

**NOAA**  
**WEATHER**  
PROGRAM OFFICE

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# Developing Guidelines for Defining, Measuring, and Fostering Innovations in Earth Prediction Systems at NOAA's Weather Program Office

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# Objectives For My Research

- **Develop guidelines for WPO to:**
  - Best define innovation for its purposes
  - Measure innovation in proposals and funded projects
  - Foster innovation through funding opportunities



# Questions to Answer

1. What does innovation mean in the context of improving Earth system predictions?
2. What are some innovation metrics to add and prioritize in future innovation-focused funding opportunities?
3. How can WPO, NOAA, and the weather enterprise in general foster innovation in their work?
4. Did WPO promote the 2023 Innovations for Community Modeling Competition and evaluate proposals effectively?

# Methods

- Conducted a structured interview process with 20 interviewees from WPO and throughout the weather enterprise.



- Performed a case study of WPO's 2023 Innovations for Community Modeling Competition.

# Meaning of Innovation in Earth Prediction Systems

An innovative idea in Earth Prediction Systems is:

- A new concept, method, or strategy that provides value towards improving earth prediction systems and/or creating better methods to inform the public

**Important features to determine if projects are innovative in WPO:**

- Important for both the WPO's priorities and its end users.
- Not limited to one certain readiness level or step in the R2O2R process

WPO recognizes the need for high-risk, high-reward. For innovation-focused competitions, innovation should have risk and the end goal should be more than just an improvement on something that already exists.



# Designing Priority Innovation Metrics

## Organizational metrics to encourage innovation:

- Progress reports
- Finance measurements
- Diversity of awardees
- Ideas generated
- Ideas transitioned

## Innovation metrics for NOFO's, reviewing and selecting awards:

- Mission value
- Time to transition
- User benefit
- Cost Benefit
- Risk metrics

# Fostering Innovation in WPO and the Government

## Inclusivity, Diversity, & Collaboration

- Help applicants with the paperwork process for funding opportunities
- Write proposals clearly and without constraints
- Have a diverse reviewer group
- Collaborate more frequently and in-person when possible

## Conquering Risk Aversion

### Cultural change:

- Expect employees to innovate and embrace failure as opportunities for learning.
- Talk about the outcome.
- Failure teaches people what doesn't work to discover what will.

# Ways to Encourage and Accelerate Innovation Throughout the Weather Enterprise

## Priorities:

Continue the efforts to create an open source and science environment.

Build a public-private-academic partnership



Encourage Interdisciplinary individuals, experts, different generations and backgrounds to work together!

Think about why the default exists in the first place!

"You have to be comfortable with the uncomfortable"  
-Bill Lapenta





# Case Study

## WPO's 2023 Innovations for Community Modeling Competition

# Case Study Results

## Guidelines for Wording Future NOFOs

### Keep

- Creative freedom
- No restrictive constraints on how to solve the problems
- Expressing proposals do not need to yield immediate results, but can lay as a foundation for other ideas to spark and improve weather forecasting.

### Change

- Clear definition of high risk, high reward
- More clarity on what exactly a 'substantially new approach' or an 'incremental change' is
- Express the understanding for risk, and therefore failure, across all platforms

# Review Criteria

All 2023 funding opportunities were broken down into these categories for scoring:

- Relevance to Program Goals (33% of overall score)
- Scientific and Technical Merit (33%)
- Qualifications of Applicants (14%)
- Project Cost (10%)
- Education, Outreach, Diversity and Inclusion activities, and Integration (10%)

**Adjust review criteria for innovation-focused funding opportunities!**

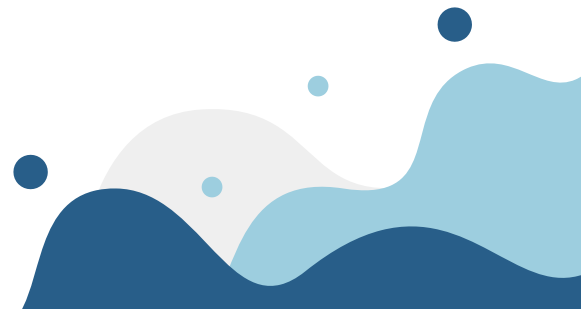


# Interviews with Some Awardees

- Their projects are a step up from what the government typically funds
- Awardees interviewed agree that innovation can involve entirely new approaches, but it doesn't necessarily always entail complete remodeling
- They believed the funding opportunity was clear and written without constraints
- More clarity on what would count as being innovative and would the process would look like

# Applications to Future Innovation-Focused Funding Opportunities

- Meaning of innovation at WPO could be better portrayed & the use of innovation metrics to review proposals should be added
- The fact that the research did not need to yield immediate, successful results could be better portrayed across all platforms
- Encourage participation from researchers with backgrounds that WPO doesn't typically fund
- As more innovation-focused funding competitions are released, the projects selected should pass medium-risk and try to be even more high-risk, high-reward.



# THANK YOU



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# Questions?

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