



NATIONAL SCIENCE FOUNDATION
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NSF 22-107

Dear Colleague Letter: UKRI/BBSRC - NSF/BIO Lead Agency Opportunity in Biological informatics, Systems Understanding of Host-Microbe Interactions, Synthetic Cells and Cellular Systems, and Synthetic Microbial Communities

July 19, 2022

Dear Colleague:

SCOPE

The US National Science Foundation (NSF) and the UK Research and Innovation (UKRI) have signed a Memorandum of Understanding (MOU) on Research Cooperation. The MOU provides an overarching framework to encourage collaboration between US and UK research communities and sets out the principles by which jointly supported activities might be developed. The MOU provides for a lead agency arrangement whereby proposals may be submitted to either NSF (via [Research.gov](https://www.research.gov) or [Grants.gov](https://www.grants.gov)) or UKRI (via Je-S).

Through this Dear Colleague Letter (DCL), the NSF Directorate for Biological Sciences (NSF/BIO) and the UKRI Biotechnology and Biological Sciences Research Council (BBSRC) are pleased to announce 2022/2023 topical areas associated with this lead agency opportunity. The lead agency opportunity allows for reciprocal acceptance of peer review through unsolicited mechanisms; its goal is to help reduce some of the current barriers to working internationally.

2022/2023 NOTICE OF INTENTIONS

The lead agency opportunity allows US and UK researchers to submit a single collaborative proposal that will undergo a single review process by the lead agency, on behalf of both NSF/BIO and UKRI/BBSRC. In 2022/2023 proposals, will be accepted for UK-US collaborative projects in the areas of intersection between NSF/BIO and UKRI/BBSRC as set out in the notice of intentions.

Proposals must address the priorities of both UKRI/BBSRC and participating NSF/BIO

Divisions. Proposers must provide a clear rationale for the need for a US-UK collaboration, including the unique expertise and synergy that the collaborating groups will bring to the project. Proposers should note that the lead agency opportunity does not represent new funding. Proposals will be assessed in competition with all others submitted to the priority areas and agency programs identified in this DCL, and outcomes will be subject to both success in merit review and the availability of funds from both UKRI/BBSRC and NSF/BIO.

Proposals relevant to the following priority areas and agency programs are eligible to apply for the lead agency opportunity in 2022/2023.

BIOLOGICAL INFORMATICS

Proposals should develop informatics approaches and cyberinfrastructure resources to enable novel and more effective use of data in biological research. Proposals should address important current or emerging challenges faced by researchers, supporting generation of new knowledge from biological data.

Proposals should clearly identify their relevance to one of two biological informatics focus areas, either:

1. Research to design novel or greatly improved research tools and methods or
2. The implementation of, scaling of, or major improvements to research tools, products, and services for biology applicable to a wide range of researchers.

Proposals can be in any bioinformatics research area within the scope of both the NSF Directorate for Biological Sciences and BBSRC. Proposals should clearly describe their potential to advance and enable data driven research undertaken by biological research communities primarily supported by both NSF/BIO and BBSRC.

Proposals must be aligned to NSF's Division of Biological Infrastructure informatics (Innovation) OR cyberinfrastructure (Capacity) programs, but NOT both. Principal investigators are advised to consult the appropriate program officers of both agencies to ensure that their portion of the project is compliant with the targeted program.

Proposals should be submitted to:

- [NSF 21-502, Infrastructure Innovation for Biological Research \(Innovation\)](#)
- [NSF 21-501, Infrastructure Capacity for Biology Core Program \(Capacity\)](#)
- [BBSRC Responsive Mode 23RM1](#)

SYSTEMS UNDERSTANDING OF HOST-MICROBE INTERACTION

Proposals are invited that take an integrative approach to address questions relating to

infection and infection-like processes. These host-microbe interactions, mediated through the immune response, can result in a range of pathogenic and non-pathogenic outcomes for the host, including interactions that could be neutral or beneficial. They may also have phenotypic consequences impacting beyond immune recognition and response, such as the impact of microbiome constituents on nutrient processing and physiological signaling.

More holistic studies of diverse and complex systems of infection biology in plants and animals will identify ways to harness infection biology to solve societal problems. This announcement calls for studies that propose systems-oriented investigations that shape our understanding of infection and infection-like processes in complex multi-faceted scenarios such as:

1. Modulation of host-infectious agent interactions in response to varied environmental conditions;
2. The influence of co-infection and the wider microbiome, both in initial responses and in influencing the dynamics of longer-term interactions;
3. How changes to host physiology through the life course may alter susceptibility and resilience; and
4. Factors that contribute towards fundamental shifts in the nature of infections, such as transitions between commensal, mutualistic and pathogenic outcomes.

Relevant areas of investigation include:

- Using genetically similar hosts or microbes that result in different phenotypic outcomes of infection and
- The use of comparative cross-species approaches to develop insights that have broad relevance across biological organisms.

Proposals must aim to progress knowledge of immunology in either non-human, non-mouse animals or plants, through integration of a range of approaches and data across the host-microbe interface to develop new systems-level insights.

Proposals that focus solely on human or mouse immune systems will not be accepted.

Proposals that focus on industrial applications will not be accepted.

Proposals should be submitted to:

- [NSF 21-506, Division of Integrative Organismal Systems Core Programs](#)
- [BBSRC Responsive Mode 23RM1](#)

SYNTHETIC CELLS AND CELLULAR SYSTEMS

Can we design, build and control a synthetic cell or synthetic cellular system? Natural cells emerge from the coordinated operation of a large number of biomolecules with their environment. One goal of synthetic cell research is to decipher the basic requirements of a living cell by understanding the myriad functions that make it resilient and adaptive. Similarly, synthetic approaches to build multicellular systems may reveal new mechanistic understanding of how both biophysical and biochemical intercellular interactions drive spatial organization and emergent behavior within cell populations.

Proposals are expected to focus on building a synthetic cell or cellular system to understand biology. Synthetic cells might be protocells containing only the most basic cellular components that allow an understanding of the origin of life, artificial cells that contain both natural and synthetic cellular components, or minimal cells that use natural molecules to build self-replicating cellular entities through 'bottom up' approaches. Synthetic multi-cellular systems would couple engineering at a cellular level to the development of higher order spatially organized structures, through control of cellular interactions, geometries, movement and collective behaviors.

Proposals focused exclusively on building a synthetic cell as a biomanufacturing platform or as a therapeutic moiety will not be accepted. Biomedically-focused proposals such as regenerative medicine and tissue engineering will also not be accepted.

Proposals should be submitted to:

- [NSF 21-509, Division of Molecular and Cellular Biosciences: Investigator Initiated Research Projects](#)
- [BBSRC Responsive Mode 23RM1](#)

SYNTHETIC MICROBIAL COMMUNITIES

Microbial communities contain remarkable genetic, physiological and biochemical diversity, allowing them to flourish in environments all over the planet and in a variety of substrates and hosts. While the means of harnessing individual microbes for biotechnological application are well established, in recent years researchers have begun to explore the wider properties and potential of more complex mixed microbial communities.

The study of natural microbiomes can be hampered by their inherent complexity and an inability to fully map how the functional properties of their constituents combine to deliver a collective phenotype. Advances in synthetic biology and allied fields are enabling researchers to assemble and engineer synthetic microbial communities from a bottom-up perspective that have novel compositions, genetics and phenotypes. This offers an alternative to natural microbiomes, allowing researchers to address more precisely fundamental questions about complex microbial communities while also providing routes towards novel bio-based solutions to societal problems.

Proposals are invited to support research that:

1. Examines the underlying mechanisms or rules that can be used to inform the construction, maintenance and evolution of synthetic microbial communities, considering factors such as cooperative and competitive interactions within communities, as well as emergent properties within these systems;
2. Examines how to design and control increasing complexity in microbial composition, behaviors and the genetic, metabolic, signaling and physical interactions that occur, as well as how these properties may change within differently spatially structured environments or as processes are scaled to enable practical application; and
3. Builds complex mixed synthetic communities with novel physiological and metabolic outputs, offering potential bio-based solutions that contribute to tackling global challenges such as production of novel biochemical cycles to enable more circular use of resources in the bioeconomy, biodegradation of recalcitrant or 'forever' chemicals', or the development of biorenewable resources that could mitigate our impact on the environment and climate.

Proposals focused exclusively on biomedical or therapeutic applications will not be accepted. All proposals should expand our understanding of biological systems, even if an application is proposed.

Proposals should be submitted to:

- [NSF 21-509, Division of Molecular and Cellular Biosciences: Investigator Initiated Research Projects](#)
- [NSF 21-506, Division of Integrative Organismal Systems Core Programs](#)
- [BBSRC Responsive Mode 23RM1](#)

PROPOSAL PREPARATION AND SUBMISSION

There is a 2-stage application process (see timeline below).

Stage 1: Intention to Submit

1. Prior to submission of a full proposal, proposers will discuss within their research team where they feel the largest proportion of research lies (typically, this means largest budget request) and agree on a proposed lead agency (either NSF/BIO or UKRI/BBSRC). Where advice is required about lead agency or fit of the proposal to the written notice of intentions, the proposer should contact the relevant staff member at the proposed lead funding agency to discuss the research project. The staff member will then confirm that they will act as lead funding agency (and subsequently inform the other participating agency) or will consult with the other agency to identify a new lead

funding agency prior to returning a decision to the proposer (generally within 10 working days).

2. Proposers will then be required to submit a PDF Expression of Interest (EOI) by email or via the Je-S system to the proposed lead agency that outlines the research proposed, research teams involved, and bottom-line estimates of funding to be requested from the NSF/BIO and UKRI/BBSRC. For NSF, bottom line estimates should include both direct and indirect costs. The EOI should not exceed 2 pages.
 - a. Where UKRI/BBSRC is the proposed lead agency, the EOI should be submitted via the Je-S system (see further guidance on UKRI/BBSRC website).
 - b. Where NSF/BIO is the proposed lead agency, the EOI should be submitted via email to NSFBIOBBSRC@nsf.gov. The EOI must identify the participating program to which the EOI is directed.
3. The EOI will be shared with the non-lead agency to check for eligibility (namely whether the proposed research fits within the participating agencies' portfolio, the scope of the notice of intentions and whether the proposed researchers and institutions meet the agencies' funding eligibility requirements). The EOI will also be used to gauge proposal pressure by program and assist programs with budget planning.

Stage 2: Full Proposals

1. If the EOI presents an eligible research project based on the eligibility description above, the subsequent full proposal must be submitted in accordance with the proposal preparation requirements of the lead agency, i.e., for NSF/BIO, the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG) and specific solicitations and for UKRI/BBSRC, the [BBSRC Grants Guide](#).
2. The proposal should include a description of the full proposed research program and research team and describe the total resources for the joint project (that is, the funds requested from both the NSF/BIO and UKRI/BBSRC). However, the budget forms submitted to the lead agency should only indicate the amount requested from that agency. A copy of the proposed requested budget of the non-lead agency should be included as part of the full proposal (in the case of NSF, this should be added as a "Supplementary Document"; in the case of UKRI/BBSRC, this should be added as an attached document to the grant application).
3. For proposals submitted to NSF, UK personnel should be listed as "non-NSF funded Collaborators". Guidance on information to provide for "non-NSF funded Collaborators" is below.
 - Biographical Sketch - Required. The biographical information must be clearly identified as "non-NSF funded Collaborators" biographical information and uploaded as a single PDF file in the Other Supplementary Documents section of the proposal. Use of a specific format is not required.
 - Collaborators and Other Affiliations (COA) Information - Optional but requested.

The COA information should be provided through the use of the [COA template](#), identified as "non-NSF funded Collaborators" COA information and uploaded as a PDF file in the Single Copy Documents section of the proposal.

- Current and Pending Support – Not required.
 - Results of Prior Research - Not required.
4. For projects involving human subjects/participants or animals, proposers will be advised about both NSF/BIO and UKRI/BBSRC policies and will be advised to consult with appropriate staff at NSF/BIO or UKRI/BBSRC prior to submitting a proposal. Proposers are expected to adhere to the published policies and guidelines concerning research ethics and to have requisite institutional approvals or exemptions in place prior to any potential award.
 5. The proposal should indicate the proposal is to be considered under this lead agency opportunity by prefacing the title with 'UKRI/BBSRC-NSF/BIO'.
 6. The proposal must be submitted by established program deadlines or target dates determined by the lead agency. For NSF/BIO, proposals may be submitted at any time after the EOI is deemed eligible but must be submitted within 6 months of the EOI to be considered for funding during the FY23 fiscal year.

MERIT REVIEW

1. Proposals will be reviewed in competition with other unsolicited proposals or with proposals received in response to a specific call by the lead funding agency (that is, proposals submitted to the lead agency opportunity will not undergo a special review process).
2. Proposals will be reviewed in accordance with the lead agency's review criteria. While not identical, the NSF/BIO and UKRI/BBSRC ask reviewers to evaluate the proposed project on both its scientific or intellectual merit as well as its broader or societal impacts. A description of the NSF merit review process is provided on the NSF merit review website at: https://www.nsf.gov/bfa/dias/policy/merit_review/index.jsp. A description of the UKRI/BBSRC assessment process is provided on the UKRI/BBSRC website at: <https://www.ukri.org/councils/bbsrc/remit-programmes-and-priorities/>.
3. The lead agency may share proposal documents and reviews with the non-lead agency via secure file transfer, according to the lead agency's confidentiality regulations. In the case of NSF/BIO, only unattributed reviews will be shared. BBSRC will share the full content of reviews.

FUNDING DECISION

1. After the reviews are received, program directors from the lead and non-lead agencies will discuss the potential outcomes. Afterwards, the lead agency will use its usual internal procedures to determine whether a proposal will be awarded or declined. In the

case of NSF, an award requires a formal recommendation by the Program Officer and then concurrence by the cognizant Division Director. NSF's Division of Grants and Agreements will review the proposal from a business and financial perspective. NSF funding decisions are subject to the availability of funds. Only the NSF Grants Officer can make commitments on behalf of the Foundation or authorize the expenditure of funds. In the case of the UKRI/BBSRC, funding recommendations from Panels are received by Research Council Officers who, taking into account the availability of funds, will fund those proposals recommended for funding in the order identified by the Panel.

2. Proposers will be advised whether their proposal has been recommended for funding or will be declined by the lead funding agency. Proposers will receive copies of the unattributed reviewers' comments and, where applicable, a panel summary.
3. Once a proposer has been notified of a pending award, the non-lead researcher(s) associated with the project must submit a copy of the proposal to the non-lead agency so that each agency has complete documentation of the overall proposed research project.
4. If a proposal is recommended for funding, the US organization(s) will be supported by NSF/BIO and the UK organization(s) will be supported by UKRI/BBSRC. NSF/BIO and UKRI/BBSRC staff will review budgets to ensure that there are no duplications in funding.
5. Because the participating organizations have different funding cycles, it is possible that some projects will have delayed start dates in order to wait until funds become available.

AWARD CONDITIONS AND REPORTING REQUIREMENTS

1. NSF/BIO and UKRI/BBSRC will clearly state in award notices and any related documents that awards resulting from this activity were made possible by the NSF/BIO-UKRI/BBSRC lead agency opportunity.
2. Awardees will be expected to comply with the award conditions and reporting requirements of the agencies from which they receive funding.
3. Researchers will be required to acknowledge both NSF and UKRI/BBSRC in any reports or publications arising from the grant.
4. Requests for extensions will be considered by the funding agency using standard procedures. Requests for changes to awards will be discussed with the other involved funding agencies before a mutual decision is reached.

TIMELINE FOR SUBMISSIONS

Deadline for EOI (UKRI/BBSRC and NSF/BIO): September 21, 2022

Feedback on EOI will be provided three weeks after the submission deadline.

Full Proposals

BBSRC Responsive Mode 22RM1 application deadline: January 2023 (date TBC)

NSF/BIO: Full proposals accepted anytime but should be received by February 2023 to ensure timely review for FY 2023 funding.

CONTACTS

UKRI/BBSRC International Collaborative Agreements

Email: inca@bbsrc.ac.uk

NSF/BIO UKRI/BBSRC Working Group

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