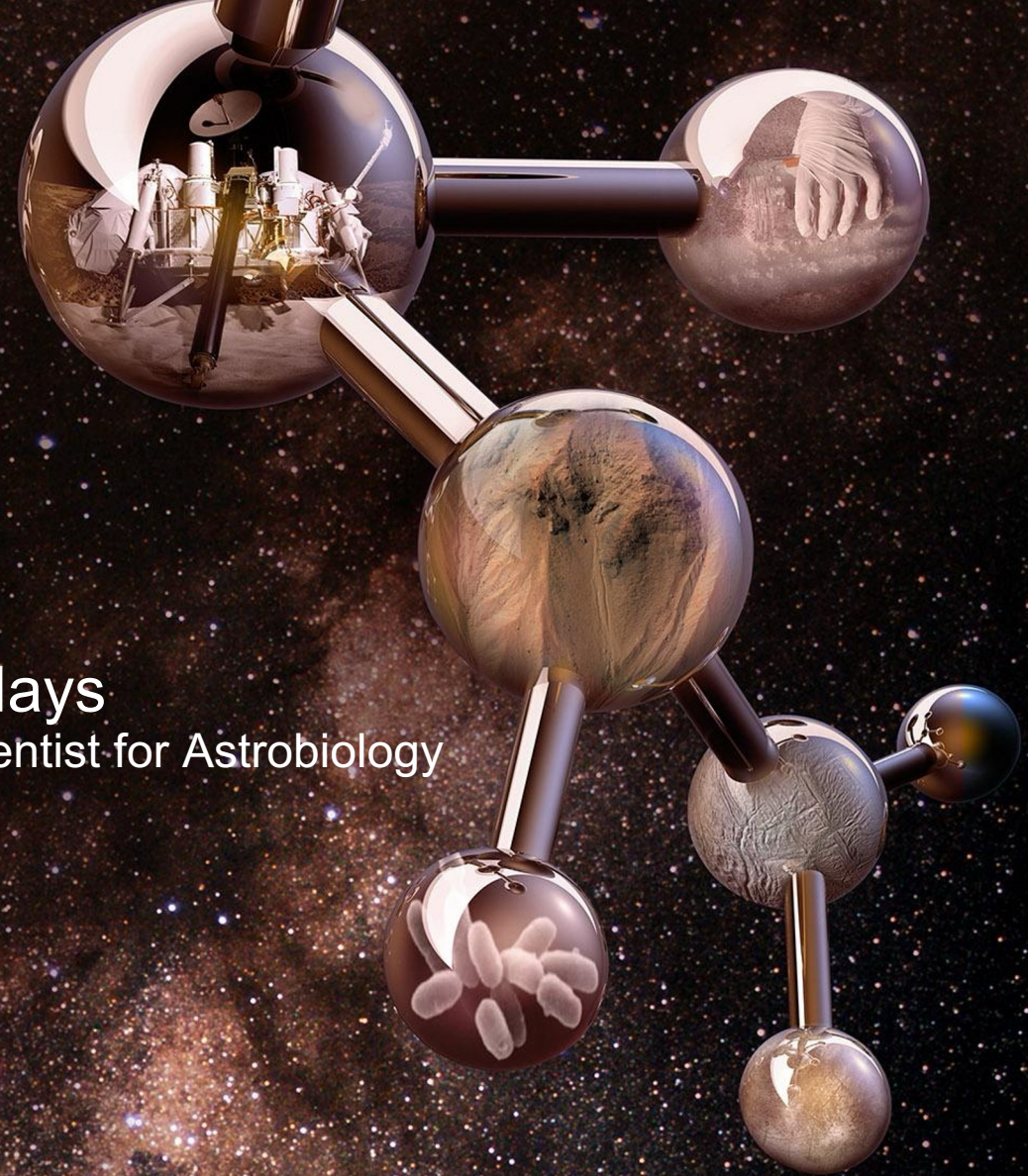


NASA Astrobiology Program Update

David Grinspoon
Senior Scientist for Astrobiology Strategy

Lindsay Hays
Program Scientist for Astrobiology

PAC Meeting
November 13, 2023





Reminder AB program leadership

Senior Scientist for Astrobiology Strategy
David Grinspoon



Program Scientist for Astrobiology
Lindsay Hays



Deputy Program Scientist for Astrobiology
Becky McCauley Rench





Year 1 Goal: Increased cross-divisional & cross-directorate activity in Astrobiology at NASA.

We are in the process of planning several interdisciplinary community activities designed to explore and catalyze new interdivisional collaborations and the potential for possible new interdivisional programs.

Earth Science:

EPSCoR on Ocean Worlds

Ocean Drilling Workshop (joint with NSF). April 2-4, Washington DC

Grinspoon will attend joint NSF/NASA ocean drilling workshop in early April and meet with NSF Program officers to explore increasing interagency cooperation in this and other areas.

Astrophysics:

Possible Ideas Lab: Exoplanet biosignatures (late 2024)

Supporting HWO working group on exoplanet biosignatures.

Joint communication efforts with Astrophysics on potential biosignature discoveries.

Biological and Physical Sciences:

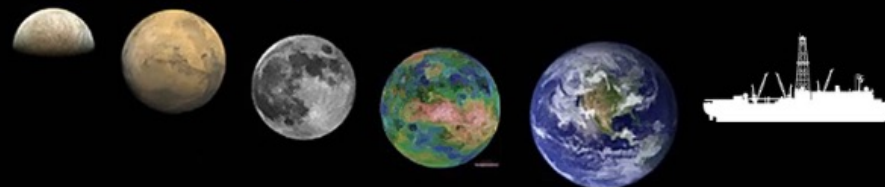
Exploring Workshop on Metagenomics in Astrobiology, Space Biology and Planetary Protection.

Cross-cutting interdivisional theme:

Future of Life.

INTEGRATING OCEAN DRILLING AND NASA SCIENCE

A Workshop to Explore Missions to Planet Earth



April 2–4, 2024
Washington, D.C.

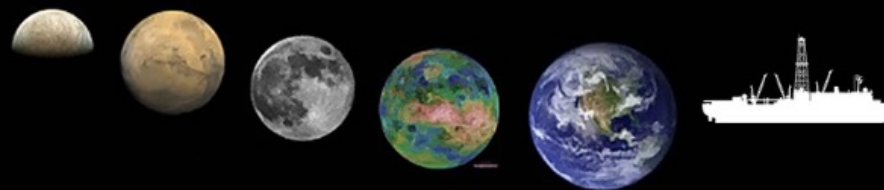
Purpose and Scope

This is a strategic workshop that is designed to lay the foundation for a new partnership between the National Science Foundation (NSF) and NASA focused on scientific ocean drilling, which is aligned with the recent [memorandum of understanding](#) between the two federal agencies (Potter, 2021). The goal of this workshop is to identify and build on the scientific synergies that NASA's Earth and Planetary Science Divisions within the Science Mission Directorate (SMD) have with scientific ocean drilling and to explore using the United States scientific ocean drilling vessel and allied international drilling assets for joint research ventures.

This goal is in response to the [2050 Science Framework](#) (2020) and the [Explore Science 2020-2024: A Vision for Scientific Excellence](#) (2020) (from NASA's Science Mission Directorate) documents. In both of these documents, collaborations with other agencies are welcomed and encouraged. Specifically, in the 2050 Science Framework (2020), connections and collaborations between scientific ocean drilling and space agencies are specifically highlighted as an Enabling Element (Terrestrial to Extraterrestrial) in the period 2024-2050. NASA's Science Mission Directorate has also highlighted "Interconnectivity and Partnerships" as one of its priorities for science in the period 2020–2024 (Science 2020–2024, pages 20–22). Five strategies are outlined to enable this, and strategies 3.2 (Actively seek collaborations with international partners based on their unique capabilities and mutual scientific goals) and 3.3 (Actively engage with other federal agencies to make more informed decisions, cooperate in scientific research, and pursue partnerships that further national interests) are particularly pertinent to forging linkages with scientific ocean drilling, which is international in nature.

INTEGRATING OCEAN DRILLING AND NASA SCIENCE

A Workshop to Explore Missions to Planet Earth



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	Division	Research Emphasis	Ocean Drilling Research: 2050 Science Framework
NASA's Science Mission Directorate	Earth Science	Climate Variability and Change	FI: Ground Truthing Future Climate Change SO: Earth's Climate System
		Carbon Cycle and Ecosystems	SO: Global Cycles of Energy and Matter
		Earth Surface and Interior (Geohazards)	FI: Probing the Deep Earth FI: Assessing EQ and Tsunami Hazards SO: Natural Hazards Affecting Society
	Planetary Science	Origin and Evolution of Life	FI: Exploring Life and its Origin SO: Habitability and Life on Earth
		Origin and Evolution of Planetary Bodies	FI: Probing the Deep Earth EE: Terrestrial to Extraterrestrial



The search for life's **ORIGIN**, **EVOLUTION**, **DISTRIBUTION**, and **FUTURE** in the Universe.



Prebiotic Chemistry and
Early Earth Environments

PCE₃



LIFE: Early Cells to
Multicellularity

ECM



Network for
Life Detection

NFoLD



Nexus for Exoplanet
System Science

NEXSS



Network for
Ocean Worlds

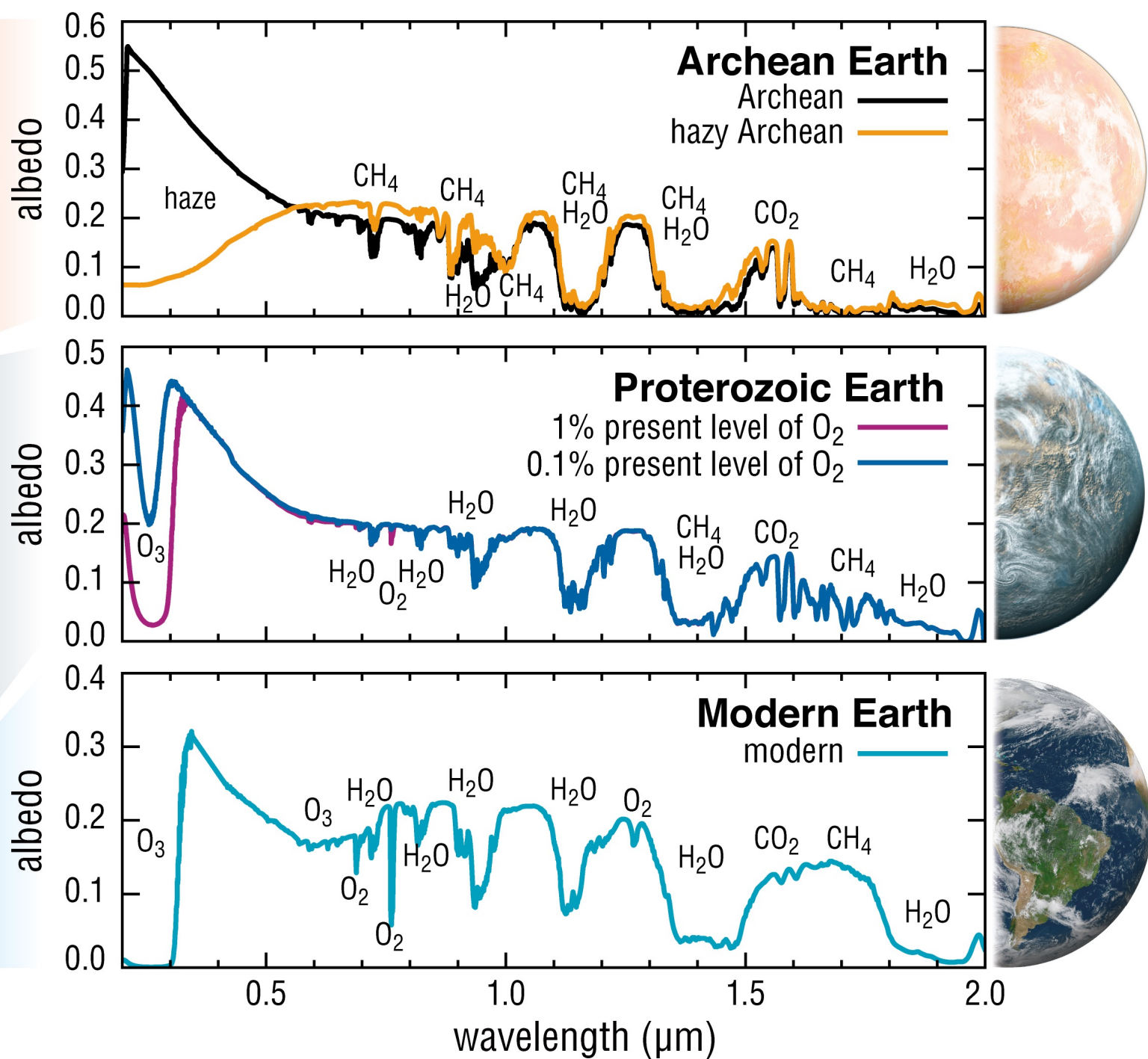
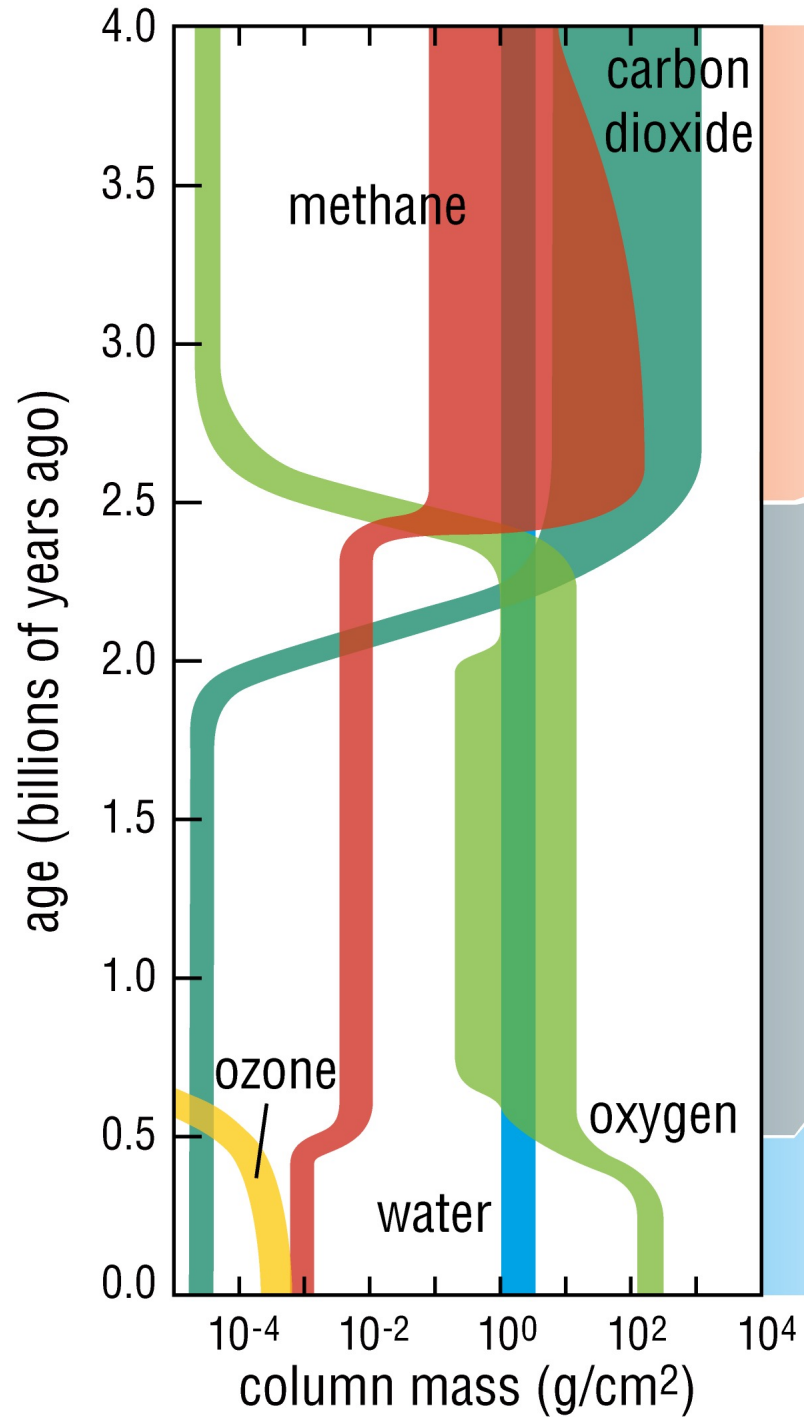
NOW




Future of Life

- Technosignatures
- Future of Earth
- Sustainability (writ large)
- Long term fates & states of biospheres & technospheres
- The future as exoplanet
- Becoming interplanetary
- Survival of Earth life on other planets
- Multigenerational life in isolated habitats
- Solar/stellar evolution and habitable zones
- The sun's future path through the galaxy
- How does life extend (or limit) the habitable lifetime of a planet?







CDSLU: Communicating Discoveries in the Search for Life in the Universe

Overview

If astrobiologists discover evidence of life beyond the Earth, how should these findings be shared with the public? Which communication strategies and techniques would best support public understanding of findings that are likely to be complex and highly specialized? Astrobiology faces a fundamental tension between the implications of finding evidence of biology or biological processes elsewhere in the universe, and explaining how observations or experiments used to accumulate that evidence will be subject to uncertainty and controversy. How might scientists and science communicators navigate this tension and communicate effectively about this uniquely compelling and challenging research?

This virtual workshop organized by NASA's Astrobiology Program (NAP) bring together astrobiologists, science journalists, science communicators and science content creators for a series of presentations, conversations and activities aimed at building a greater shared understanding of the challenges and opportunities for each group that such an event might present. By creating a space to exchange perspectives, experiences, professional realities, and foster relationships between scientists and science communicators we hope to explore mutually-beneficial and socially responsible paths towards communicating the discovery of extraterrestrial life.

Summary

This virtual workshop will bring together the astrobiology and science communication communities to exchange perspectives about the potential discovery of life beyond Earth. Through a series of presentations, conversations, and activities the workshop will explore mutually-beneficial and socially responsible paths towards communicating the discovery of extraterrestrial life and creating a lasting community of shared interest.

Virtual Workshop Session Details

Kickoff webinar: Friday February 23, 11am to 12 pm EST

Day 1: Friday March 1, 11 am to 1 pm EST

Day 2: Monday March 4, 11 am to 2 pm EST

Day 3: Wednesday March 6, 11 am to 3 pm EST

Astrobiology Strategy 2025

We are starting to plan an activity to formulate a new Astrobiology Strategy

New Hire: NPMP

Rachel Harris, Post-Doc at Harvard



Starts at NASA HQ May 1, 2024.





BIOSIGNATURES IDEAS LAB

VIRTUAL & IN-PERSON: REGISTER TODAY!

[NASA's Astrobiology Program](#) invites scientists at US Institutions to apply to the Biosignatures IDEAS lab, a hybrid workshop to develop new and innovative grant proposals through real-time peer review. The workshop will include several virtual pre-meetings, three days of in-person sessions and three full-day virtual sessions. We expect to fund a few of the proposals developed by this process through the Exobiology program.

For more information, and to apply for this workshop, please visit the link below:

BIOSIGNATURES IDEAS LAB

Application Deadline: November 16th, 2023

Ideas Lab In-Person Sessions

Denver, Colorado (Tentative)

Day 1: February 6th, 2024

Day 2: February 7th, 2024

Day 3: February 8th, 2024

Ideas Lab Virtual Sessions

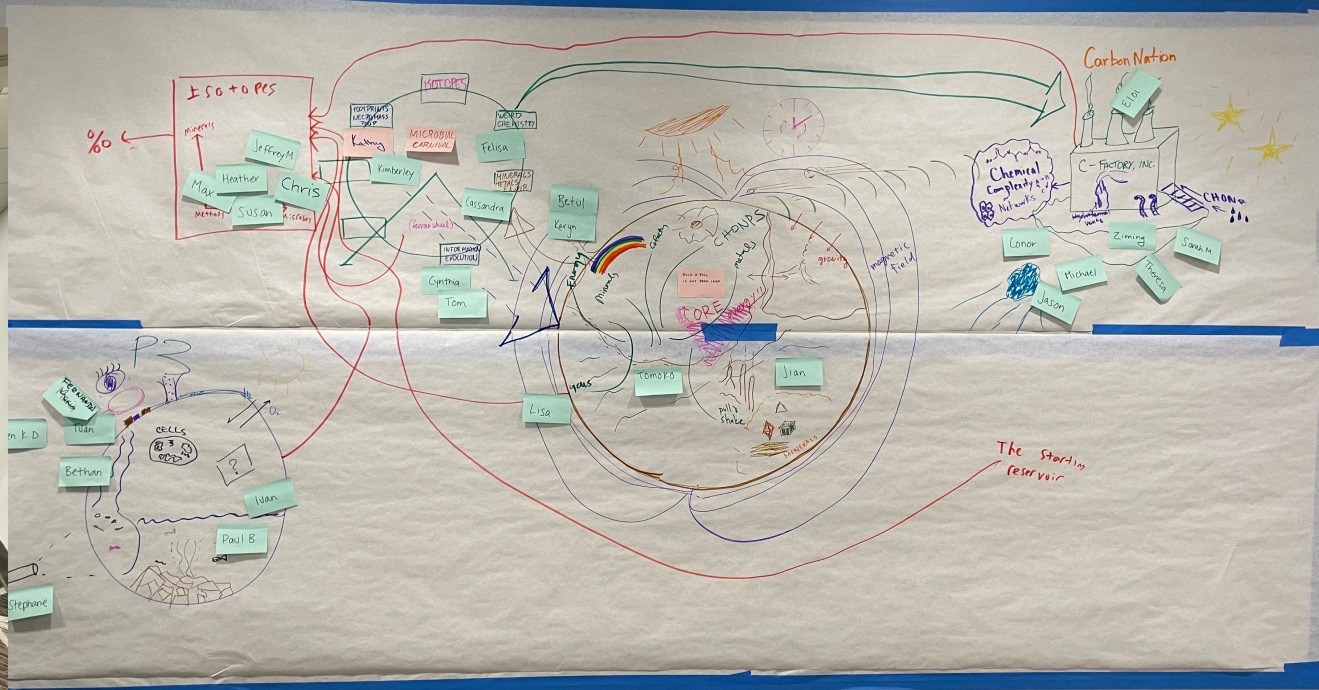
Day 4: February 16th, 2024

Day 5: February 23rd, 2024

Day 6: March 1st, 2024



NASA Biosignatures Ideas Lab



In-person 2/6-2/8 Virtual 2/16, 2/23, 3/1

Who was involved?

Participants: scientists selected from applicants with relevant expertise

Mentors: scientists who help the participants focus on the topic

Facilitators: professionals who help the group focus on the process

Research Coordination Networks



The Nexus for Exoplanet
System Science
nexss.info

From Early Cells to Multicellularity

lifercn.org



To understand how life and the Earth coevolved, focused on key innovations in the transition from early cells to multicellularity.

To investigate the diversity of exoplanets and to learn how their history, geology, and climate interact to create the conditions for life, dedicated to the study of planetary habitability.

The Network for Life Detection

nfold.org

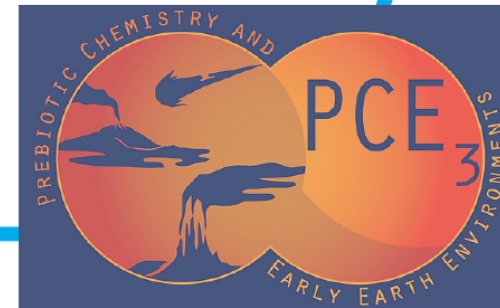


To advance life detection strategy and capability and catalyze interdisciplinary collaborations for research and technology objectives.

The Network for Ocean Worlds

oceanworlds.space

To advance comparative studies to characterize Earth and other ocean worlds across their interiors, oceans, and cryospheres; to investigate their habitability; to search for biosignatures; and to understand life—in relevant ocean world analogues and beyond.



Prebiotic Chemistry and Early Earth Environments

prebioticchem.org

Investigate the delivery, synthesis, and fate of small molecules under the conditions of the Early Earth, and the subsequent formation of proto-biological molecules and pathways that lead to systems harboring the potential for life.

Assessment of NASA's Nexus for Exoplanet System Science Initiative



Assessment Team Members and Affiliations

Mark Marley (co-Chair)
University of Arizona

Nicolle Zellner (co-Chair)
Albion College and NASA HQ

Bradley Burcar, NASA Goddard Space Flight Center

Ofer Cohen, University of Massachusetts Lowell

Colin Goldblatt, University of Victoria

Tiffany Kataria, Jet Propulsion Laboratory

Quinn Konopacky, University of California, San Diego

Kathleen Mandt, Johns Hopkins Applied Physics Laboratory and NASA
Goddard Space Flight Center (starting April 24, 2023)

Larry J. Paxton, Johns Hopkins University Applied Physics Laboratory

Margaret Tolbert, University of Colorado, Boulder

Nicholeen Viall, NASA Goddard Space Flight Center

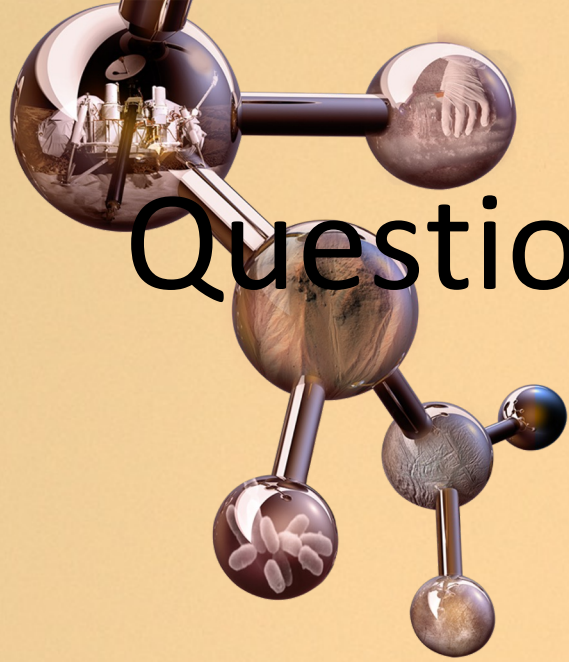
Ex Officio Members

Lindsay Hays (NASA Headquarters)
Eric Mamajek (Jet Propulsion Laboratory)



RCN Update Schedule

- NExSS Assessment (2023)
- Working with RCN co-leads now – needs assessment
 - What are current support levels?
 - How are they being used?
 - What is not being supported?
 - Prioritization?
- Targeting FY2025 for new support method
- ICAR Solicited in ROSES-24
- Next Steps: Co-Leads Succession planning



Questions?

