Office of Polar Programs
Arctic Sciences Section (ARC)

Response to the Committee of Visitors (COV) Report
June 16 – 18, 2020

The Arctic Sciences Section (Herein referred to as ARC or the Section) extends its sincere thanks to the members of the Committee of Visitors (COV) for their comprehensive evaluation of the ARC merit review process and program portfolio management. The COV included scholars with strong ties to Arctic policy and the Arctic research community, and the quality of their work reflects a vested commitment to the continuation of a highly productive and influential program. ARC acknowledges the significance of such a large investment of time and effort and the Section values the thoughtful observations and recommendations outlined in the report. Considering the COVID-19 pandemic, ARC especially appreciates the COV's flexibility and willingness to work across time zones to conduct the meeting in a virtual setting.

The Section is gratified by the committee's acknowledgement of efforts to ensure the integrity of the decision-making process. ARC appreciates the recognition of our efforts to improve representation among reviewers, to engage with the scientific community, and our success in working across directorates at the National Science Foundation (NSF). The Arctic Sciences Section will strive to maintain these good practices as it continues to evolve.

What follows is the ARC response to specific recommendations made by the COV in its report.

COV Recommendations with ARC Responses

ARC Section Use of Panels, Section I.1 page 2: The COV strongly recommends that panels be implemented whenever possible…
Section 1.6 page 3: The COV also discourages the omission of panel discussions as there is evidence for conflicting statements in the reviews that may have been clarified through the panel summary.

ARC Response: Program officers must consider many factors when determining the most appropriate review process for a given program, including the number and complexity of proposals received, the degree of interdisciplinarity of the proposed work and reviewer expertise needed, portfolio balance, dwell time, conflicts of interest, and the impacts on the reviewer community. The Section agrees that panels provide valuable additional perspective as part of the merit review, both for NSF and for the Principal Investigator (PI), and as the COV noted, some Arctic programs (e.g. Arctic Natural Sciences, ANS) fully make use of panels as part of the review process. Using panels is not an agency requirement for the review process, but Arctic program officers will continue to consider the use of panels when appropriate and feasible.

Implementation of a Review Analysis Template, Section I.5 page 4: ARC leadership should consider regularizing a review analysis template form with input by the POs that would encourage a more systematic inclusion of review analysis materials… We recognize that review analyses may require a certain degree of flexibility that may warrant deviation from any strict template format.
Section II.1 page 5: Include a table on the first page with ad-hoc reviewers Name, Institution, Area of Expertise, and Score.

ARC Response: Following the COV, Arctic Section Program Officers (POs) compiled a document identifying all "Suggested Elements" in a proposal review analysis. This compilation was circulated among POs, who then had the opportunity for comment. The resulting "Suggested Elements" document provides a template and guidance (referencing appropriate NSF documents) to aid POs in producing a thorough review analysis that contextualizes the proposal, summarizes the reviews and reviewer expertise, and addresses strengths and weaknesses in the proposal's intellectual merit and broader impacts. This template is now in use by the POs and is included in the onboarding materials for new program officers. The template is included as an appendix for COV reference.

Diversity and Inclusion, Section II.3 page 5: This COV agrees with COV 2016 and encourages NSF to continue efforts to improve the participation of under-represented groups as reviewers. We encourage the program to increase the participation of minorities in the review process, particularly women and early-career scientists (post-doctoral and assistant-level professors/scientists).

ARC Response: ARC will continue to include early-career investigators and underrepresented groups, including Indigenous scholars, as part of the review process as panelists and ad hoc reviewers. ARC recognizes that more focused effort is needed to increase diversity in polar sciences and geosciences as a whole. The Advisory Committee for the Office of Polar Programs instituted a sub-committee on Diversity and Inclusion in 2019 that is examining existing efforts and creating recommendations to significantly enhance diversity and inclusion in the polar sciences. ARC program staff also co-lead the Interagency Arctic Research Policy Committee (IARPC) Diversity & Inclusion Working Group, which encourages open conversations on how to increase inclusion and equity in scientific research to enhance problem-solving and generate innovative solutions. ARC created three new funding opportunities aimed at diversifying the Arctic research community and/or ensuring increased inclusion of Indigenous communities in Arctic research:

- the Doctoral Dissertation Improvement Grant solicitation is aimed at supporting diverse students pursuing polar research;
- the Dear Colleague Letter: Potential Support for Community Hubs for Collaborations Between NSF-funded Arctic Researchers and Arctic Residents encourages proposals that increase collaborations between researchers and communities in the Arctic, with an emphasis on Indigenous communities; and
- the Postdoctoral Research Fellowship solicitation encourages research proposals that demonstrate evidence that the recipients will diversify the breadth of polar research and bring perspectives to the polar community that arise from their experience with groups that have not traditionally participated in OPP-funded polar research.

Impacts of No Deadline, Section III.1 page 6: The COV encourages ARC to evaluate the impact of no-deadlines on submission rates, proposal quality, and the review process.

Section III.4 page 8: the COV encourages all possible efforts to decrease dwell times and to keep Investigators informed of pending decisions.

ARC Response: Based on NSF's experiences in other Divisions where deadlines were removed, ARC anticipated that proposal pressure would decrease. The Arctic Sciences Section elected to remove its deadlines to accomplish three goals; reduce workload of POs, reduce pressure on the reviewer community, and provide PIs the opportunity to submit polished proposals. Within each directorate, NSF is analyzing the impacts of no deadlines on programs, on proposers, and on the reviewer communities; a group within the Geosciences (GEO) directorate is exploring ways to qualitatively and quantitatively explore these impacts using NSF data, including the possibility of developing near-real-time dashboards. ARC has participated in these efforts and is tracking dwell times on a monthly basis. ARC will consider these evaluations when planning future actions.

ARC program officers receive a monthly report on dwell times of all pending proposals. This report highlights proposals that are nearing the six-month mark and enables program officers to prioritize their work. The report is part of a pro-active approach to reaching dwell time goals as one of ARC's priorities.

ARC Response to Portfolio Review, Section III.1 page 6: The portfolio review committee recommended that ARC science programs reorganize into three sections: Natural Sciences and Systems (NSS), Social Sciences and Systems (SSS), Coupled Human-Natural Systems (CHNS). The COV recommends that ARC consider this recommendation in light of decreasing proposal submissions.

ARC Response:
ARC will consider this recommendation in a Section retreat that is being planned for later this spring. The three designations suggested by the Portfolio Review Committee do not necessarily capture all of the types of research funded by ARC. While ARC does recognize the intention to reduce barriers across programs and increase interdisciplinary research about the Arctic, other approaches will also be considered. Changing the program names and purpose would require careful consideration to ensure the research community is not dissuaded from submitting proposals by the change. A change to program names and coding would also create internal challenges for comparing data year-to-year. If a change to the organization of ARC is implemented, it must be well-justified, well-designed, approved by NSF leadership and would include sufficient outreach to the research community and other stakeholders.

Strategic Planning for the AON Program, Section III.4 page 8: This COV encourages continued specific planning for AON… The COV recommends that ARC form an external (or internal to OPP) advisory committee to evaluate the AON program balance and proposal submission trends, the viability of AON as a distinct program, and to aid the PO in developing a strategic plan.
Section V.1 Page 15: The COV recommends ARC form an advisory committee to evaluate the AON program balance and proposal submission trends, etc., in an effort to support and aid the PO in developing a strategic plan that meet ARC's vision for the program and reflect the PO's desires to support the Arctic community's growing need for AON-related initiatives.

ARC Response: Given the multidisciplinary range and societal value of sustained Arctic observing efforts, ARC acknowledges the importance of maintaining and strengthening the Arctic Observing Network (AON) program and related activities. Further, the Section agrees with the need to develop a strategic plan for the AON program

and to aid the cognizant PO in its design and implementation. To this end, ARC has begun internal deliberations to develop a pathway for soliciting input from the research community, relevant stakeholders, and end users of Arctic observing products; for identifying and prioritizing Arctic observing needs to enhance the AON program's portfolio; for leveraging NSF cross-Directorate programs, interagency collaborations, and international initiatives; and for communicating the resulting strategic plan to research communities and the general public.

Expansion of Doctoral Dissertation Research Improvement Grants (DDRIG) in the ARC Program, Section IV.2 Page 12: The COV recommends ARC consider an expansion of DDRIG support across all programs.

ARC Response: ARC agrees with the COV's recommendation to expand opportunities for graduate student support through the Doctoral Dissertation Research Improvement Grant (DDRIG) Program. Indeed, ARC had already begun the clearance process for a new solicitation at the time of the COV that not only formalizes the solicitation for proposals for DDRIGs, but also expands the opportunity for DDRIG proposals to 2 more programs in the Arctic Section – the Arctic Observing Network and the Arctic System Science Programs. This new solicitation (NSF 20-597) not only increases funding opportunities for graduate students, but also allows them to become familiar with NSF's funding mechanisms by submitting their own proposal and running their own project (if funded) under the guidance of their advisor.

Additional Comments

Evaluation of Broader Impacts (BI), Section I.2 page 2: The COV believes a clearer articulation of broader impact expectations for each program should be made to the research community
Section III.4 page 10: The COV recommends that all POs clarify expectations of program-specific broader impacts (to PIs, reviewers and panelists), and communicate their role in the merit review process.

ARC Response: Defining Broader Impacts (BI) has been a long-standing topic of discussion at NSF and the Foundation has conducted extensive work and generated several reference materials to aid the PI community in understanding what qualifies as Broader Impacts activities. The Office of Integrative Activities (OIA) hosts a website to serve as a gateway for these materials that includes a workshop report from the Broader Impacts Infrastructure Summit, a video outlining merit review criteria for assessing Broader Impacts, and a link to a website for the recently funded Advancing Research Impact in Society (ARIS). ARIS was funded to "advance the rigor, relevance, and practice of broader impacts (BI) by (a) cultivating and strengthening the existent and emerging BI expert community; (b) building capacity of researchers and educators to enhance and articulate the broader impacts of their work; and (c) creating socio-technical infrastructure able to adapt to stakeholder needs as BI continues to grow and evolve". The center was co-funded by all the major research directorates and is meant to be a resource to researchers, collaborators, and the public.

Currently all reviewers are provided resources on the Broader Impacts merit review criterion when requested to provide an *ad hoc* review or to serve on panel. *Ad hoc* review requests are linked with the explicit Foundation expectation for the BI merit review criterion outlined in the Proposal & Award Policies & Procedures Guide (PAPPG). Panelists are required to participate in a panel orientation that also explicitly outlines expectations on the BI merit review criterion with the opportunity to ask specific questions of program officers after the presentation is complete.

The ARC section is disinclined to set additional ARC-specific expectations surrounding BI on PIs submitting to the Arctic Research Opportunities solicitation. ARC POs want to ensure that PIs have the creative latitude to propose non-traditional BI activities and to tailor their proposed activities to the needs and expectations of their intended beneficiaries.

We will consider implementing a mechanism where we explicitly point to materials hosted by OIA and the ARIS center to better educate the reviewer community on the intellectual development that NSF and grantees have done concerning BI over the past few years.

Release of Information Beyond Review and PO Comments, Section I.6 page 3: The COV encourages POs to send PIs any additional information beyond the Panel Summaries and individual reviews that could shed light on the decision-making process. For instance, POs should be encouraged to share priorities on desired research scope for that particular panel and what Broader Impacts might be considered appropriate for the particular research community.

ARC Response: The Arctic section POs routinely engage one-on-one with individual PIs to discuss their submissions, awards, and declines. This process of cultivating a research community is perhaps not well-captured in the layers of documentation provided to justify the use of federal tax dollars, but NSF staff take great care in providing context for their decisions on proposals using PO Comments. NSF information policies restrict the type of information that can be shared with individual PIs without management approval, so PIs must look to their Context Statement to understand the field in which their proposals were evaluated.

NSF also releases Dear Colleague Letters to the community to express interest in proposals that managing POs and leadership think would benefit the research community. Some recent examples include: Research Coordination and Planning Opportunities for the Directorate for Geosciences (GEO) in Artificial Intelligence (AI); Supporting Data and Sample Reuse in Polar Research; Potential Support for Community Hubs for Collaborations Between NSF-funded Arctic Researchers and Arctic Residents.

ARC Engagement with Research Community, Connecting Awards to Larger Arctic Priorities Section III.2 page 7: The COV recommends that Program Officers continue to facilitate planning and community discussion workshops and town hall meetings (e.g. at AGU), and that ARC compile a running list of these activities.
Section III.2 page 7: The COV recommends that ARC maintain and enhance its participation (where applicable and practical) in national and international Arctic research coordination activities, and that it also encourages community participation in these efforts.

ARC Response: The ARC Section spends a significant portion of its time on engagement with the polar research community and will ensure that it remains a priority in the years to come. Some explicit examples from the past year are:
-NSF leadership in developing the next 5-year Arctic Research Plan (ARP)
-Co-leadership of multiple IARPC Collaboration Teams including Atmosphere, Coastal Resilience, Environmental Intelligence as well as co-leadership of IARPC Working groups on Arctic STEM Education and Diversity & Inclusion
-Active involvement in and contributions to Arctic Council Working Groups (e.g., Arctic Monitoring and Assessment Programme, Conservation of Arctic Flora and Fauna, Sustainable Development Working Group)

-Several Office Hours to update the research community on new solicitations, Dear Colleague Letters, and the impacts of COVID-19 on field work
-Participation in the Navigating the New Arctic (NNA) PI meeting
-Attendance at AGU, virtually staffing the GEO booth, and participating in a virtual Open House with the Arctic research community, including organizing sessions and panels on Polar Science and co-production of knowledge at AGU and Arctic Science Summit Week (ASSW), as well as participation in the "Navigating NSF" Training
-Attendance at Arctic Science Summit Week; membership in and currently chairing the Forum of Arctic Research Operators (FARO); membership and currently chairing the federal-only Board of the interagency United States Arctic Observing Network (US AON); national representation on the Sustaining Arctic Observing Networks SAON); and planning for a workshop on trans-national access to Arctic research infrastructure

ANS/ARCSS Program Identities, Section III.4 page 10: The 2018 Portfolio Review recommended combining the ANS and ARCSS programs and the COV encourages clarification and exploration of the distinct role of ARCSS.

ARC Response: In the time since the COV met, ARC has updated the program solicitation: NSF 21-526 (https://www.nsf.gov/pubs/2021/nsf21526/nsf21526.pdf). The program officers used this opportunity to significantly update the Arctic System Science (ARCSS) program description to be reflective of the new perspectives they brought to their roles. The ARCSS program now solicits:

"…projects that study systems of the Arctic operating at multiple temporal and spatial scales, systems that can inform our understanding of Arctic processes, and the relationship of Arctic systems to other global and regional systems…PIs should ask themselves if their work addresses interactions among several components of the Arctic system, explores emergent behavior in linked subsystems, or otherwise provides essential knowledge, and they should apply that knowledge to system-level understanding.

ARCSS projects are often, but not always, interdisciplinary and can focus on the relationships among physical, chemical, biological, geological, ecological, social, cultural, and/or economic processes…Theoretical and methodological approaches can include (but are not limited to) political ecology, historical ecology, human ecodynamics, food security, resilience theory, Indigenous and local knowledge, socioecological systems, coupled natural human systems, risk and vulnerability studies, ecosystem services, and sustainability studies. ARCSS also encourages projects aimed at creating new knowledge through synthesis of published science, reports and previously collected data to better understand the Arctic system at multiple scales.

If there is doubt as to the appropriate home for a proposal, prospective PIs are encouraged to contact the ARCSS program officer(s) prior to proposal submission."

The specific highlight on the human-natural system is an element new to the program and addresses the request from the Portfolio Review Committee to create a program explicitly addressing that study area. As always, PIs are encouraged to contact POs to discuss where they should submit their research. The POs work closely together across program to ensure that each proposal is appropriately evaluated.