Division of Molecular and Cellular Biosciences (MCB)

Virtual Office Hours

Welcome!

We will begin at 2pm ET

Questions and Answers

Submit your questions via the Q&A box on your screen

- You may elect to submit your question anonymously.
- For specific questions about your project, please contact a Program Director.

Next MCB Virtual Office Hour

April 10, 2024: How to Write a Great NSF Proposal

MCB Core Solicitation – NSF 24-539

To submit proposals for:

- **MCB core clusters**
  - Cellular Dynamics and Function; Genetic Mechanisms; Molecular Biophysics; Systems and Synthetic Biology
- **IntBIO Track - including LIFE proposals for MCB**
- **Dear Colleague Letters - including NSF-DBT India proposals for MCB**
- **EXPAND MCB in EPSCoR Track**
  - Collaborative proposals between a PI in an EPSCoR jurisdiction with PI(s) in any jurisdiction, with the EPSCoR organization serving as the lead. The project should lead to increased research and training capacity in scientific areas supported by MCB.

    Upcoming VOH: July 10, 2024
- **Other**
  - Conferences, EAGER, RAPID, RAISE (these require prior consultation with PD)

    Resource: August 11, 2021 - VOH slides/recording

MCB Virtual Office Hour

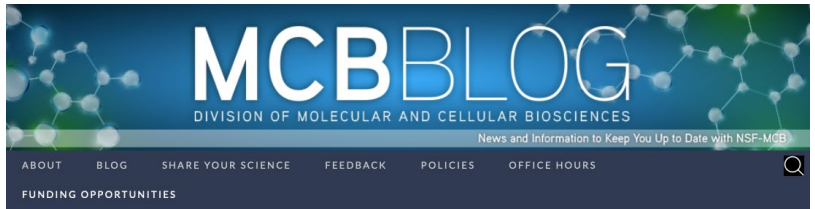
Today's Topic:

Special Funding Opportunities Relevant to MCB PIs

(IntBIO, LIFE, NSF-DBT India)

Slides and recordings of past presentations at

https://mcbblog.nsfbio.com/office-hours/2/



Note: underlined text = hyperlinks

IntBIO Integrative Research in Biology Track

- **What:** Integrative biological research spans subdisciplines and incorporates cutting-edge methods, tools, and concepts from each to produce groundbreaking biological discovery. Research should be synergistic and produce novel, holistic understanding of how biological systems function and interact across different scales of organization.
- Proposal title begins with IntBIO:
- Apply to IntBIO via one of the BIO core solicitations.

MCB - 24-539 - Loretta Jackson-Hayes lojackso@nsf.gov

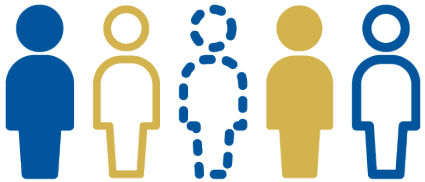
DEB – 24-543 - Steve Dudgeon sdudgeon@nsf.gov

IOS – 24-546 - Suzy Renn srenn@nsf.gov

Jodie Jawor jjawor@nsf.gov

IntBIO Program Goals

Scientific: To support *collaborative* scientists for innovative, *integrative* research on fundamental questions that cross different scales of biological organization, using perspectives and approaches from more than one biological *subdiscipline*



Training: To prepare a *new generation* of scientists who reflect the diversity of the nation and are ready to contribute to future research through *integrative* approaches

IntBIO Solicitation Specific Criteria

- Overarching question
  - Should be addressed through bold, integrative, hypothesis- or question-driven research about function/interaction of biological systems across scales of organization
  - Requires integration across subdisciplines, or development of tools/technology for integrative analysis
- Synergistic outcomes from interdependent, integrative components
- Graphical illustration conveys integrated elements and synergistic outcomes
- Description of investigative team including roles and qualifications of two or more investigators (may be from the same institution)
- Training and education plan as part of the broader impacts that is inclusive and likely to produce new generation of scientists trained in integrative approaches to biological research

Leveraging Innovations From Evolution

The rich diversity of life and its evolutionary innovations means a treasure-trove of bio-solutions resulting from millions of years of organisms confronting and solving environmental challenges.

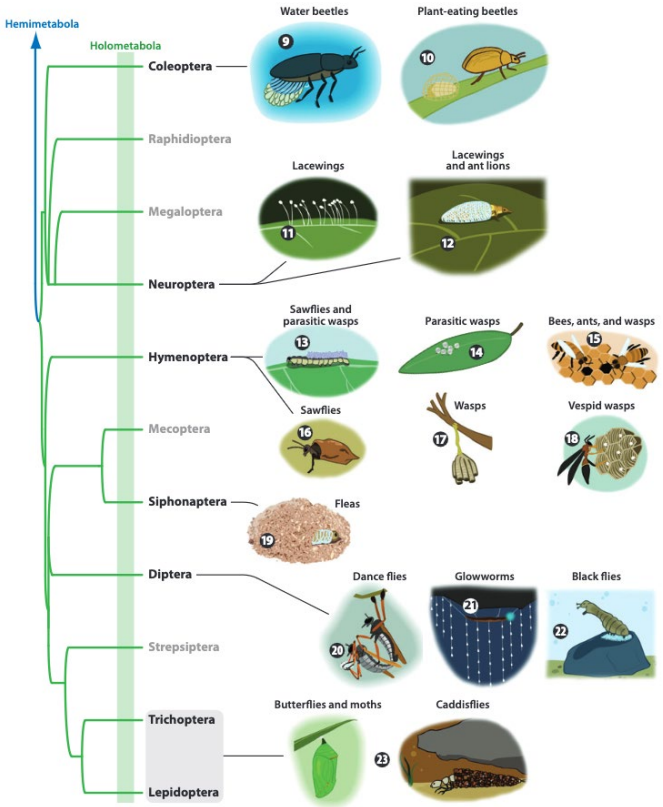
- **Convergent Evolution** – analogous traits arise independently in separate lineages across the ToL
- **Leveraging Innovations** - use the diversity of life to discover common or unique molecular and evolutionary mechanisms to speed discoveries of nature-based solutions

LIFE DCL NSF 24-409

- To speed discovery and understanding of convergent biological innovations that hold significant potential for applications in the bioeconomy (*nature-based solutions*)
- Integrating evolutionary perspectives with mechanistic studies of gene and genome function across the tree of life
- Proposals are particularly encouraged to include
  - novel research collaborations
  - robust integrative training initiatives that cross intellectual silos and bridge the fields of molecular and cellular biology, biochemistry, organismal biology, systematics and/or evolutionary biology
- Translational aims encouraged but not required

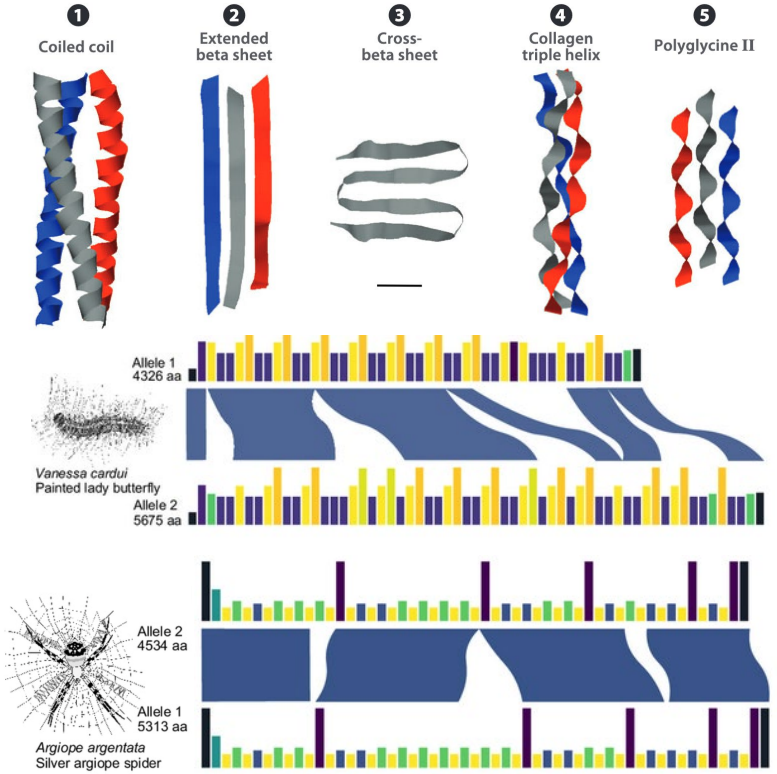
LIFE: Convergence to Translation

Arthropod Silks



Silk has evolved independently at least 20 times: insects, spiders, molluscs, crustaceans

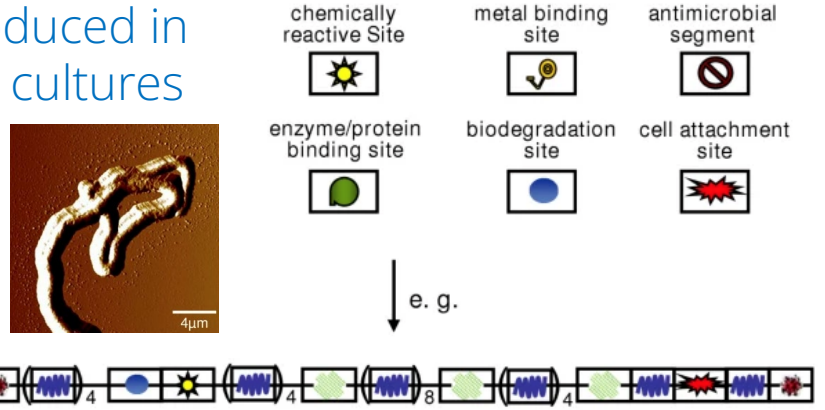
Sutherland et al. 2010. Annu. Rev. Entomol. 55:171-188



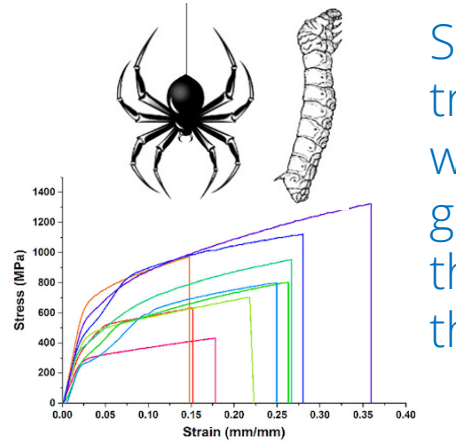
Remarkable convergence in allelic variation in insect silk

Frandsen et al. 2023 ***PNAS*** 120:e2221528120

Synthetic silk produced in cell cultures



Scheibel 2004. *Microbial Cell Factories* 3:14



Silkworms transformed with spider genes spin silk that is tougher than Kevlar

Mi et al. 2023. *Mattter* 6:P3661-3683

LIFE – How to submit:

- Directly to core solicitation in DEB, MCB, or IOS, OR
- Directly to the Infrastructure Innovation for Biological Research in DBI (NSF 23-578), OR
- IntBIO track:
  - Title begins with IntBIO:LIFE
  - IntBIO must be co-reviewed by two BIO programs
  - See previous slide for additional requirements for IntBIO submissions

More Information about LIFE

- Contact a Program Officer: LIFE@nsf.gov
- Reports from community scoping workshops in 2023: https://ag.purdue.edu/department/biochem/research/nsf-life/

Lead PI: Jennifer Wisecaver, Purdue University

National Ecological Observatory Network (NEON)

- NSF-funded network of 81 highly instrumented field sites distributed in 20 eco-climatic domains across the United States.
- Provides standardized, open data on 182 data products accessible through the NEON data portal.
- Extensive biorepository that offers specimens and samples that can be requested for research purposes
- NEON also has an assignable assets program that allows PIs to make special requests to use NEON infrastructure,

Video of NEON assets

Interactive Overview

भारत सरकार
GOVERNMENT OF INDIA

विज्ञान और प्रौद्योगिकी मंत्रालय
MINISTRY OF SCIENCE AND TECHNOLOGY

सत्यमेव जयते

जैवप्रौद्योगिकी विभाग
DEPARTMENT OF
BIOTECHNOLOGY

U.S. National Science Foundation and India's Department of Biotechnology

NSF-DBT Dear Colleague Letter

NSF 24-054

NSF PARTICIPATING PROGRAMS

- Directorate for Biological Sciences (BIO)
  - Division of Integrative Organismal Systems
    - **Plant Genome Research Program**
  - Division of Molecular and Cellular Biosciences
    - **Systems and Synthetic Biology**
    - **Molecular Biophysics**
- Directorate for Engineering (ENG)
  - Division of Chemical, Bioengineering, Environmental, and Transport Systems
    - **Cellular and Biochemical Engineering**
    - **Biosensing**
- Cross-Directorate
  - **Future Manufacturing: Future Biomanufacturing Research Thrust**

OISE India International Collaborations Webpage

india-collaboration@nsf.gov

जैवप्रौद्योगिकी विभाग
DEPARTMENT OF
BIOTECHNOLOGY
सत्यमेव जयते

IMPORTANT INSTRUCTIONS

- Proposals are expected to **adhere** to the proposal page limitations, research areas, funding limitation, and award durations for the participating NSF programs from which funding is sought.
- For U.S. Investigators, involvement in a joint international proposal will count towards the limitation on the number of submissions, as specified in the NSF program webpage or program solicitation to which the proposal is submitted.
- Proposals should be relevant and advance knowledge in the areas of focus outlined by the participating program of interest.

PROPOSAL PREPARATION

- The Project Summary and Project Description must include a description of the collaboration.
  - Role(s) of the Indian collaborator(s)
  - Explain how the team will work together
  - Resources provided by each team
- Address the Intellectual Merits of international collaboration and the Broad Impacts should include relevant societal benefits.
- Follow NSF's Proposal and Award Policies and Procedures Guide (PAPPG) and the program description.
- If a program has a solicitation, the requirements in the solicitation take precedence over those listed in the PAPPG.

PROPOSAL SUBMISSION

- U.S. investigators submit proposals to NSF
  - Research.gov (https://www.research.gov)
  - Grants.gov (https://www.grants.gov/)
- Proposal title must start with "NSF-DBT:"
  - For example – NSF-DBT: Fundamentals of Raising Puppies
- A separate copy of the same proposal to be submitted by the India investigators to DBT
  - Identical – Title, Summary, Description and References
  - Agency specific – See DCL Guidelines
    - #3 - The DBT budget and budget justification must be included in the NSF proposal as a Supplementary Document.
    - #10 - Non-NSF funded collaborators require additional information
- Proposal submission due date is **April 11, 2024**

PROPOSAL **REVIEW**

- DBT will check that the Indian investigators have active and appropriate roles and confirm their eligibility at the onset of the process
- Proposals will be reviewed by experts contacted by NSF
  - DBT may recommend experts from India
  - Proposals will compete with other proposals received for the same funding round of the program to which the proposal is submitted
- DBT officials may attend and observe any discussions as part of the merit review
  - A parallel review will NOT be conducted by DBT

PROPOSAL FUNDING

- NSF will share outcome of review process with DBT
- DBT will honor the NSF review process
- NSF will honor DBT inputs and insights
- NSF intends to make awards to the U.S. investigators
- DBT intends to make awards to the Indian investigators
- Submission outcomes expected mid-Fall 2024

Use-Inspired Acceleration of Protein Design (USPRD)

USPRD seeks to advance protein design and its applications:

- **Use-driven applications** for small binders
- The design and use of **enzymes** and families of enzymes

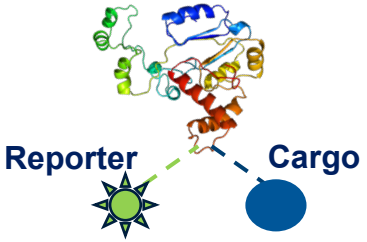
Focus on use-inspired translational research with applications beyond human therapeutics.

Examples: Advanced materials, biomanufacturing, agriculture and food security, environmental remediation, sustainability, climate-related challenges etc.

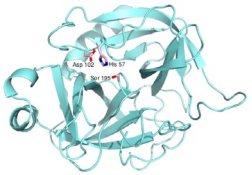
Only teams/groups formed during a special **Ideas Lab Workshop** may be eligible to submit full proposals.

By invitation only, based on a 2-page preliminary proposals.

Small Binders



Enzymes



Preliminary proposals to participate are due **April 23, 2024** (see solicitation for required documents)
Ideas Lab Workshop will take place **on June 10-14, 2024**, in the vicinity of Alexandria, VA

Figures adapted from chemistry.harvard.edu; wikiversity.org

Upcoming…

Office hours:

- Wed April 10th, 2024, 2-3 pm ET
  How to Write a Great NSF Proposal
- Wed May 8th, 2024, 2-3 pm ET
  Faculty Early-CAREER Development Program (CAREER)
- Wed June 12th, 2024, 2-3 pm ET
  Meet MCB Program Directors

Funding opportunity deadlines:

- Building Research Capacity of New Faculty in Biology (NSF 22-500);
  May 1 - July 1, 2024
- Research Experiences for Teachers Sites in Biological Sciences (BIORETS) (NSF 21-584);
  July 31, 2024

See Funding Opportunities page on MCB blog for other relevant funding calls.