring plans.



Longyearbyen colorful houses. Credits: Carmen Rizzo

The SESS Report 2024 is a valuable contribution to tracking the state of research in Earth System Science, highlighting scientific gaps and providing important suggestions for improving our understanding of and protecting the environment in Svalbard.



Snowy panorama of Longyearbyen. Credits: Carmen Rizzo

#SIOS #SESSreport #PolarNightWeek #Svalbard #EarthSystemScience #ESS

### 3 – Lake Enigma: More Than Just Ice

[Violetta La Cono](#), [Francesco Smedile](#), [Mikhail Iakimov](#)

A recently published article in the journal *Communications Earth & Environment* (Nature Portfolio), titled "The perennially ice-covered Lake Enigma, Antarctica supports unique microbial communities", explores the study of Lake Enigma, one of the deepest lakes in Victoria Land, Antarctica. The article thoroughly analyzes the physical structure, geochemistry, hydrological history, and microbial community of this fascinating lake.



The ice-covered surface of Lake Enigma with the Northern Foothills in the background (source: PNRA, grant n. PNRA16\_00121 'Enigma') – Credits: ©PNRA

As of April 2, 2025, the article has received significant media attention, with an Altmetric score of 451, reflecting good levels of visibility and online discussions across platforms such as social media, blogs, and news articles. The article has received over 12,000 views and is among the top 1,000 most-read articles (ranked 842nd to be exact) out of 327,133 similarly aged articles published in scientific journals.

The study was funded by the National Program for Antarctic Research (PNRA) under the coordination of the National Institute of Geophysics and Volcanology (INGV) and was carried out by the Institute of Polar Sciences (CNR-ISP) in collaboration with INGV, the Institute for Water Research (CNR-IRSA), Southern Illinois University (USA), and Queen's University Belfast (Ireland).

Until recently considered completely ice-covered, Lake Enigma has revealed a surprising secret:

beneath 11 meters of perennial ice lies a large body of liquid water, at least 12 meters deep, with distinct stratification and low nutrient levels. Drilling operations conducted by the EMBA (Extreme Microbiology, Biotechnology & Astrobiology) group of the ISP of Messina during the XXXV Italian Antarctic Expedition (November 2019 - January 2020), following a strict protocol for sampling in Antarctic subglacial environments, allowed the analysis of surface ice, various layers of the water column, and well-developed "microbial mats" on the lake floor.

Geochemical analyses revealed that the lake basin is isolated from the atmosphere, presenting clear thermal and chemical stratification. From a microbiological perspective, Lake Enigma hosts a highly diverse and abundant microbial ecosystem, unique among Antarctic subglacial lakes. In particular, the microbial community of the lake is characterized by the presence of ultrasmall bacteria belonging to the superphylum Patescibacteria (also known as Candidate Phyla Radiation, CPR), simple organisms with reduced genomes, never before found in permanently ice-covered lakes. This discovery highlights the complexity and diversity of food webs in Antarctic lakes, with symbiotic and predatory life forms.

Lake Enigma, fed by the meltwater from the nearby Amorphous Glacier, may host a microbial community composed of a combination of organisms native to the lake itself and newcomers from the glacier.



Drilling activity at point DP#C22 of Lake Enigma. Image by drone (source: PNRA, grant n. PNRA16\_00121 'Enigma') - Credits: ©PNRA

For those wishing to explore the topic further, the full article is available at the following [link](#).



## BEYOND THE POLES

### Monitoring and Protection of Marine Biodiversity: ISP's Contribution to the PNRR Project - National Biodiversity Future Center (NBFC)

*NBFC ISP team\**

The NBFC project, coordinated by the CNR, aims to develop effective strategies for monitoring and conserving biodiversity in Italy.

ISP participates in Spoke 1 to harmonize and integrate marine biodiversity databases and assess Mediterranean habitats' vulnerability to global and local stressors, such as climate change and contamination. Particular attention has been given to the relationship between biodiversity indices and the occurrence of bioactive emerging contaminants (CECs), such as endocrine disruptors, pharmaceuticals and personal care products, microplastics (<100 µm), and plastic additives.



Sampling of Poriferans (Ganzirri lake, Messina)

The experimental activities (performed in 2023 and 2024) focused on the determination of CECs in abiotic matrices (water and sediment) and marine organisms (bioaccumulation) of ecological

and/or commercial relevance in the Mediterranean basin. The target organisms included both endemic species, such as *P. oceanica*, and alien species, such as the blue crab – *C. sapidus*. In addition, the study of microbial biodiversity associated with sponges (i.e., *H. perlevis*, *H. simulans*, and *H. bowerbanki*) and fish (i.e., *M. cephalus*, *A. fasciata*, and *A. boyeri*) was conducted, using a polyphasic approach, highlighting the role of microorganisms in collective well-being and global sustainability.



Specimen of sponge (Faro lake, Messina)

ISP is also involved in the Spoke 2 aimed at the restoration of degraded deep-sea ecosystems. In 2024, during the [ECOREST](#) campaign aboard the Gaia Blu research vessel, 24 artificial structures made of eco-friendly material were placed at depths ranging from 300 to 1000 m along the Dohrn canyon in the Gulf of Naples. These structures, called ecoreefs, will provide a substrate for the growth of benthic organisms, such as deep-sea corals, which serve as true biodiversity "hotspots," offering refuge and habitat for other marine species.

*\*NBFC ISP team: [L. Patrolecco](#), [M. Azzaro](#), [E. Casoli](#), [F. Corami](#), [F. Crisafi](#), [M. Iakimov](#), [V. La Cono](#), [A. Lo Giudice](#), [L. Marturano](#), [M. Papale](#), [T. Pescatore](#), [A.C. Rappazzo](#), [J. Rauseo](#), [B. Rosso](#), [F. Smedile](#), [F. Spataro](#), [E. Valentini](#), [C. Venier](#), [M. Zucchetto](#), [P. Montagna](#)*



## NEWS FROM ANTARCTICA



### Potential Role of Sea Ice change in controlling Mercury in coastal Antarctic Areas (PRIMAR)

[Warren Cairns](#) and [Carmen Rizzo](#)

The PRIMAR project investigating the potential role of sea ice change in controlling mercury in coastal Antarctic Areas started in mid-November 2024. After their flights from Venice and Rome to Dubai, the team, Warren Cairns (CNR-ISP) and Carmen Rizzo (SZN and an associated member of ISP) finally met up at Dubai airport for the flight to New Zealand together with the mascot Leo of the elementary school Pascoli of Campalto Venezia.



The PRIMAR team. Credits: Warren Cairns©PNRA

After two days to recover in the spring sunshine of Christchurch, the Aeronautica Militare transported Warren and Carmen to MZS.

During 40 days at the base with the assistance of the personnel present, all the sampling objectives for the campaign were met. Aerosol samples were collected every 10 days for determination of trace elements (including mercury) and a characterisation of the microbiological content.



View from the aircraft window. Credits: Carmen Rizzo©PNRA



Aerosol PM10 sampler. Credits: Warren Cairns©PNRA



The timing of the sampling covered the period of total cover by pack ice to when the pack broke and retreated, which was perfect for our needs, as pack ice acts as a barrier to the exchange of mercury between the ocean and the atmosphere. To collect samples of live bacteria in the ambient air, a bioaerosol sampler from our partner at the University of Perugia was used. It pumps air through a cyclonic sampler filled with a phosphate buffer solution to keep the bacteria viable.



14<sup>th</sup> November 2024 first day of sampling, view from the Campo Icaro sampling site. Credits: Warren Cairns©PNRA



15<sup>th</sup> December last sampling day. Credits: Warren Cairns©PNRA

However, with the cold in Antarctica the sampling train froze rapidly, so with the base electrician we added a heating line and immersed the sampler in hot water to prevent freezing.



Bioaerosol sampler

Frozen sampling tube

Credits: Warren Cairns and Carmen Rizzo©PNRA



Heated sampler and the base pier. Credit: Warren Cairns©PNRA

This improved matters and allowed us to take samples for the whole campaign, but it is a problem that needs to be resolved before the next expedition.

In tandem with these sampling activities, samples of sea ice, glacier ice and snow were taken to investigate their contribution to the mercury biogeochemical cycle and investigate the microbiome in these matrices.



Sampling at the Maria weather station site. Credits: ©PNRA



Other opportunistic samples were taken by our colleagues from Monte Melbourne when they went into the field, so from this preliminary sampling campaign 4 cases of samples were taken that will then be analysed when they arrive in Italy this spring.



Surface sea ice sampling. Credits Warren Cairns©PNRA



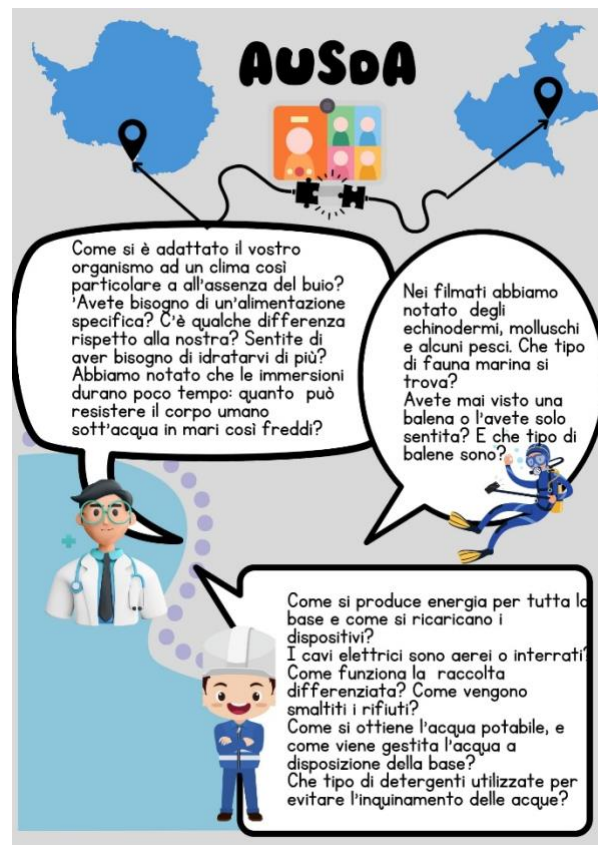
Strandline Glacier snow pit. Credits ©PNRA



Taking density measurements before snow sampling. Credits ©PNRA

During the expedition, we also participated in the Adopt a School from Antarctica outreach programme. With a school from Campalto Venice and Mestre having CNR ISP as their tutor. The

students sent many interesting questions before the video calls.



Questions received for the 5B class of the Pascoli Elementary School.

Our outreach efforts also included a video conference with *La Fenice* theatre in Venice. Where we spoke with the teachers training the children for the *Acqua Profonda* Opera on plastic pollutions in the oceans.



Warren Cairns at "La Fenice". Credits Angela Quattrococchi.

We also took part in the *Un quarto d'ora per acclimatarsi* pod cast of the *L'Altra Montagna* website.

**POSTCARDS FROM THE ..... "FIELD"**

*See you in Rome!!!*

This May, the 3rd Annual Meeting of the Institute of Polar Sciences (ISP) will take place. We will all gather in Rome for a two-day event where the main theme is **SYNERGY!!!**

ISP staff will participate in roundtable discussions on science, cooperation, and strategies for the future, strengthening collaborations to launch new initiatives. The meeting will also serve as a platform for dialogue between ISP personnel and the world of media communication because **science belongs to everyone!**



In 46 days of exhibition, the CNR's scientific-interactive show "Arctic. An Interactive Journey to the North Pole" welcomed an impressive 21,716 visitors, many of whom were students from schools in the Bologna area. A success also for ISP, which contributed to the creation, organization, and animation of the exhibition. Thank you all!







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## UPCOMING EVENTS

- [EGU General Assembly 2025](#), April 27<sup>th</sup>-May 2nd, 2025, Vienna, Austria. The EGU General Assembly 2025 brings together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary, and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and discuss their ideas with experts in all fields of geoscience. The EGU25 [programme](#) has been launched! Not yet registered? [Register now!](#)
- [Rovaniemi Arctic Spirit Conference](#), 5–7 May 2025, Rovaniemi, Finland. Living in the Arctic calls for security on many levels: human security, ecological and climate security, as well as hard security. Rovaniemi Arctic Spirit Conference 2025 combines the elements of Arctic security in its keynotes, panels and scientific sessions. The [registration is now open](#) and the [preliminary program](#) is published.
- The [6th Annual Assembly meeting of UArctic](#) will be held in Inari, Finland, on June 6-9, 2025. UArctic Assembly is the annual meeting of UArctic members, which also serves as a platform of cooperation, networking and consultation between all UArctic members. See the UArctic Assembly meeting program [here](#). Registration [here](#) (Last registration date: 23 May 2025)
- [VIII Conference of the Italian Society of Astrobiology](#), 11-13 June 2025, Messina, Italy. The conference will address key topics in contemporary Astrobiology, including Prebiotic Chemistry and the Origin of Life, Experimental Astrochemistry, the Search for Life in Extreme Environments, Experimental Astrophysics related to the study of Exoplanets, and current and future Space Missions aimed at detecting biosignatures in space. Here [program](#) and [registration](#).
- [Global Tipping Points](#), 30 June – 3 July 2025, University of Exeter, Streatham Campus, Exeter, Devon (UK). The conference is a ‘call to action’ to the research community, policymakers, and business to raise awareness and understanding of the importance of tipping points and to accelerate the required action. Registration [here](#) (closing date for registration: Tuesday 17 June)
- The [Second Inter-Polar Conference Connecting the Arctic with the Third Pole HKH - Cryosphere, People, and Climate Change](#), September 3-5, 2025, in Kathmandu, Nepal. The conference will contribute to the objectives of the International Year of Glaciers’ Preservation (IYGP) 2025, which aims at taking immediate action towards preserving the cryosphere for building a resilient future for all. Deadline for Abstract submissions: April 30, 2025. Registration deadline following confirmation of participation: June 30, 2025.

### STAY IN TOUCH:



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