

Fiscal Year 2024 Competition Information Sheet - Early career award for exceptional research in Earth System Model Development and Application

Program Name

Modeling, Analysis, Predictions, and Projections (MAPP) Program.

Program Mission

The MAPP program supports advances in the development and application of Earth system models and analyses across NOAA for the purpose of building resilience to climate impacts, predicting and projecting change from years to decades in the future, and improving our understanding of and ability to simulate the Earth system. MAPP works with partner agencies in the U.S. Global Change Research Program, and focuses on engaging the non-NOAA research community to help advance NOAA's modeling capabilities and applications. MAPP is a program in the Earth System Science and Modeling (ESSM) division in NOAA's Climate Program Office. ESSM supports research to advance broad understanding of the Earth system through observations, monitoring, process science, and modeling; and to advance NOAA's mission through collaborations with the external community.

Focus for FY 2024

Early career award for exceptional research in Earth System Model Development and Application

Funding for FY2024

Pending the availability of funds in FY 2024, the MAPP program anticipates a funding allocation of up to \$300,000 per year for this competition.

Proposals may be for up to four years, up to \$300,000/year. One project may be funded.

Competition Information

NOAA's Fisheries, Ocean, Satellite, and Weather services as well as its Laboratories and Cooperative Institutes provide a wide range of critical climate information to the public, leveraging the agency's extensive in-situ and remote data holdings, modeling capabilities, communication and dissemination expertise, and scientific leadership. A strong external NOAA-affiliated R&D workforce is necessary to advance these mission areas.

This effort is motivated by the need for NOAA to foster relationships with a new generation of exceptionally skilled scientists by supporting the development of research interests associated with NOAA mission areas and facilities (e.g., operational centers, laboratories, science centers, etc.). The recipient of this award is expected to use it to build a solid foundation for career-long leadership in innovative research that will advance Earth system models and their application, and development of the next-generation research and applied workforces.

NOAA has long been a leader in the advancement of climate research and services, and the development of a NOAA-affiliated workforce; however, there is a gap between the many available NOAA-

associated fellowship, internship, and postdoc programs, and the career research and development workforce. This early career award intends to bridge that gap by enabling focused early-career support on NOAA mission areas relevant to MAPP activities. This solicitation also builds on a long history^{1,2} of the Climate Program Office's support for education and innovation within the Earth sciences.

In FY 2024, MAPP is soliciting proposals from early career researchers to foster innovative Earth System Modeling research in collaboration with NOAA. This award will support early-career scientists who have the potential to serve as research leaders and mentors to future scientists, and who are interested in focusing their research careers on Earth System Model development and application relevant to the NOAA mission. Applicants are expected to propose a research plan centered around topics prioritized by the MAPP program, which include: advancing climate and Earth system models to better simulate climate variability and change, improving multi-annual to decadal climate prediction systems and products, and multi-decadal projections; and applying Earth system models to better understand, predict, and project drought, extreme heat, sea level change, and marine ecosystems. Proposed work should be clearly related to the broader NOAA mission^{3,4}; CPO's mission, including the societal challenges it has identified⁵; and the mission of the collaborating NOAA institution selected by the applicant. It is anticipated that one proposal will be selected, and should focus on any of the MAPP research areas below:

1. Applying Earth system models to better understand, predict, monitor, or project drought, extreme heat, sea level change, and marine ecosystems.
2. Marine ecosystem simulation, prediction, and projection focused on applications to NOAA's NMFS⁶ and/or Sanctuaries⁷ missions.
3. Process-based Earth System Model development
4. Climate and Earth system model diagnosis in support of next-generation model development
5. Advancing climate projections and projections products and services, and the attribution of extreme events in the context of NOAA's attribution effort

This award is expected to be highly competitive and will enable early-career climate scientists to work on problems that can significantly advance NOAA climate and Earth system modeling and applications through innovative application of promising or new techniques and approaches to research and development questions.

Proposals should take into account the utility of research to stakeholders through documented criteria describing thresholds, metrics, and categorical criteria needed by stakeholders who make decisions in the context of CPO's societal challenges. Products that may be able to fill information gaps in the National Climate Assessment^{8,9} are encouraged. The focus should be on advancing modeling and applications on multi-annual and longer timescales that are central to the CPO mission. Efforts focused on large regional

¹ <https://cpo.noaa.gov/Our-Work/Fellowships>

² <https://cpo.noaa.gov/Divisions-Programs/Communication-Education-and-Engagement/Education>

³ NOAA Next Generation Strategic Plan: <https://www.noaa.gov/organization/budget-finance-performance/value-to-society/noaa-fy22-26-strategic-plan>

⁴ NOAA Office of Oceanic and Atmospheric Research Strategic Plan: <https://research.noaa.gov/external-affairs/strategy/>

⁵ <https://www.cpo.noaa.gov/Initiatives/Climate-Risk-Areas-Initiative>

⁶ <https://www.fisheries.noaa.gov/about-us>

⁷ <https://sanctuaries.noaa.gov/about/>

⁸ <https://nca2018.globalchange.gov/>

⁹ <https://science2017.globalchange.gov/>

or national scales are welcome; a focus on smaller spatial scales would have to be highly generalizable, or focus on multiple small scales (e.g., multiple metropolitan areas).

When relevant, work should use new or under-utilized observational datasets, modeling or assimilation-based techniques, and/or reanalysis data (for example, the 20th Century Reanalysis, Version 3¹⁰, or operational climate analyses). Approaches using machine learning or other artificial intelligence techniques, or being able to address data that is sparse or unstructured are welcome.

Proposers who already have a working connection with a collaborator at a NOAA federal entity (e.g., a lab, an operational center, an office) may scope their Letter of Intent (LOI) in coordination with that collaborator. Proposers who do not have a working connection with a NOAA collaborator should clearly identify the potential collaborating institution in the LOI, but **should not reach out to the institution during the LOI stage**. MAPP will coordinate with that institution to review the LOI and evaluate its potential relevance. The institution will help find an interested collaborator, if possible. Eligible institutions for applicants without existing working connections to NOAA include:

- Air Resources Laboratory (College Park, MD)
- Atlantic Oceanographic and Meteorological Laboratory (Miami, FL)
- Chemical Sciences Laboratory (Boulder, CO)
- Geophysical Fluid Dynamics Laboratory (Princeton, NJ)
- Global Monitoring Laboratory (Boulder, CO)
- National Centers for Environmental Information (Asheville, NC)
- National Severe Storms Laboratory (Norman, OK)
- Pacific Marine Environmental Laboratory (Seattle, WA)
- Physical Sciences Laboratory (Boulder, CO)

Collaborators at NOAA institutions may be federal or Cooperative Institute employees. Full proposals will be required to involve a NOAA collaborator, and to fully demonstrate the relevance of the proposed research to one or more NOAA federal entities (e.g., a lab, an operational center, an office), MAPP's program activities, CPO's societal challenges, and NOAA's mission. Proposals will also need to articulate how the early career funding would result in a durable relationship between the proposer and NOAA throughout their career beyond the duration of this award.

Under this award, non-NOAA (i.e., outside NOAA institutions, including CIs) researchers will receive grants for up to \$300K per year for up to 4 years to cover expenses articulated in the NOFO. NOAA collaborators may receive up to 20% of the total annual budget.

Proposers must meet all of the following eligibility requirements by the application deadline and clearly articulate and support the following eligibility requirements in their proposal materials:

1. Proposers must have received their Ph.D. degree no more than 8 years before the application deadline of this solicitation.
2. The Principal Investigator must be employed in a research position at an eligible non-NOAA U.S. institution or organization.
3. It is expected that the primary support for the MAPP Early Career Scientist Award will be for the lead PI and their research efforts and team. The lead PI should dedicate a significant share of

¹⁰ https://www.psl.noaa.gov/data/20thC_Rean/

their available fundable time to this award, as it is intended to help early-career PIs avoid the distraction of submitting applications for and managing a large number of awards.

4. Co-PIs are not allowed in the proposal, although research collaboration is recommended. Some support for NOAA collaborators is permitted, which could be up to 20% of the total annual funding.
5. Only one application is allowed to be submitted to this solicitation by each proposer. This award is open to anyone qualified according to the criteria above, including the recipients of other MAPP awards.

The MAPP Early Career Award proposals should be prepared in accordance with the instructions given in the Climate Program Office FY24 NOFO. In addition, a statement of leadership (up to one page) in the applicant's research area must be included in the proposal. The statement should articulate the past and current contributions of the applicant to the Earth science and modeling community, which include but are not limited to cutting-edge research activities, involvement in academic committees and organizations, efforts in education and outreach, and diversity and inclusion. It should also address the anticipated future impacts of the proposed activities. A letter of support from the collaborating NOAA institution should be provided in the proposal as an endorsement of the proposed research, which needs to be aligned with the priorities of the lab and the goals of MAPP. In the proposal, applicants should consider opportunities for visits, sabbaticals, internships, etc. that could be hosted by the federal collaborating institution to deepen connection between the applicant's research and team and the federal institution and its work.

All proposals will be evaluated through the same process and review criteria stated in the CPO FY24 NOFO¹¹. In the Stage I review process, peer panel reviewers will evaluate applications based on three criteria (including scientific merit, overall qualifications, and cost), which accounts for 75% of the final weight of the evaluation. The statement of leadership will be considered an important component of the qualification evaluation. Stage II review accounts for 25% of the final weight and will assess the importance and relevance to the MAPP prioritized research topics.

Competition contact information: David Benson (david.benson@noaa.gov).

General Guidelines for FY 2024 MAPP proposal submission:

- Principal investigators submitting a proposal in response to this MAPP Announcement are required to follow the Letters of Intent (LOI) and Proposal preparation and submission guidelines described in the Climate Program Office FY 2024 Notice of Federal Funding Opportunity announcement.
- Investigators must submit an LOI prior to developing and submitting a full proposal using the FY24 MAPP [Letter of Intent submission form](#)¹²; investigators unable to submit via the form should email their LOI to oar.cpo.mapp@noaa.gov. Investigators will be notified by the MAPP Program Competition Manager as to whether a full proposal is encouraged based on the LOI within four weeks of the LOI due date.
- Proposals must clearly identify in their summary which MAPP competition is being targeted (only one competition may be targeted by a given proposal).
- We encourage investigators to consider how their projects may engage individuals from underserved communities including internships or other opportunities, K-12 outreach, etc.

¹¹ <https://cpo.noaa.gov/Funding-Opportunities>

¹² https://docs.google.com/forms/d/e/1FAIpQLSffQsfdhDtUqnBDZC79JrKSaySQkD_HfY3vel7iggAU_Uiw/viewform

- Administrative questions regarding the Notice of Federal Funding Opportunity (e.g. proposal formatting or submission guidelines) should be directed to Diane Brown (diane.brown@noaa.gov).

A webinar will be offered to potential applicants for background on the MAPP program and this solicitation soon after the publication of this announcement. For information on webinar timing and registration procedures please check the MAPP website¹³; prior to when the webinar is held, potential applicants can also sign-up to receive an email notification¹⁴.

Data Archiving and Computational Resources

Computational Resources

Computational resources on NOAA's high-performance computing platforms may be requested for research sponsored as a result of this solicitation. Proposals should indicate the availability of alternative computing resources should NOAA resources not be available for the project. Proposers who choose to request computational allocations on NOAA's platforms must include in their proposal a request describing the computational resources and data storage required, as well as a description of how they will port their methodology to the NOAA platforms. Proposers must submit an HPC Request Form¹⁵ with their proposal in order to apply for computational resources.

Questions regarding the use of NOAA's high-performance computing platforms should be directed to Dan Barrie (daniel.barrie@noaa.gov).

Data Management Guidance

The MAPP Program requires that all products and deliverables produced via solicitation will reside in the open access / open source domain, freely available to the public.

Public access to grant/contract-produced data will be enabled in one of the following ways (select one):

- Funding recipients are planning to submit data to NOAA National Centers for Environmental Information (NCEI), which will provide public access and archiving¹⁶. Point of Contact for NCEI is Nancy Ritchey (Nancy.Ritchey@noaa.gov)
- Data are to be submitted to an International Council for Science (ICSU) World Data System facility: <https://www.icsu-wds.org/community/membership/regular-members>
- An existing publicly accessible online data server at the funded institution is to be used to host these data (describe in proposal).
- An existing publicly accessible online "cloud" service is to be used to host the data (described in the proposal).

The Competition Manager (above) is the responsible NOAA Official for questions regarding this guidance and for verifying the accessibility of data produced by funding recipients.

¹³ <https://cpo.noaa.gov/Meet-the-Divisions/Earth-System-Science-and-Modeling/MAPP>

¹⁴ https://docs.google.com/forms/d/e/1FAIpQLSf8JpkyJwvVeZC-uy5jqxUXsRyB3Zh_IKAKL_tg7xdgoTTYGw/viewform

¹⁵ <https://drive.google.com/file/d/1wJQmpsiR8V6RhVPAULWuBmUKgK9NtxUF/view>

¹⁶ NCEI supports the creation of adequate metadata and data ingest into long term repository holdings using tools such as Send2NCEI (www.nodc.noaa.gov/s2n), for small volume, one-time only data collections) and Advanced Tracking and Resource tool for Archive Collections or ATRAC (<https://www.ncdc.noaa.gov/atrac/index.html>), for recurring and/or large volume data collections).