

## Report from the Program Review Chair

Following presentations on the state of the program, the program status, and the program impacts, the Review Panel Members for the NOAA Climate and Global Change Postdoctoral Fellowship Program Review met in closed session to discuss their findings.

The Review Panel Members found:

**1. Excellent program.** This excellent Program promotes NOAA's mission and prestige both nationally and internationally, as demonstrated by Fellow and Alumni scientific achievements, citations, innovations, prestigious appointments, and leadership roles.

**2. Serving the nation and society.** In service to the nation and society, the Program supports improving and expanding prediction within the earth system; combining observation and modeling; developing new tools and techniques and identifying and quantifying new interactions in weather, water and climate; and enabling nationwide communication of resilience and adaptation strategies.

**3. Fostering and developing the next generation.** The Program fosters and develops the next generation of earth system and climate science leaders by supporting independent scientists and emerging leaders who build the new and transformational tools, technologies, understanding, and innovations.

**4. Building the nimble and interdisciplinary community.** The Program builds the nimble and interdisciplinary community required to address emerging issues in weather, water, and climate.

Consistent with these findings, the Review Panel Members recommend:

**1. Funding at least ten postdoctoral fellows per cohort.** The Program is compromised by any cohort with fewer than ten (10) postdoctoral Fellows. The Program selects for excellence across a broad range of disciplines that are essential to addressing emergent and inherently interdisciplinary areas of national need and opportunity, much like an index fund. Addressing the urgent diversity of topics and approaches (more than ten relevant, distinct, and essential disciplines) is only possible with a broader group of postdoctoral Fellows. In addition, at least ten fellows per year would allow for the development of a diversely-trained cohort of leaders to address the nation's urgent emerging needs in climate and global change science.

**2. Improving Fellow interaction with NOAA.** Improving fellow interaction with NOAA supports research coherence now and builds networks of contacts and knowledge for later. Fellow interaction with NOAA might include attending a lab review; visiting or giving a talk at NOAA headquarters; or joining NOAA scientists at the AGU [American Geophysical Union] lunch or at the Biannual Summer Institute.

**3. Enhancing diversity and inclusion.** Improving diversity and inclusion relative to the Fellows themselves and the host institutions is critical to advancing the field. Enhanced diversity and inclusion might be achieved by enhancing the language on the website and

advertisements for Fellows, hosts, and host institutions. Similarly, when considering both hosts and applicants, best practices must be incorporated to encourage inclusive and diverse candidates.

**4. Incorporating ongoing and well-maintained metrics.** Measuring the Program is key to understanding and demonstrating the success and excellence of the Program. Metrics might include an aggregated h-index; career progression statistics (narrative of positions and time); grant funding (amounts and counts); early-career grants (amounts and counts); award and medal (count); Ph.D. students (count); other postdoctoral fellowships awarded (count); service to NOAA (narrative); use of NOAA data and resources (narrative); and Fellows hosted by joint institutes, NOAA employees, and cooperative institutes (count).

**5. A note about alternate funding.** Review Panel Members declined to comment on alternate funding for the Program, noting that they would not presume to direct NOAA's funding sources and choices. However, Review Panel Members did identify four criteria for satisfaction relative to alternate funding strategies: (1) The Program requires a single home and point of coordination that serves the Fellows, the hosts, the host institutions, and the overall research. (2) The Program requires overarching accountability, which the Climate Program Office has expertly provided for decades. (3) To preserve the independence, leadership, and innovation of the Fellows, consideration of split-funding with specific already-funded projects should be precluded; however, other funding sources that are contributing without expectation or agenda could be considered. (4) NOAA must be entrepreneurial in approach to simultaneously honor the promise of the past and the purpose for the future.

# NOAA Climate & Global Change Program Review Panel Meeting

## Summary from the Chair and Meeting Summary

### Review Panel Members

**Chair: Joellen Russell**

**Members: Louisa Koch | Ruby Leung | David Battisti**

Review Panel Meeting Date: October 5, 2018  
Report Submitted to the Climate Working Group  
on October 26, 2018

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## 1.0 INTRODUCTION

A panel composed of a diverse field of experts in climate and global change met on October 5, 2018 to hear reports on the history and the status of the Climate & Global Change (C&GC) Program and to make recommendations to NOAA. The Review Panel addressed two charges: (1) Communicating the Program's effectiveness and impact to date; and (2) Suggesting alternate funding options that could maintain the long-term viability of the Program.

Review Panel Members discussed these overarching questions:

### 1. Communicating the Program's effectiveness and impact to date:

- Has the Program clearly defined its objectives, scope, and methodologies for key projects? [Effectiveness]
- Have the Program-funded researchers effectively conducted research and development, given the resources provided? [Effectiveness]
- How well has the Program cultivated its partnerships inside and outside of NOAA? [Effectiveness]
- Do Program-funded researchers demonstrate scientific leadership and excellence in their respective fields? [Effectiveness]
- Are there strategies and approaches that could be used to reach underserved and underrepresented researchers in support of the relevant parts of the NOAA and CPO strategic plan? [Effectiveness]
- What has being part of this Program meant to individual Fellows' careers? [Impact?]
- To what degree are the Program's research and development relevant to NOAA's mission and valuable to the Nation? [Impact]
- How is the Program viewed by the research community? [Impact?]
- How does the Program rank in comparison to other agencies/institutions? [Impact?]
- How does the Program communicate about its impacts to the Fellows, Hosting Scientists, Hosting Institutions, to NOAA, and to the field(s)? [Communication]
- How is the effectiveness of that communication measured? Based on those metrics, is the communication effective? [Communication]

### 2. Suggesting alternate funding options that could maintain the long-term viability of the Program:

- What are the benefits of the NOAA C&GC Postdoctoral Program funding model? What are its challenges?
- What are other postdoctoral funding models? What are their benefits and challenges? Overall, are these current funding models successful in providing robust and meaningful educational opportunity and career

preparation (e.g., NOAA Sea Grant, NOAA/GFDL Postdoctoral program, NSF, WHOI, Lamont, Berkeley, directed research)?

- How can the Program better obtain needed resources through NOAA and other sources?
- Which alternative funding models, if any, should be considered to ensure consistent funding is secured for the Program?

The report that follows is a high-level summary of the presentations and discussions from the State of the Program, Program Status from a NOAA Perspective, Program Impacts from the Fellows' Perspective, and Program Impacts from a Hosting Scientist Perspective. Nothing in the summary that follows represents consensus opinions or recommendations from participants to NOAA. Additionally, the recommendations of Federal Government participants do not represent official NOAA policy.

## 2.0 STATE OF THE PROGRAM

### 2.1 The History of the Program

In 1990, J. Michael Hall, then director of NOAA's Office of Global Programs envisioned the NOAA Climate and Global Change postdoctoral program and invited UCAR [University Corporation for Atmospheric Research] to partner in managing the program. The Program's initial objective, to help create the next generation of researchers needed for climate studies, was later refined to include research on mechanisms of climate variations on time scales of seasons to centuries. The overall goal has always been to provide predictions and assessments of global climate change on seasonal to centennial time scales.

### 2.2 The Annual Process

Most appointments begin at any time until mid-December, although there are occasional exceptions for later starts (see Figure 1, Annual Process). Fellows must provide first-year and final reports; final reports are accompanied by a final report from the hosting scientist. Fellows also participate in a luncheon (for current and past Fellows of the program, steering committee members, and NOAA sponsors) and a Biennial Summer Institute in Steamboat Springs, Colorado, for which the goals are to:

- Develop a sense of community among climate & global change postdoctorates and senior researchers.
- Explore the breadth of climate and global change research problem areas.
- Discuss the future directions of climate science research.
- Discuss the bridge between climate and global change scientific goals and public policy.

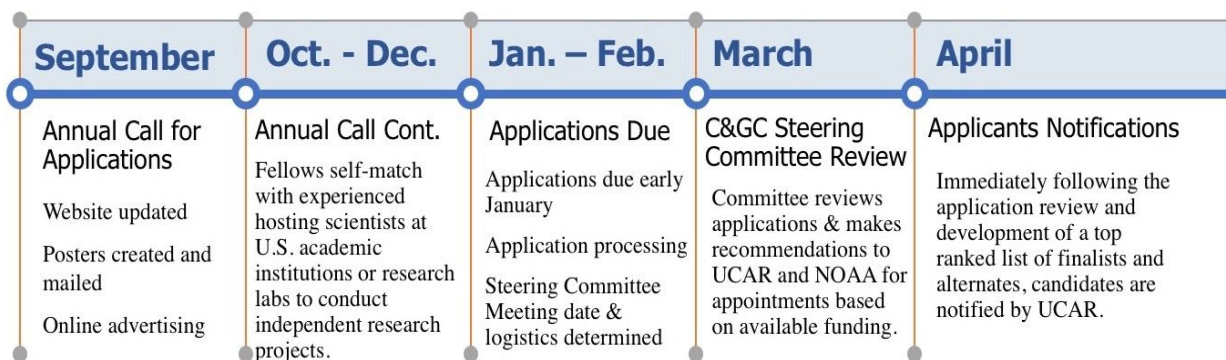


Figure 1. Annual Process

### 2.3 The Annual Costs

The annual costs of the program include: postdoctoral Fellow salaries, postdoctoral Fellow benefits package, the Biannual Summer Institute (funding split between two years), the annual AGU [American Geophysical Union] Postdoctoral Fellow and Alumni Luncheon, postdoctoral Fellow travel and publication allowance, UCAR Administrative Costs. In 2018 and 2019, this was broken out as follows:

2018	2019
<p>\$1,612,943 including:</p> <ul style="list-style-type: none"> <li>• Four new postdoctoral Fellows, two starting in FY2018 and FY2019</li> <li>• Higher budget in FY2018 is from supporting eight postdocs hired in 2016 and four postdocs hired in 2017</li> <li>• Current salary: Year 1: \$64,570, Year 2: \$66,200</li> <li>• C&amp;GC Steering Committee Meeting</li> </ul> <p>Additional funding received:</p> <ul style="list-style-type: none"> <li>• \$127,985 for the 2019 NOAA Summer Institute</li> <li>• \$36,688 for the 2018/2019 C&amp;GC Program Review Meeting</li> </ul>	<p>\$1,342,028 including:</p> <ul style="list-style-type: none"> <li>• Four new postdoctoral Fellows</li> <li>• Three postdocs hired in 2017 and four postdocs hired in 2018</li> <li>• Salary: Year 1: \$65,570, Year 2: \$67,200</li> </ul> <p>Events to be hosted:</p> <ul style="list-style-type: none"> <li>• 2019 NOAA Summer Institute (skipped 2018) previously-funded</li> <li>• Fall AGU NOAA Fellows Luncheon</li> <li>• C&amp;GC Steering Committee Meeting</li> </ul>

## 2.4 The Hosting Institutions

The 58 Hosting Institutions include fourteen “NOAA” institutions consisting of NCDC [National Climatic Data Center], ESRL [Earth System Research Laboratory], ETL [Environmental Technology Laboratory], GFDL [Geophysical Fluid Dynamics Laboratory], and PMEL [Pacific Marine Environmental Laboratory] (see Figure 2, The Hosting Institutions).

Hosting Institution	Number of Fellows Hosted
1. Massachusetts Institute of Technology	21
2. Harvard University	20
3. NOAA*	14
4. University of Washington	14
5. Princeton University	12
6. Lamont-Doherty Earth Observatory, Columbia University	10
7. National Center of Atmospheric Research (NCAR)	8
8. University of California, Irvine	8
9. University of California, Los Angeles	8
10. Woods Hole Oceanographic Institution	8

Figure 2. The Hosting Institutions

## 2.5 The Alumni

Alumni hold positions as diverse as vice-chancellor, provost, associate dean, department chair, and chief scientist advisor. Thirteen alumni have left the field or their positions are unknown.

## 2.6 The Highlights

Highlights since the Program's inception include:

- 226 postdoctoral fellowships
- 952 publications have resulted from the C&GC Fellowship Program with an average of 4.4 publications per Fellow
- C&GC Fellows have been hosted at 58 different US institutions
- C&GC Alumni now work at 132 different institutions worldwide
- 2 MacArthur Fellowship "Genius Grant" awardees

## 3.0 PRESENTER PERSPECTIVES

### 3.1 Questions about the Program Status from a NOAA Perspective

NOAA representatives Meghan Cronin, Roberta Hotinski, Chidong Zhang presented on the program impacts from a NOAA perspective to address these questions:

- What are the Program's impacts to NOAA, both qualitative and quantitative (measurable benefits could include jobs, dollars, advancement of X #s of projects, etc.)?
- What would not have been achieved/advanced, either at all or as quickly, without this Program?
- What consequences would arise were this Program to be diminished?
- Do you have an anecdote of how the Program provides great science, service, and innovation?

### 3.2 Questions about Program Impacts from the Fellows' Perspective

Fellow representatives Liz Moyer, Peter Huybers, and Martin Visbeck presented on the program impacts from a Fellow perspective to address these questions:

- How did this Fellowship help to launch your career?
- What aspects of the Program would you change/add/remove?
- If you have also hosted a Fellow, how did being a Fellow improve your experience as a Hosting Scientist?
- How effectively do you feel the Program communicates to the research community, NOAA, and other stakeholders about its impacts and benefits?
- Are there other funding models you have seen for postdoctoral programs that should be considered for this one?
- Do you have an anecdote of how the Program provides great science, service and innovation?

### 3.3 Questions about the Program Impacts from a Hosting Scientist Perspective

Hosting scientists Dan Schrag, Cecilia Bitz, Leo Donner presented on the program impacts from a hosting scientist perspective to address these questions:

- What do you consider to be the top benefits of hosting a Fellow?



- What impact has hosting a Fellow had on your research/work?
- What impact has hosting a Fellow had on your department/center and institution?
- What impact does this Program have to the field(s)?
- Do you have an anecdote of how the Program provides great science, service, and innovation?

### **3.4 Synthesized Perspectives**

Across the presentations and discussions, participants typically described the Program as highly-competitive, as highlighted by the one-in-ten acceptance rate. Interest in the Program is a function of national and international prestige, which may be driven by the research independence within the Program, which is useful for inquiry during the fellowship and may be important to self-determination and later leadership, as demonstrated by Alumni Fellows who are leaders in climate and global change whether they become faculty at leading research universities or scientists at major research centers.

Relative to the applicant and Fellow stages, participants discussed the diversity and inclusion of applicants, Fellows, host scientists, and hosting institutions. While the importance of each for the Program was mentioned, participants also noted the opportunities for improved outreach to the research and stakeholder community. Participants also discussed the opportunities for additional Fellow service opportunities and improved interconnections with NOAA during the fellowship as opportunities to develop longer-term connections and to better understand the role of the Fellow's research in NOAA's service to society.

Relative to overall career trajectory, the impact of the fellowship on career trajectory was discussed as a significant and important augmentation to the Ph.D. experience. Targeted professional development, in the form of guidance on developing proposals and information about career paths outside academia, was mentioned often as an important part of the career path. Moreover, because the complex modeling and observational elements of climate science limit the number of institutions that can provide career-development experience, the Program is addressing an essential need. The Program has chosen the most self-motivated and independent young scientists and put them on a fast track for career development, which makes the Program an important part of their successful careers.

## 4.0 CHARGE TO THE REVIEW PANEL

**From: OAR Climate Program Office**

**Re: Review of the NOAA Climate & Global Change Postdoctoral Program**

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Since the NOAA Climate & Global Change (C&GC) Postdoctoral Program was established in 1991, the overarching purpose of the program has been to help create and train the next generation of leading researchers needed for climate studies. Anticipating the large amount of data that would be collected from major field programs, such as TOGA COARE, NOAA and the broader research community recognized the need for an expanded workforce here and abroad to advance understanding and improve modeling and prediction. In a larger context, it is necessary to attract new PhDs to the community in order to establish the seeds of scientific leadership needed in the field of climate and global change research.

Over the past 27 years, the Program has evolved into a highly sought after and prestigious source of support for the most promising early career scientists as they develop their own careers and lead critical directions in climate and global change research, contributing to a breadth of climate studies in major U.S. Federal agencies, universities, and organizations. The Program has attracted recent PhDs in sciences to address studies of relevance to NOAA climate programs, the U.S. Global Change Research Program (USGCRP), and many other organizations. The University Corporation for Atmospheric Research (UCAR) has been a partner and managed this NOAA sponsored program from the beginning and has helped to create a generation of over 200 researchers.

Like many federal programs, the C&GC Postdoctoral Program is facing increasingly tighter budget constraints. Over the past two years, the NOAA Climate Program Office (CPO), in light of Executive Branch budget proposals calling for significant cuts in the “climate competitive research” budget line, decided to fund only four instead of the more-recently-typical eight postdocs.

In this context, this Review Panel is charged with conducting a review of CPO’s C&GC Postdoctoral program and making recommendations to the NOAA Science Advisory Board (SAB). CPO requests that the review focus on (1) the communication of the Program’s effectiveness and impact to date and (2) on potential alternate funding options that NOAA could consider to maintain the long-term viability of the Program.

Under (1) the communication of the Program's effectiveness and impacts to date, the Review Panel will:

- A. Review briefly the history of the Program; its evolution; and how well it has cultivated its partnerships inside and outside of NOAA;
- B. Review the quality and relevance of the C&GC Postdoctoral Program and materials to help create and train the next generation of leading researchers needed for climate studies; (Refer to OAR Laboratory Review Guidance for more detailed information about evaluation indicators that might be used by the panel members for the review)
- C. Suggest best practices and metrics that will help C&GC to monitor, assess, and adapt its Postdoctoral activities as conditions change and opportunities arise. If metrics can't be readily identified, then consider a recommendation to explore and create metrics.

Under (2) potential alternate funding options, the Review Panel will:

- D. Review the current Program funding mechanism and recent funding challenges. Explore and suggest alternative funding mechanisms, through, for example, partnering with other federal and non-federal entities, in ways that may help ensure the long-term stability and viability of Program support;
- E. Recommend strategies and approaches to reach underserved and underrepresented researchers in support of the relevant parts of the NOAA and CPO strategic plan.

The Review Panel will be made up of members of the NOAA SAB Climate Working Group (CWG). Information on the Program's history, evolution, leverage, and partnerships will be provided to the Review Panel. Members of the Review Panel and subject matter experts invited to the review shall have the expertise needed to properly assess the Program. The Review Panel will prepare a report by 31 October, 2018, for consideration by the full CWG.

### **Background**

The enabling legislation, the [National Climate Program Act](#), enacted in 2012, directs NOAA to establish a program to "include, but not be limited to, basic and applied research to improve the understanding of climate processes, natural- and man-induced, and the social, economic, and political implications of climate change." Additionally, the USGCRP was established by Presidential Initiative in 1989 and mandated by Congress in

the [Global Change Research Act \(GCRA\)](#) of 1990 to develop and coordinate “a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.” The NOAA Climate Program Office (CPO) strategic plan includes a goal to “empower people and their role in the organization to sustain a highly skilled and competent workforce prepared to deal with changing needs and conditions.” USGCRP’s National Global Change Research Plan 2012–2021: A Strategic Plan for the U.S. Global Change Research Program has the related strategic goal to “Advance communication and education to broaden public understanding of global change and develop the scientific workforce of the future.”

## 5.0 ANNOTATED AGENDA

**October 5, 2018; 8:30 AM - 5:00 PM ET**

**Objectives:** Examine and evaluate the NOAA Climate and Global Change Postdoctoral Program needs, the history and current program model, the value of the program, and the best ways to proceed given the possibility of several different budget scenarios.

**Outcomes:** The Panel will prepare a report, including recommendations, on the quality, relevance, and performance of the NOAA Climate and Global Change Postdoctoral Program. This review will help the strategic planning of the Program's future science.

**Theme:** Climate and global change research ensures that we are a weather-, water-, and extreme events-ready nation.

8:30 AM ALL | Registration [Light refreshments will be available in the open seating area]

9:00 AM WAYNE HIGGINS | Welcome to NOAA

9:05 AM JOELLEN RUSSELL | Welcome, Introductions, Scope of the Day  
Materials: Charge to the Review Panel (see page 4)

The Review Panel has been charged with considering two main foci: (1) Communication of the Program's effectiveness and impact to date; and (2) Potential alternate funding options that NOAA could consider to maintain the long-term viability of the Program.

Under the communication of the Program's effectiveness and impacts to date, the Review Panel will:

- Review briefly the history of the Program; its evolution; and how well it has cultivated its partnerships inside and outside of NOAA;
- Review the quality and relevance of the C&GC Postdoctoral Program and materials to help create and train the next generation of leading researchers needed for climate studies; (Refer to OAR Laboratory Review Guidance for more detailed information about evaluation indicators that might be used by the panel members for the review); and
- Suggest best practices and metrics that will help C&GC to monitor, assess, and adapt its Postdoctoral activities as conditions change and opportunities arise. If metrics can't be readily identified, then consider a recommendation to explore and create metrics.

Under potential alternate funding options, the Review Panel will:

- Review the current Program funding mechanism and recent funding challenges. Explore and suggest alternative funding mechanisms, through, for example, partnering with other federal and non-federal entities, in ways that may help ensure the long-term stability and viability of Program support; and
- Recommend strategies and approaches to reach underserved and underrepresented researchers in support of the relevant parts of the NOAA and CPO strategic plan.

The Review Panel will prepare a report by 31 October, 2018, for consideration by the full CWG.

9:30 AM MEG AUSTIN | State of the Program

Meg will provide background information on the program, including the results from the Postdoctoral Fellowship Questionnaire.

10:15 AM ALL | Break

10:30 AM CHIDONG ZHANG/MEGHAN CRONIN/ROBERTA HOTINSKI | Program Status from a NOAA Perspective

NOAA Lab Directors will speak to the importance of the Program to NOAA.

12:00 PM ALL | Lunch

1:00 PM PETER HUYBERS/MARTIN VISBECK | Program Impacts from the Fellows' Perspective  
Fellows from various classes will speak to the importance of the Program to their career paths and ongoing research.

2:00 PM CECILIA BITZ/ LEO DONNER | Program Impacts from a Hosting Scientist Perspective  
Hosting Scientists will speak to the importance of the program to their work, their institutions, and the field in general.

3:00 PM ALL | Break

3:15 PM REVIEW PANEL MEMBERS | Reviewer Closed Session

Reviewers consider the day's presentations, review materials, and discuss their recommendations.

5:00 PM ALL | Adjourn

## 6.0 MEETING PARTICIPANTS

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