

Opportunity Title: Development and Testing of High Angular Resolution X-ray

Mirrors

Opportunity Reference Code: 0351-NPP-NOV26-GSFC-Astrophys

Organization National Aeronautics and Space Administration (NASA)

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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 11/1/2026 6:00:59 PM Eastern Time Zone

Description About the [NASA Postdoctoral Program](#)

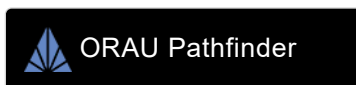
The [NASA Postdoctoral Program \(NPP\)](#) offers unique research opportunities to highly-talented scientists to engage in ongoing NASA research projects at a NASA Center, NASA Headquarters, or at a NASA-affiliated research institute. These one- to three-year fellowships are competitive and are designed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

Description:

The Next Generation X-ray Optics (NGXO) team at NASA Goddard Space Flight Center develops advanced X-ray mirror technology using segmented monocrystalline silicon to enable future high-performance space telescopes. NGXO creates ultra-thin (0.8-1.2 mm), lightweight mirror segments that are approximately ten times thinner than Chandra's mirrors while achieving comparable or better optical quality, with individual segments reaching angular resolutions as fine as 0.2-0.3 arcseconds.

The fabrication process involves precision CNC grinding, lapping, polishing, ion-beam figuring, and stress-compensated iridium coating of 100 mm × 100 mm silicon segments. These segments are then precisely aligned and bonded into mirror modules using traditional Hartmann optical alignment techniques, with multiple modules to be assembled into rings to form the complete mirror assembly. This modular, hierarchical approach allows construction of large-aperture (>1 m diameter), high-effective-area (>4000 cm²) telescope mirrors that maintain sub-arcsecond angular resolution—performance characteristics unattainable by other lightweight mirror technologies.

NGXO bridges the gap between Chandra's exquisite angular resolution and the large collecting areas needed for next-generation astrophysics,



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supporting mission concepts ranging from flagship observatories like Lynx to Probe-class missions like AXIS, LEM, and HEX-P. The team's work encompasses the entire development chain: advancing manufacturing processes, conducting rigorous metrology and quality control, building engineering demonstration hardware, and maturing the technology toward flight readiness for missions launching in the late 2030s.

The participant will engage in advanced X-ray optics research and development activities supporting NASA's Next Generation X-ray Optics (NGXO) technology program at Goddard Space Flight Center. The participant will have opportunities to contribute to several complementary research areas. These may include designing and participating in beamline testing campaigns for X-ray mirror segments and modules, where the participant will collaborate with team members to plan test configurations, collect data, and analyze optical performance measurements. The participant will research and develop robust metrology methodologies to characterize mirror surface quality across multiple spatial frequency ranges using techniques such as Fizeau interferometry and Scanning White Light Interferometry.

Software development opportunities include creating and refining analysis tools to integrate metrology data from multiple measurement systems, developing simulation tools for predicting module coalignment performance. The participant may also engage in commissioning activities for X-ray detectors and participate in operating a hard X-ray reflectometer to evaluate mirror reflectivity and surface characteristics.

Throughout these activities, the participant will gain hands-on experience with precision optical systems, advanced manufacturing metrology, X-ray physics, and space telescope technology development. The participant will collaborate with scientists, engineers, and technical staff to explore how mirror segment fabrication, stress compensation techniques, mounting methodologies, and module assembly approaches affect overall optical performance. These educational experiences will provide knowledge directly relevant to NASA's mission in astrophysics and space-based observatory development, preparing the participant for careers in aerospace optics, scientific instrumentation, or related technical fields.

Field of Science: Astrophysics

Advisors:

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(301) 219-5664

Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found

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at: <https://www.nasa.gov/oiir/export-control>.

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

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

Qualifications Ph.D. in physics, optics, astronomy, aerospace/mechanical engineering, or related field. Strong background in X-ray physics, optical systems, and metrology techniques including interferometry (Fizeau, white light). Experience with precision optical testing, characterization, and detector systems.

Proficiency in scientific programming (Python, MATLAB, IDL) with experience in data analysis, visualization, optical raytracing, and simulation software. Ability to develop custom analysis tools. Knowledge of numerical methods, statistical analysis, and version control (Git) beneficial.

Hands-on laboratory experience with precision instruments, optical testing experiments, and scientific instrumentation. Experience with vacuum systems or X-ray beamline facilities preferred. Strong analytical skills including multi-system data integration, point spread function analysis, optical modeling, and error analysis.

Excellent communication skills with ability to collaborate in multidisciplinary teams, document procedures, and present technical findings clearly.

Point of Contact [Mikeala](#)

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