**Opportunity Title:** ICAR - The Formation and Evolution of Prebiotic Organics in Extraterrestrial Environments: Exploring the Role of Astrochemistry in the Origin of Life
**Opportunity Reference Code:** 0029-NPP-NOV24-ABProg-Astrobio

**Organization** National Aeronautics and Space Administration (NASA)

**Reference Code** 0029-NPP-NOV24-ABProg-Astrobio

**How to Apply** All applications must be submitted in Zintellect

Please visit the NASA Postdoctoral Program website for application instructions and requirements: How to Apply | NASA Postdoctoral Program (orau.org)

A complete application to the NASA Postdoctoral Program includes:

1. Research proposal
2. Three letters of recommendation
3. Official doctoral transcript documents

**Application Deadline** 11/1/2024 6:00:59 PM Eastern Time Zone

**Description** **About the NASA Postdoctoral Program**

The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented U.S. and non-U.S. scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to advance NASA's missions in space science, Earth science, aeronautics, space operations, exploration systems, and astrobiology.

**Description:**

The Formation and Evolution of Prebiotic Organics in Extraterrestrial Environments: Exploring the Role of Astrochemistry in the Origin of Life" ICAR effort addresses the core astrobiological goals of (1) understanding the abiotic emergence of organic chemical complexity at every stage of star and planet formation from quiescent regions of dense molecular clouds, through all stages of cloud collapse, protostar, disk, and planet formation, and ultimately to the materials that rain down on planets; and (2) understanding how these depend on environmental parameters like the ambient radiation field and the available inventory of H2O and other simple molecules. To accomplish this, we are executing a highly integrated program that contains modeling of protoplanetary disk evolution, astrochemical laboratory experiments, and quantum chemical computations. The goal of this effort is to move beyond simply identifying particular molecules, ions, or radicals present in astronomical objects to understanding their place in the dynamics of the chemical evolution of different astrophysical environments, with particular attention to the formation sites of new planetary systems and our own Solar System. Our research is of direct relevance to goals in three of four Research Areas within the 2015 Astrobiology Strategy associated with the "Identifying Abiotic Sources of Organic Compounds" Topic, namely: (1) What Were the Sources, Activities, and Fates of Organic Compounds on the Prebiotic Earth?; (2) What is the Role of the Environment in the Production of Organic Molecules?; and (3) What is the Role of the Environment on the

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Stability and Accumulation of Organic Molecules? A coordinated program between disk modeling, laboratory experiments, and quantum chemistry is critical to achieve the project's overall goals, and the members of our team work closely together across traditional boundaries to ensure that each individual effort is geared towards mutual benefit of the other tasks. Our work is largely associated with studying the production and evolution of prebiotic compounds of astrobiological interest capable of being delivered to planetary surfaces, and it falls within the purview of the Prebiotic Chemistry and Early Earth Environments (PCE3) Research Coordination Network (RCN). Our effort addresses the PCE3 objective to promote novel and innovative experimental and theoretical approaches to exploring the abiotic ? prebiotic ? biotic transitions that lead to life. Research candidates should have a background in laboratory or theoretical quantum chemistry, or have experience with computer modeling.

**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

**Eligibility**

- **Degree:** Doctoral Degree.

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**Requirements**