**Opportunity Title:** Development of Inverse Heat Transfer Methods for Reconstructing Aerothermal Entry Environments
**Opportunity Reference Code:** 0149-NPP-NOV25-ARC-Engineering

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

**Reference Code** 0149-NPP-NOV25-ARC-Engineering

**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** 11/1/2025 6:00:59 PM Eastern Time Zone

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

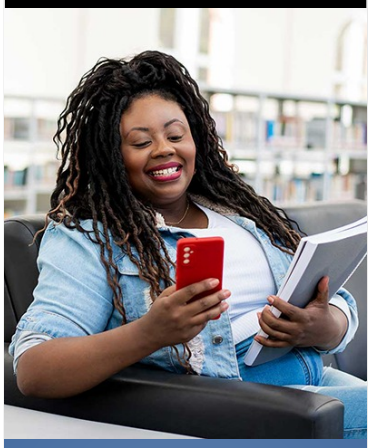
The NASA Postdoctoral Program (NPP) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed to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

**Description:**

Spacecraft encounter extreme thermal environments during atmospheric entry, necessitating advanced thermal protection systems (TPS) to ensure mission success. A deeper understanding of these entry conditions is essential for designing more efficient TPS solutions (i.e., selecting optimal material systems, reducing design margins). Instrumentation, such as in-depth thermocouples and heat flux gauges, is commonly integrated into NASA missions that have an atmospheric entry component, to facilitate post-flight analyses of the aerothermal environment. One widely used technique for this analysis is inverse heat transfer modeling, which leverages in-depth temperature measurements to estimate surface heating conditions. These methods are also invaluable in high-enthalpy test environments like arc jet testing, where heat flux is typically measured using cold wall calorimeters, and extrapolated to conditions relevant to the test article via correlations.

However, current inverse heat transfer methods tend to be computationally intensive, relying on iterative time-marching algorithms to reconstruct heating environments. This limits their use in more advanced computational analyses, such as uncertainty quantification. Additionally, current state-of-the-art inverse heat transfer methods may be unsuitable for capturing the

NPP NASA Postdoctoral Program
ORAU Pathfinder



Whether you are just starting your career or already at a senior level, ORAU offers internships, fellowships, research opportunities, and contract positions that can provide you with invaluable experience. Download the ORAU Pathfinder mobile app and find the right opportunity to propel you along your career path!

Visit ORAU Pathfinder
GET IT ON Google Play
Download on the App Store

**Opportunity Title:** Development of Inverse Heat Transfer Methods for Reconstructing Aerothermal Entry Environments
**Opportunity Reference Code:** 0149-NPP-NOV25-ARC-Engineering

effects of material recession in ablative TPS, which become significant at flight-relevant heat rates.

This post-doctoral position focuses on developing and advancing innovative inverse heat transfer methodologies to achieve accurate, efficient post-flight reconstructions of aerothermal entry environments. The goal is to explore solutions that reduce computational demands while improving the reliability and applicability of these techniques for a broader range of scenarios. The developed methods will be applied to both existing and new flight data. The applicant should have experience with materials modeling, uncertainty quantification, and heat transfer analysis.

**Field of Science:** Engineering

**Advisors:**

Hannah Alpert
hannah.s.alpert@nasa.gov
(650) 448-4785

**Questions about this opportunity?** Please email npp@orau.org

**Qualifications** The successful applicant should have a PhD in a science or engineering discipline with experience in inverse heat transfer methods, uncertainty quantification, and materials modeling.

**Point of Contact** Mikeala

**Eligibility Requirements**

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree.