



BioFoundries

to Enable Access to Infrastructure and Resources for
Advancing Modern Biology and Biotechnology

BioFoundries Team

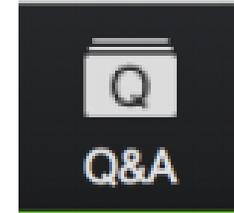
Program Webinar, June 15, 2023

<https://new.nsf.gov/funding/opportunities/biofoundries-enable-access-infrastructure>



Questions

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 - Will answer questions live (not in the module)
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Program Contacts

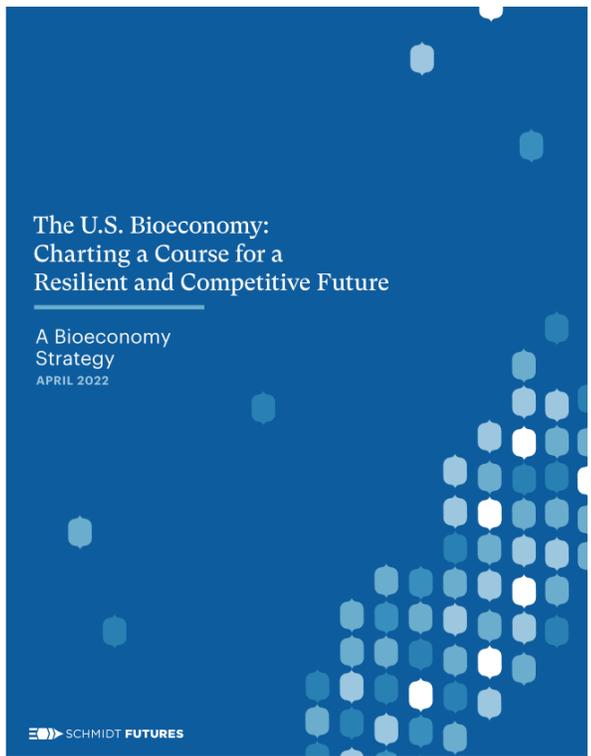
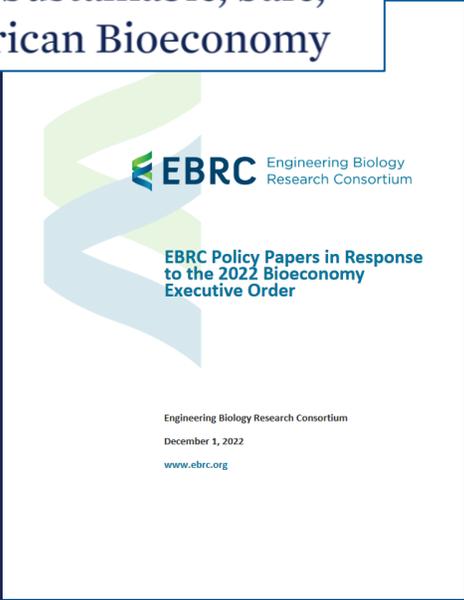
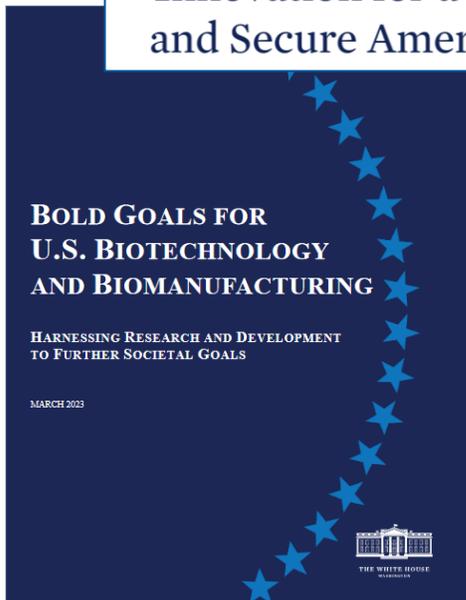
Theme	Program Directors
Biological Sciences (BIO)	Sri Raghavachari (DBI) / Anthony Garza (MCB)
Computer and Information Sciences and Engineering (CISE)	Mitra Basu (CCF) / Vladimir Pavlovic (IIS)
Engineering (ENG)	Laurel Kuxhaus (CMMI) / Steve Peretti (CBET)
Geosciences (GEO)	Alberto Perez Huerta (EAR)
Mathematical and Physical Sciences (MPS)	Charles Ying (DMR) / Gregory Collins (CHE)
Social, Behavioral and Economic Sciences (SBE)	Lee Walker (SES) / Dwight Kravitz (BCS)
Technology, Innovation and Partnerships (TIP)	Ruth Shuman (TI)



Need for BioFoundries

SEPTEMBER 12, 2022

Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy



Feeding the Planet Sustainably



Building a Biotechnology Innovation Ecosystem to Mitigate Climate Change



World without Waste A Circular Bioeconomy

A UIDP Bioeconomy Workshop
Aug. 19-20, 2021

A UIDP Academy Workshop
Oct. 12-13, 2021





Outline

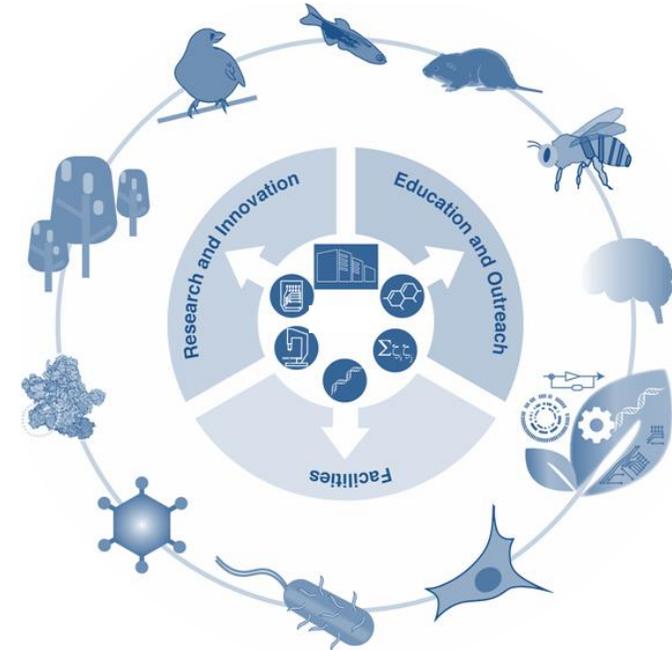
- Program overview and structure
- Program-wide considerations
- Questions



BioFoundries

New NSF-wide initiative

- Program designed to accelerate advances in the biological sciences, chemical biology, biotechnology, and bioengineering via access to modern infrastructure, technology, and capacity
- Addresses needs outlined in several reports and recent Executive Order on Biotechnology
- Builds on existing NSF investments and programs (e.g., Materials Innovation Platforms, EDGE, NeuroNex, RECODE, partnership with DOE Agile BioFoundry, Future Manufacturing, Cyber-Physical Systems)





What is a BioFoundry?

BioFoundries are integrated facilities that combine biological, chemical biology, and engineering biology systems and tools with automation, high throughput measurement, integrated data acquisition and analysis, and artificial intelligence (AI) and machine learning to:

- Catalyze transformative discoveries in biological and engineered biological systems
- Provide access to instrumentation, workflows, tools and processes
- Enable feedback loops that facilitate progressive end-to-end cycles of design, build, test, and learn.



Accelerate
Biodesign



Build Capacity for
Innovation



Democratize
Access to Tools



Develop NextGen
Workforce



Program Timeline

Milestone	Program-wide timeline
Solicitation release	May 8, 2023
Webinar	Today
LOI due	August 01, 2023
Full proposals due	October 02, 2023
Schedule Reverse Site Visits*	December 2023
Reverse Site Visits*	January 2024
Anticipated start date of awards*	April 2024

** Date is anticipated*



Letters of intent

MUST be submitted prior to a full proposal

1. Title of the proposal should be preceded by "BioFoundry:",
2. In the Manage Senior Personnel section, include all Co-PIs and senior personnel on the project - Maximum of 4 senior personnel (excluding PI),
3. In the Manage Participating Organizations section, include all the institutions involved in the project – Max 5 institutions excluding Lead,
4. In the "Project Synopsis" section, provide a synopsis that describes the proposed BioFoundry, including expertise of the Project PI and Senior Project Personnel, and sufficient detail to permit an appropriate selection of potential reviewers. (limit: 2,500 characters, including spaces).



Full Proposals

- Must follow the LOI - submitted to same theme by same lead organization
- Max 37-page Project Description. Must include sections listed
- Follow all PAPPG guidance for items not specified in the instructions

- Senior participant list
- Results from prior NSF support
- Vision, goals and rationale
- Research program
- User facility operation plans
- Technology development
- Platform/knowledge sharing
- Management Plan

Broader Impacts

- Education/Training
- Diversity strategic plan
- Partnerships and translation

Include each of these headings



Desired Aspects of a BioFoundry

1. A user facility that provides technical capacity and infrastructure
2. Multidisciplinary research and technology development teams that synergistically conduct research and develop next generation instrumentation, experimental and computational methods, workflows and automations in **any aspect of biology and biotechnology domains supported by NSF**
3. Grow the next generation of talent
4. Be nexus points for academic/industry collaborations to enable pathways for translation



Vision and Research Program

- Address a fundamental or grand challenge in science or engineering of biological systems
- Support in-house and external user-initiated research programs for catalyzing transformative discoveries and new innovations across the range of biological and biologically engineered systems supported by NSF
- Coherent multidisciplinary groups of scientists, engineers and educators appropriate for a large-scale, long-term research agenda for the advancement of modern biology and biotechnology.
- Catalyze foresight and adaptability beyond what is possible in single research projects.
- Have a transformative impact on biosciences, biotechnology and bioengineering



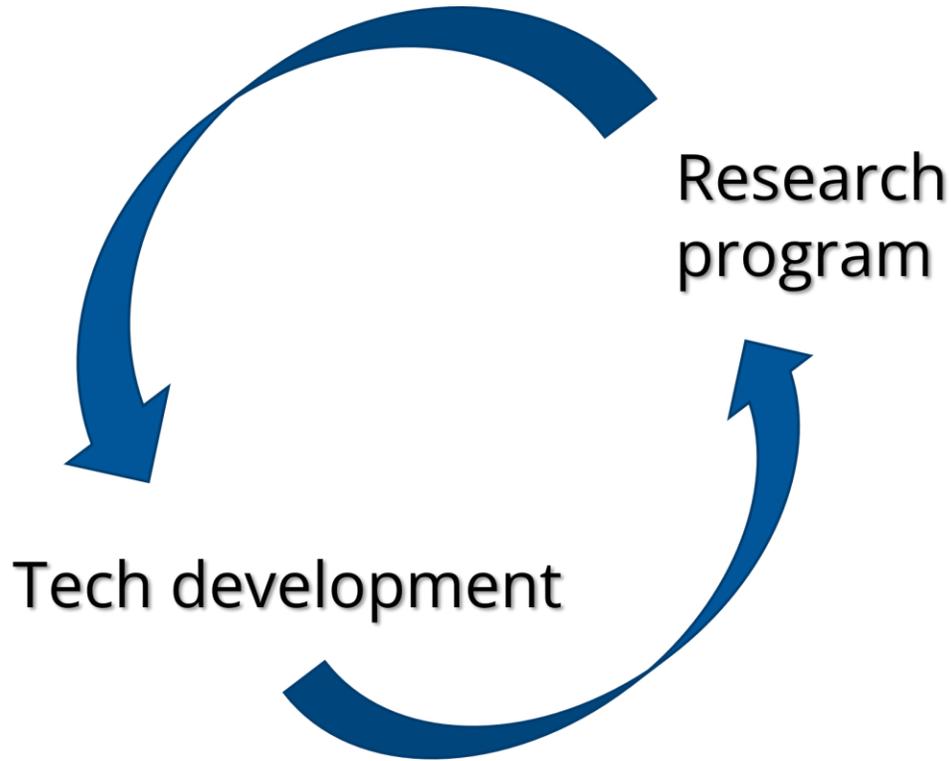
User-facing Activities

- Provide resources/instrumentation/technology to external users
- Increase access to cutting edge tools/workflows/infrastructure to a diverse array of institutions
- Proposal should detail user access models and plans for user engagement, and training
- Effective strategies for coordination and management of user facing activities
- Metrics for community engagement should be clearly outlined

BioFoundry proposals that do not describe an extensive plan for broadening user access to cutting edge resources will not be responsive to this program



Technology Development



- Foundries should engage in strategic development, deployment, and refinement of relevant research tools, including software and AI based approaches, technologies, or instrumentation.
- Emphasize the virtuous cycle between technology development and research activities (in-house and user-facing).
- Be responsive to community needs
- Provide an assessment of the risk associated with the technological development, instrument acquisition, and user facility commissioning.



Platform/Knowledge Sharing

- BioFoundries have the potential to contribute towards accelerating discovery by facile sharing of tools, reagents, workflows, software and know-how and the development of *de facto* standards
- BioFoundries are expected to incorporate the emerging fields of data science, including artificial intelligence and/or machine learning, as appropriate.
- Proposals should describe as appropriate priorities, programs, mechanisms, and other considerations knowledge sharing and their effectiveness
- Mechanisms should create a culture of knowledge sharing consistent with FAIR data principles and NSF policies



Grow The Next Generation of Talent

- Well chosen educational and training activities that interact with research goals (e.g., workshops, schools, webinars etc.)
- Outreach plans to increase user base
- Attract diverse communities with a focus on broadening participation among the full range of groups traditionally under-represented in science and engineering
- Leverage the visionary research focus and integrate education and workforce development for a whole *"greater than the sum of its parts"*



Partnerships and Translation

- BioFoundries are expected to accelerate translation of products and processes for societal benefit
- These may include collaborations with industry, licensing of research by third party or a start-up, or adoption of technologies by public sector or non-profits
- The overall strategy of IP and management of IP should be described
- Strategies for fostering translation and innovation should be tailored to meet the stated goals for users and key non-academic stakeholders, particularly in the context of intellectual property protection, licensing, entrepreneurship, development and distribution of open-source tools, or other knowledge transfer paths



Broadening Participation

Each BioFoundry is expected to have an effective plan for encouraging participation by a diverse group of users. These include:

- Users from diverse institutions (R1, non-R1, MSIs and HBCUs, PUIs and EPSCoR jurisdictions)
- Users that are traditionally under-represented in STEM

Develop metrics to track the effectiveness of diversity plans
Leadership and management should espouse these principles



Organization of BioFoundries

1. Each BioFoundry will have a lead PI with demonstrated experience to manage complex multi-faceted projects
2. Leadership team (at the minimum)
 - Managing director – oversee ongoing operations, reporting and coordination
 - User facility coordinator – oversee user facility operations, engagement with user community and other aspects
 - External advisory board (potential EAB members should not be identified in the proposal until after funded)
3. Additionally, BioFoundries can have coordinators for training, diversity, and translation activities
4. Leadership model should empower team members to contribute within a culture of collaboration and inclusion



Items not supported

The BioFoundries Program will NOT support requests for any of the following:

- Construction, renovation, or modernization of rooms, buildings or research facilities;
- General-purpose and supporting equipment.
- Sustaining infrastructure and/or building systems.
- General-purpose platforms or environment.
- Projects that would be eligible for support through core, center, or infrastructure programs funded by other parts of NSF.
- Research that might be considered exclusively focused on drug testing or biological mechanisms of human diseases.

BioFoundry proposal submissions focused exclusively on drug screening for treatment of human diseases will be returned without review.



BioFoundry award terms

All awards will be made as cooperative agreements

1. 2-4 BioFoundries at \$15-24 M each
2. Will support acquisition and development of instrumentation, technologies, cyberinfrastructure, staffing, technical staff and a limited number of students and postdoctoral researchers
3. Initial commitment of six (6) years
4. Continuation dependent on program evaluation, performance and availability of funding
5. 50% of the funds (after subtracting equipment costs) should be devoted for user facing activities



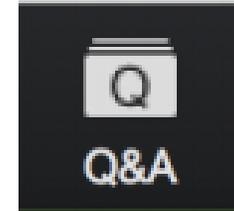
Notes on Submission and Eligibility

- Institutions who may apply.
 - Institutions of Higher Education (IHEs)
 - Non-profit, non-academic organizations
 - Other organization types (e.g., FFRDCs) may be included as sub-awardees on proposals
- Limit on Number of Proposals per Organization: 1
 - Collaborative proposals are to be submitted from a single organization.
 - Limit applies to the submitting (i.e., “lead”) organization
 - No limit on participation as non-lead (collaborating) organizations
- Limit on Number of Proposals for Senior Personnel: 1
 - Senior personnel defined in PAPPG, includes but not limited to PI/co-PI
 - PI/co-PI are subset of “senior personnel”



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Selected Frequently-Asked Questions

- Letters of collaboration...

"If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment and Other Resources section of the proposal."



Selected Frequently-Asked Questions

- Letters of collaboration...
- Should I obtain letters of collaboration from organizations appearing in the budget as collaborating organizations?
 - No, their participation is explicit in your proposal.
- Can the letter include statements of support or capability?
 - No. Follow the guidance in the PAPPG (see Chapter II.C.2.j)



Selected Frequently-Asked Questions

- How do the submission limits apply to campuses of the same university system?
 - Follow the PAPPG and consult the related FAQ
https://www.nsf.gov/bfa/dias/policy/papp/pappg22_1/faqs22_1.pdf
 - Eligibility: “Can different campuses of the same university system submit separate proposals in response to a program solicitation that limits the number of proposals to one per organization?”
 - A distinct organization for this purpose:
 - Has its own DUNS and is registered via an NSF electronic system using that;
 - has separate Sponsored Projects Offices that can submit proposals directly to NSF;
 - is listed as the awardee organization on the NSF Cover Sheet



Selected Frequently-Asked Questions

- Can we consult with program contacts about our proposal plans?
- Program contacts prefer that you email your questions.
- Address all program contacts in the theme.
- Include a project summary of up to two pages.



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