Opportunity Title: Analytical and Computational Research Tools for Advanced Materials and Structures
Opportunity Reference Code: 0047-NPP-MAR26-LRC-Aeronautics

Organization
National Aeronautics and Space Administration (NASA)

Reference Code
0047-NPP-MAR26-LRC-Aeronautics

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
4/2/2026 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:

The primary focus of this opportunity is to perform analytical and computational research in the Structures and Materials Division at NASA Langley Research Center to improve the understanding of failure and fracture in advanced aerospace materials and to advance the state-of-the-art of progressive damage analysis methods.

The Durability, Damage Tolerance, and Reliability Branch (DDTRB) conducts a broad-based research and technology program that quantifies behavior, durability, and damage tolerance of structural materials; develops efficient, physics-based analytical and computational methods; develops new innovative test methods; and validates performance of advanced materials and structures for aerospace applications in support of NASA, other government agencies, and the aerospace industry. The numerous structural life-limiting damage mechanisms exhibited by advanced aerospace materials occur at various length scales and can drive component failure via several types that interact in a potentially complex manner. Deployment of composite materials on aircraft is partly inhibited by an insufficient understanding of damage progression and its effect on component lifetime and reliability. The broad vision of the branch's work is to remedy this issue by creating experimental and computational methods that will yield a reduced cost for certification of composite aerospace structures and provide advanced understanding of durability and damage tolerance, the latter helping to ensure safe operation of existing and emerging high performance aircraft structural designs and to enable future long duration space missions.

Analytical efforts in the DDTRB are focused on computational fracture mechanics and the development and application of progressive damage analysis methods. Progressive damage analysis methods under development in the group currently focus on the development of numerical tools for simulation of multiple interacting damage processes, such as matrix cracking, delamination, and fiber failure, for a variety of advanced aerospace materials, including fiber-reinforced thermosets, fiber-reinforced thermoplastics, ceramic matrix composites, carbon-carbon composites, silicon carbide (SiC) fiber-reinforced SiC matrix composites, and others. Researchers in the group have experience with closed-form fracture mechanics approaches, cohesive zone modeling, discrete damage mechanics, continuum damage mechanics, and other related approaches. Tools for both quasi-static and fatigue loading are of interest. Incorporation of these tools into commercial finite element codes is being sought to enable the creation of analyses that may be used to complement testing practices used currently during the certification process.

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Also of interest are research proposals into novel joining and consolidation methods for composite materials with a specific emphasis on tackling challenges that have prevented widespread use in the past. Development of new/emerging composite (carbon fiber-reinforced thermoset/thermoplastic) material systems and processing methods that enhance material performance, durability, and/or processability are also within scope.

Opportunities exist to participate in all aspects of the research, development, and application of analytical and computational modeling efforts. Successful applicants should have a PhD in an appropriate field of study and have programming experience related to finite element analysis user subroutines and related scripting languages.

Field of Science: Aeronautics

Advisors:

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

Qualifications

The candidate should have a PhD in Mechanical Engineering, Aerospace Engineering, Materials Engineering, Materials Science, or a related technical discipline.

The candidate should have experience in finite element analysis software packages, such as Abaqus.

The candidate should have experience in programming languages compatible with custom user subroutines in finite element analysis software packages, i.e., FORTRAN.

The candidate should have experience in scripting languages, e.g., Python, MATLAB.

Point of Contact
Mikeala

Eligibility Requirements
- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.

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