**Questions and Answers from the 16 November 2021 ORCC Webinar**

Below, please find answers to questions asked during the webinar. The answers have been edited for brevity and clarity.

If you have specific questions about the fit of your proposal to the ORCC solicitation, please prepare a 1–2-page project summary that includes the overarching biological question, specific aims, and how the project would address the solicitation specific criteria. You can then email this summary to any of the program officers listed on the solicitation and the program webpage. The working group will discuss your summary and give you feedback regarding its fit to the program.

**Can you explain the difference between the two NSF cross-directorate solicitations - ORCC and Biodiversity on a Changing Planet (BOCP)?**

The existence of these two programs reflects a prioritization in BIO and NSF more broadly of understanding the consequences of global change. Both programs overlap in seeking an interdisciplinary understanding of environmental change-related issues. Whereas ORCC is centered on climate and organismal physiology, BoCP is centered on community, ecosystem and phylogenetic-level patterns and processes. There is room, however, for BoCP projects that get down to species level adaptation, and ORCC projects that scale up to ecosystem processes. Successful ORCC projects could focus on single species to gain deep insights into physiological mechanism that could then be generalized and applied, but successful BoCP proposals would require analyses of biodiversity more broadly. ORCC places a clear emphasis of taking initial steps towards applying research findings toward mitigating the effects of climate change. Whereas BoCP emphasizes functional diversity across spatial and temporal scales, ORCC emphasizes a mechanistic understanding of organismal responses. The relationship of the programs is evidenced by the fact that they share program officers, so if you're considering a project for either of these solicitations, you are strongly encouraged to reach out with a 1–2-page project summary.

**Will this program support international collaborations (Including NSF-BSF and NSF-NERC)?**

*International collaboration*: The short answer is to get feedback from your program officers. The details matter. NSF encourages international collaborations where appropriate and needed. See the PAPPG and reach out to a program officer with your brief 1–2-page description of your plans. <https://www.nsf.gov/pubs/policydocs/pappg22_1/pappg_2.jsp#IID8>

*NSF-BSF collaborations*: ORCC is now a participating program in the collaborative research framework between U.S. and Israeli research communities. Please entitle the proposal as ORCC: NSF-BSF followed by the title and follow the guidelines in the current NSF-BSF DCL: [Dear Colleague Letter: Special Guidelines for Submitting Collaborative Proposals under NSF and BSF Collaborative Research Opportunities](https://www.nsf.gov/pubs/2020/nsf20094/nsf20094.jsp).

*NSF-NERC*: ORCC is not yet a participating program in the NSF-NERC joint funding opportunity. However, as mentioned above international collaborations are encouraged when justified and used to advance the science.

**Do ORCC proposals have to be a multi-PI or collaborative?**

Proposals do not need to be multi-PI or Collaborative. You can submit your proposal as an individual. However, a lot of these projects will be cross-disciplinary and take on aspects that require diverse skill sets, so we expect that many of them will be collaboratives.

**How many years will the solicitation run?**

We hope that this program will run for a while, but the federal government has a new budget every year. We are optimistic and you can see that in the solicitation with respect to the deadlines. There will be two deadlines this year and then in subsequent years one deadline per year, so we are optimistic, but we don't know.

**Can workshop and conference proposals be aimed at bringing a diverse group of researchers together with an eye to writing proposals together in the future? Will you accept planning proposals under the current PAPPG then, to develop teams (if the workshop won't work)?**

This would probably not be a very competitive proposal if the primary goal was to build collaborations for future proposals as opposed to building collaborations themselves. We would certainly hope that workshop and conference proposals would bring together diverse researchers and in indirect outcome of a workshop may be the development of proposals. However, the emphasis is on workshops and conferences that aim to identify new directions for the field or resources needed to relieve limitations to current research. There isn’t a planning track in this solicitation for ORCC.

**If we're looking at climate change effects on multiple biological scales such as individuals, populations, and communities, but it doesn't explicitly consider feedback between these scales would it sink a proposal?**

Feedback between scales is not a requirement. The proposal will be judged on its merits and how it integrates research from organisms with eco-evolutionary components, to improve our understanding and prediction of biological responses to climate change. There are many ways to accomplish this.

**Is there a limit to which ecosystems can be studied? Can the study system be marine? Can the study systems be agricultural production systems?**

ORCC proposals should be focused on organisms and mechanisms in response to climate change in any ecosystem. Marine ecosystems are not off limits. Again, if you have questions about a project along these lines then you are encouraged to reach out to program officers with a 1–2-page project summary.

*Agricultural systems*: It depends on how you're using the agricultural production system. If you're looking at the basic mechanistic responses of a species of plant or an animal, and then predicting how those responses will translate to future climate change or even current climate change, then that would be great. You could use those outcomes to make a plan or even an application to the production system but the production itself would be part of the broader impacts of the proposal. The focus of the research should be basic understanding that can be applied to other systems, hopefully outside agricultural systems or outside the particular system. However, if your primary goal is to improve productivity of maize in Iowa, then this might not be appropriate for ORCC. It has to be something more basic than that, for example, what is limiting plant growth in response to temperature in these types of habitats?

**Is there a limit to grant size? Are ‘small grant’ -type proposals allowed?**

There is no specific call out for small grants, but there's no minimum size that these grants have to be. You can submit a grant that has a modestly sized budget. The project and budget should be aligned.

**Can you describe what is meant by ‘plan or predictive framework’ in our broader impacts? Can project results can go into an earth system model? Can you have collaborators from government employees (NOAA, USDA, etc) or industrial partner?**

We are looking for something that goes beyond statements such as “these data might have implications for x, y, & z”. Proposals should have broader impacts that are closer to actual translation of the results. Some examples might include, but are not limited to, working with a conservation group, natural resource managers, or experiment station extension specialists. For example, if you develop a species distribution model that predicts a change in range of a certain species a collaboration to mitigate negative effects of this change in range might be formed with a conservancy group that would set aside land or develop strategies for assisted migration. Plant mechanistic studies may reveal genetic adaptations to warmer temperatures that then could form the basis for a plan to develop new crop varieties. These examples are a very limited set but we would love to see collaborations with applied groups, such as forestry or natural resource managers. In summary, we're looking for a plan that goes beyond the normal statement about implications of the research, and actually shows the way forward, where some of these results can be used in the near future. We would point out that this is consistent with new emphasis areas for NSF, and also of the current NSF? administration, where they would like to see basic research translated into applied results at a more rapid pace.

*Earth system models:* Yes, this is a perfectly acceptable avenue for incorporation of mechanistic organismal information.

*Government Scientists:* You could certainly have collaborations with NOAA & USDA. Generally, we cannot support the salary of other government scientists, but we certainly can have them as subawards or collaborators on projects. If you establish collaborations, keep in mind that letters of support would be needed by the March 1 deadline. Collaborative letters (which must be in an NSF template) saying that collaborators are going to do what is outlined in the proposal can be uploaded. They're not required, but the more you can show the reviewers that you are serious about this collaboration, and you have resources lined up, the stronger the application is.

*Industrial partner:* Yes, these are allowed, but the details matter, so please reach out to PDs with a 1–2-page project summary.

**Would the ORCC solicitation accept proposals on single extreme climate events? Would understanding responses to these devastating climate events fit the solicitation?**

This is an example where it is best to send a 1–2-page project summary, because the specifics matter. Just getting some feedback is often very helpful. If the work will lead to an increased understanding of the mechanisms for response of organisms to climate change and if a single event allows for that, then that is fine. It is up to the investigators to make a compelling case for how the research would satisfy the solicitation specific criteria. In some scenario’s RAPIDS might be a better fit for extreme events than ORCC.

**Can you give any guidance about what approaches will be considered “mechanistic”? Definitions vary widely across research domains.**

We always struggle with that, so the first answer to this question would be that the onus is on you to provide a rationale for why you think your approach is mechanistic. It could be a behavior, it could be a biochemical reaction, it could be a physiological response. It could be any number of physiological or morphological properties that underlie the basic response of the organism. Mechanism is often in the eye of the beholder. We know that mechanism to a molecular biologist, is different than a mechanism to an organismal researcher, is different than an ecologist. But this is an organismal focused solicitation. So, we're mainly talking about mechanisms on the organismal or sub-organismal level.

**Can you please elaborate on what is meant by the eco- and evolutionary approaches? Does it have to be both kinds of the approaches, or can it be more eco or more evo?**

There is no requirement for a certain balance of ecological or evolutionary approaches. We use that phrase because it's often used in publications about integrating mechanism into species response to climate change. So, what we're looking for is something that goes beyond the organismal mechanism to other levels of organization. It could include the genetic basis of a trait, or the inheritance of a trait, or habitat-allele associations, or whether the mechanism is based on acclimation rather than adaptation. It may involve the evolutionary capacity for populations to adapt to climate change. So we're looking for approaches that will elevate the results from the organism to the population, the community or the ecosystem level.

**Are there any guidelines or preferences between lab and field research? Will proposals that use both approaches be seen as favorable?**

There aren't any guidelines. Again, to use that same language, the onus is on the investigators to make the case for what's needed to advance the science. There's no pre-existing bias of one being more favorable than the other because it really depends on the study objectives.

**What kind of climate change variables will be considered? Temperature is called out specifically, but will other factors be considered as well?**

There are many subtleties in the variables associated with climate change. We know that CO2 increase in the atmosphere leads to increasing temperatures. So, relevant climate change research may include CO2, temperature, changes in precipitation regimes such as more frequent drought, or extreme events that change in duration and frequency as a consequence of changing global temperature and circulation patterns. So, many of the indirect effects of climate change certainly fall into the research foci of this solicitation. If you can relate an abiotic factor to climate change, then certainly it would probably be a fit to this solicitation. Multiple stressors could be considered as well but it is always a good idea to reach out to your program directors.

We would probably rule out things like habitat alteration or habitat destruction. So, if a land use change occurs due to activities other than because of climate change, that would not fall under this solicitation. Again, if you have a specific project or specific factor in mind then you can certainly send us a summary and we can tell you whether we think it would be a good fit.

**Can you elaborate a little bit about what sort of functional genomics approaches might be appropriate? Many of them are organism specific or centric approaches.**

We want to clarify that we do want organism centric proposals, this is in the title of the solicitation. There is no problem with using functional genomics approaches that are organism specific if the results increase our understanding of how organisms respond to stress writ large, and if you can use the results cross-scale to predict outcomes at population or community or other levels of biological hierarchy. If you have questions about the fit of a project based on a species specific functional genomic approach, please send a 1–2-page project summary and have us help determine whether it fits ORCC or a core program.

**How many years are appropriate timeline for the budget of the solicitation?**

You should ask for as many years as needed to perform the work. The proposals that come into NSF range from 3 to 5-year projects. If you need less time to complete the project that is fine too.

**Can you please elaborate on how this solicitation differs from IntBio since both “integration” and synergistic outcomes are expected in both?**

Both solicitations share the property that they are encouraging integrative approaches and synergistic outcomes. The primary difference is that ORCC is focused on climate change and organismal mechanisms whereas IntBio could focus on any biological research topic. IntBio came about because of the desire of the BIO Directorate to integrate across sub-disciplines of biology; molecular biology with ecology with organismal biology and ecosystems biology, etc. So, the IntBio mission is to promote integration across sub disciplines to tackle a problem. ORCC encourages collaborative teams and encourages integrated synergistic projects but is mainly focused on organismal mechanisms of response to climate change – a much more specific focus than in IntBio.

**How broad taxonomically should we be thinking (a broad group of organisms? E.g. salmonid fishes) and/or should we be explicitly considering species interactions as driver to be more competitive?**

You may focus on individual species or groups of species, but we would like for the results to be broadly informative. Research on a single species is okay if you make a compelling case for how the results might be applicable to species or how they increase our understanding of organismal response to climate change. You don't have to include species interactions; you could just be looking at an abiotic interaction with the study system of your choice. But you could also look at species interactions as they impact an organism’s response to climate change - or vice versa how an organism’s response to climate change might impact the biotic interactions it is involved in. Don't limit yourself to the examples we have used in the solicitation or in this webinar, you can certainly go way beyond those examples or not use those examples at all.

**What types of societal outcomes/challenges are considered applied enough? At some level, preservation of species/communities/ecosystems in and of itself represents a challenge to society. How will the panel strike a balance between broader and more specific (within communities, within ecosystems) societal challenges?**

The scientific community, by participating in the review panels will help to determine the balance between broader and more specific societal challenges, and what is applied enough. The panelists will be asked to address these questions for each of the proposals they review. The salient point is that we are looking for more specifics than we may typically see in the broader impacts of proposals that come into the core programs. The solicitation is calling for broader impact plans that go beyond the statement ‘this could be helpful in our understanding of how organisms are going to respond’. We are seeking to stimulate efforts to mitigate the negative outcomes of any predictions based on mechanisms of response, that stem from the research.

**Will ORCC consider microbes and microbiome and their influence on plant communities**?

These systems are certainly appropriate for the solicitation. We would suggest sending a 1–2-page summary to program officers so they can advise you as to whether it's a good fit for the program.

**One of the examples given was how species interactions affect organismal responses to climate change. Would the reverse be appropriate, i.e., how organismal responses to climate change affect species interactions?**

Yes, that would be something that would be an appropriate and important topic of research for this solicitation.

**How long does it take to receive the decision/reviews of a proposal? Can I submit the proposal in November if the one submitted in March is rejected?**

We try to get decisions to PIs within six months of receipt of the proposal, so you should have a decision before the November deadline.

**Will ORCC accept EAGER proposals?**

Currently we are not accepting EAGERs but reach out to POs with your specific ideas.

**Is there a limit on the number or eligibility to submit proposals?**

Consult the Eligibility Information.

*Who May Submit Proposals*: The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the NSF Proposal & Award Policies & Procedures Guide (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

*Who May Serve as PI:* There are no restrictions or limits.

*Limit on Number of Proposals per Organization*: There are no restrictions or limits.

*Limit on Number of Proposals per PI or co-PI:* There are no restrictions or limits."

**Is there a limit on how much annual salary support (# months) can be requested by academic staff in the ORCC program?**

The rules governing salary support follow those in the PAPPG. For full time appointments, the request is limited to 2 months - exceptions can be made but must have a strong rationale.

**Is there any emphasis on organisms? Would it support plant biology, non-model plant systems?**

There is no restriction on what organisms that you use. Any system can be used as long as a strong case is made that you can address important questions.

**Can proposals to ORCC be designated as RUI?**

Yes - but you have to then satisfy the RUI requirements.

**Is this a new pot of funding or will the funds come from other programs?**

Funds are coming from IOS and DEB.

**Should we be looking at the IMAGiNE program for the types of projects that have been funded?**

This solicitation replaces the IMAGiNE DCLs. The IMAGiNE DCLs were more general in their call for proposals looking at organismal responses to the environment – they did not call out climate change specifically. So, awards funded under those DCLs may not always be reflective of proposals sought for this solicitation.

**Are you opposed/excited by -omics approaches?**

'-omics approaches are fine and were called out in the IMAGiNE FG DCL that has been replaced by this solicitation.

**Could we get the links to overlapping solicitations mentioned in the Webinar?**

Organismal Response to Climate Change (ORCC): <https://www.nsf.gov/pubs/2022/nsf22513/nsf22513.htm>

Biodiversity on a Changing Planet (BoCP)

<https://www.nsf.gov/pubs/2022/nsf22508/nsf22508.htm>

Integrative Research in Biology (IntBIO)

<https://www.nsf.gov/pubs/2021/nsf21622/nsf21622.htm>