**Opportunity Title:** RCN – The Network for Ocean Worlds (NOW) - Exploring Ocean Worlds
**Opportunity Reference Code:** 0017-NPP-MAR23-ABProg-Astrobio

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| **Organization** | National Aeronautics and Space Administration (NASA) |
| **Reference Code** | 0017-NPP-MAR23-ABProg-Astrobio |
| **How to Apply** | All applications must be submitted in Zintellect |
| **Application Deadline** | 3/1/2023 6:00:00 PM Eastern Time Zone |

**Description**

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Ocean worlds have emerged as a prominent focus of NASA's Planetary Sciences endeavor, driven largely by their potential to host extant life (e.g. Sherwood et al., 2017). NASA has already approved the next phase of missions to Europa (*Europa Clipper*) and Titan (*Dragonfly*) while a suite of future missions and targets have also been identified the recently published Roadmap to Ocean Worlds (Hendrix et al., 2019). We consider it timely, therefore, to bring the astrobiology, planetary sciences, and ocean sciences communities together in a new, collaborative partnership that will provide the scientific underpinning and context needed to explore these worlds in an informed and rigorous fashion. In particular, it is likely that diverse ocean worlds will differ markedly in both ***biological potential*** (the abundance and productivity of life that they have the capacity to support) *and* their ***biosignature potential*** (the nature and abundance of evidence for life that they could express). Accordingly, it is important to ask:

On which ocean worlds, and with what measurements, will we have the greatest potential to successfully detect the presence of life?

We will integrate astrobiology, ocean system and planetary sciences to pursue this question, guided by two basic principles: (i) both biological potential and biosignature potential are governed by a complex network of *processes* and not just static conditions; (ii) to be of greatest utility, efforts to quantify biological potential and biosignature potential must identify *observable features* that serve to constrain that network of processes. With this basis, our two objectives are:

Objective 1: Quantify the dependence of biological potential and biosignature potential on physical & (bio)geochemical processes.

Objective 2: Identify which observable features would be most powerfully diagnostic of the processes that determine biological and biosignature potential.

We will address these objectives by constructing a comprehensive theoretical framework, informed and ground-truthed by experimental efforts, that connects the broad spectrum of physical and chemical *processes* that could govern the fluxes of material and energy within an ocean system, and thereby determine biological and biosignature potential. https://oceanworlds.whoi.edu/exploring-ocean-worlds/

Applicants who apply for this research opportunity and are subsequently selected for an NPP award are expected to attend the Astrobiology Graduate Conference (AbGradCon) and/or the Astrobiology Science Conference (AbSciCon) using the travel funds that are conferred as part of the NPP award.

**Field of Science:** Astrobiology

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**Eligibility is currently open to:**

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

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| **Eligibility Requirements** | • **Degree:** Doctoral Degree. |