Biological Sciences at NSF

Spring 2021 Virtual Grants Conference

Phoebe Lostroh, PhD

Program Director

Division of Molecular and Cellular Biosciences

Directorate for Biological Sciences

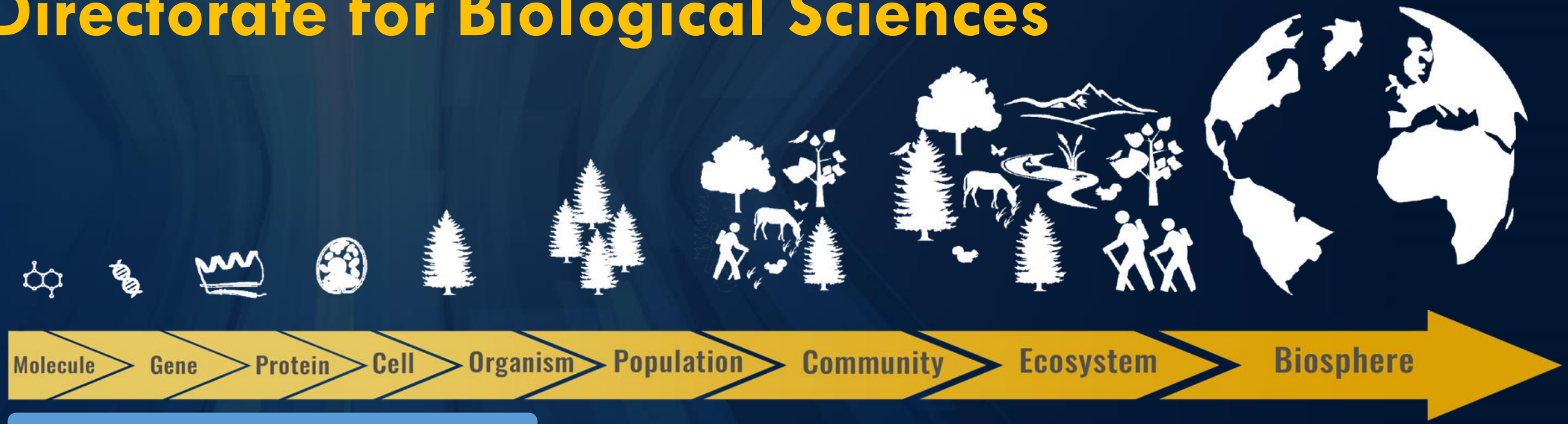
Biological Sciences at NSF

What kind of science do we fund?

How does a scientist apply for NSF funding?

Funding for people at specific career stages

Directorate for Biological Sciences



Molecular & Cellular Biosciences

Integrative Organismal Systems

Environmental Biology

Biological Infrastructure

Molecular & Cellular Biosciences

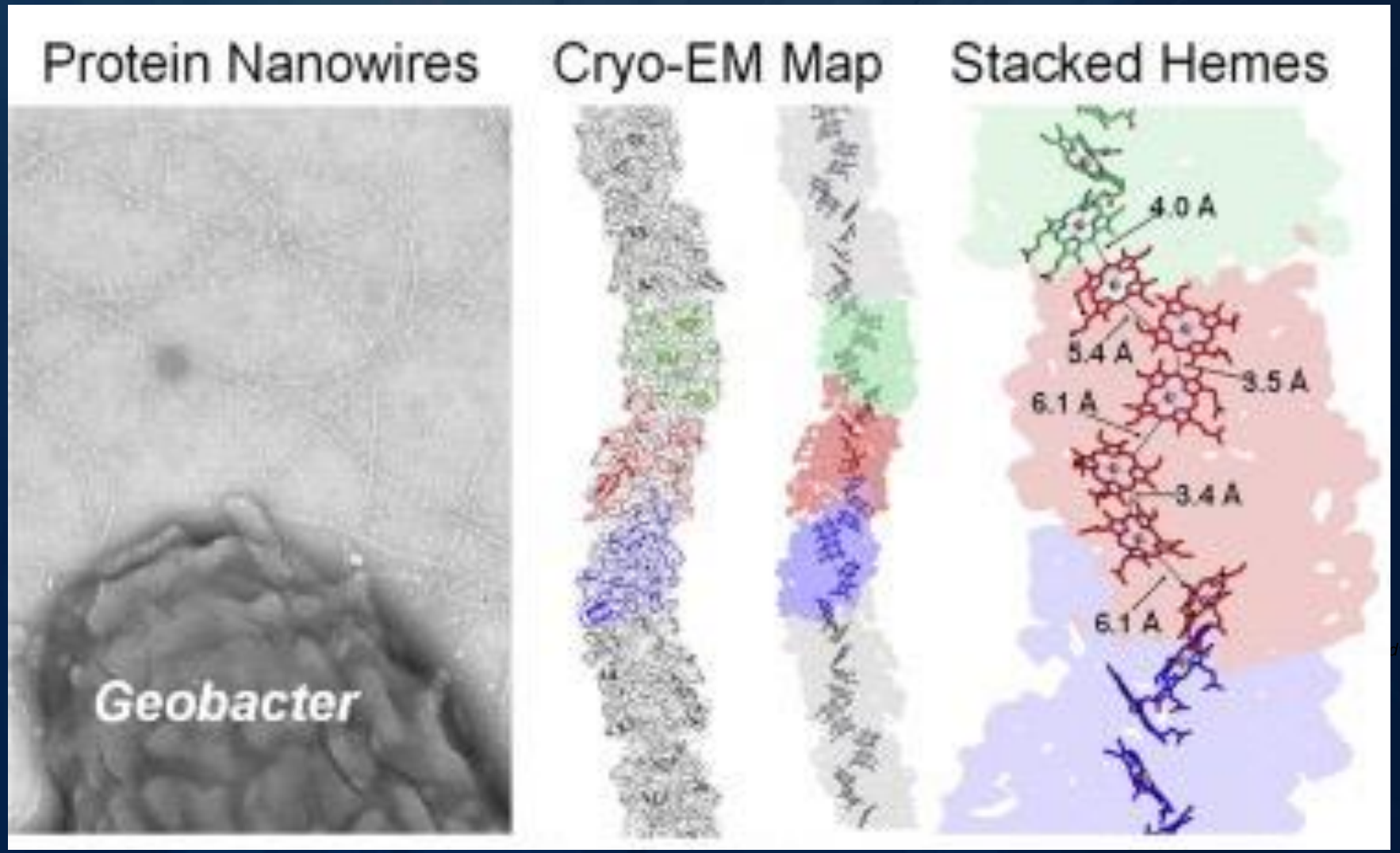
Core Programs

Cellular Dynamics and Function	**Genetic Mechanisms**
Molecular Biophysics	**Systems and Synthetic Biology**

Special Programs & Tracks

Transitions to Excellence in Molecular and Cellular Biosciences Research	Designing Synthetic Cells Beyond the Bounds of Evolution	Semiconductor Synthetic Biology for Information Storage and Retrieval	Reproducible Cells and Organoids via Directed-Differentiation Encoding

Division of Molecular & Cellular Biosciences



Bacteria that build nanowires to conduct electricity. New technology based on these bacteria could provide renewable energy.

Wang et al. (Malvankar Lab)
https://doi.org/10.1016/j.cell.2019.03.029

https://www.nsf.gov/funding/programs.jsp?org=MCB

Integrative Organismal Systems

Core Programs

Behavioral Systems

Animal Behavior

Developmental Systems

Plant, Fungal, and Microbial Developmental Mechanisms
Animal Developmental Mechanisms
Evolution of Developmental Mechanisms

Neural Systems

Organization
Activation
Modulation

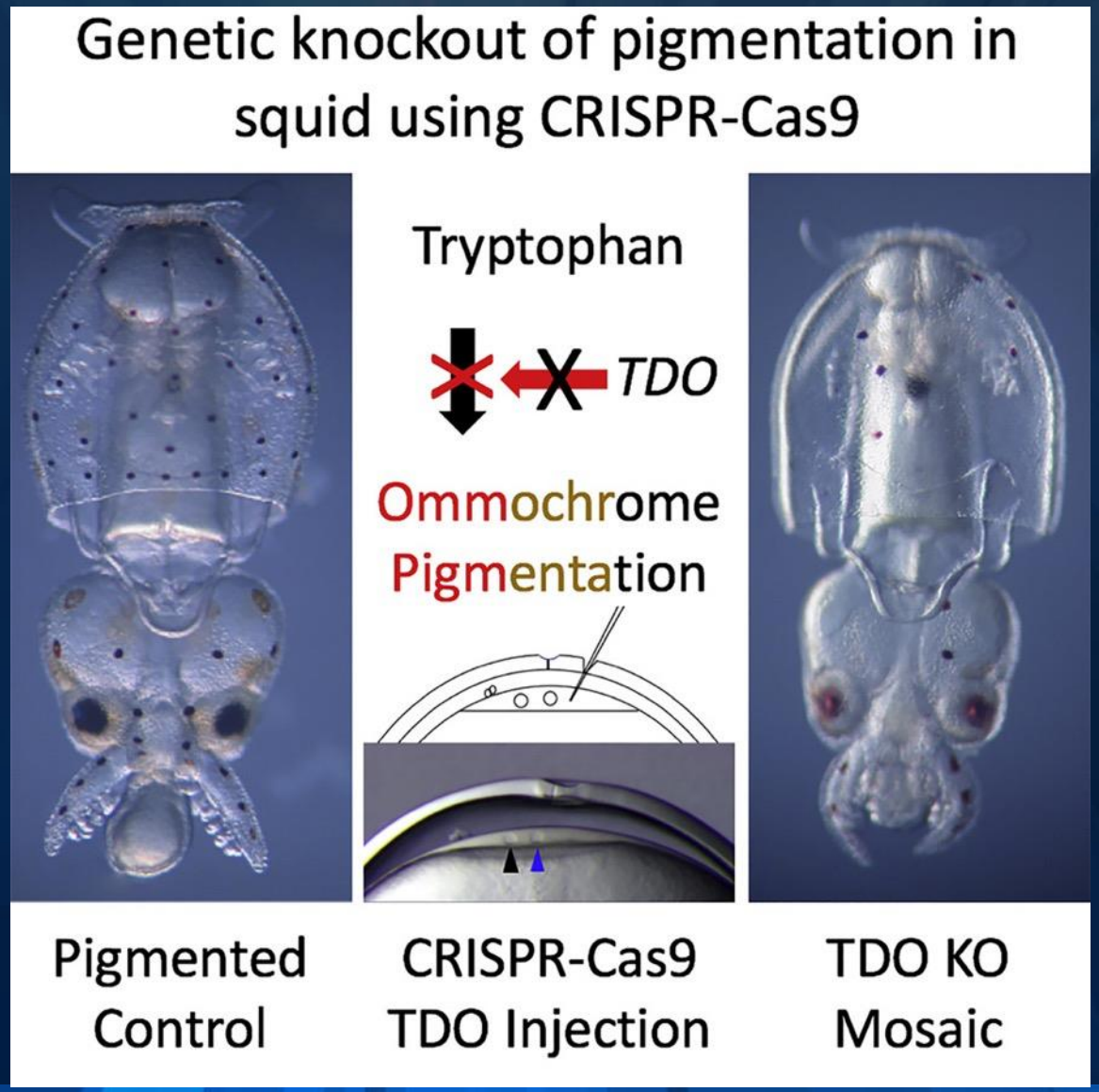
Physiological and Structural Systems

Symbiosis, Infection, and Immunity
Physiological Mechanisms and Biomechanics
Integrative Ecological Physiology
Plant Biotic Interactions

Plant Genome Research Program

Enabling Discovery through GEnomics

Division of Integrative Organismal Systems



With this new genetic engineering technology, scientists will be able to study squids as they do more common laboratory subjects such as fruit flies and mice. This breakthrough will help us understand how marine animals will respond to changing conditions in the world's oceans.

Credit: (L), *Mikhail Matz, Univ Texas-Austin;* (R), *Willow Gabriel, Goldstein lab, Univ North Carolina at Chapel Hill*

Crawford et al.

https://doi.org/10.1016/j.cub.2020.06.099

Credit: *American Society of Plant Biologists*

Credit: *Z. Jeff Chen Laboratory, Univ Texas-Austin*

https://www.nsf.gov/funding/programs.jsp?org=IOS

Division of Environmental Biology

Core Programs

Ecology

Ecosystem Sciences

Population & Community Ecology

Evolution

Evolutionary Processes

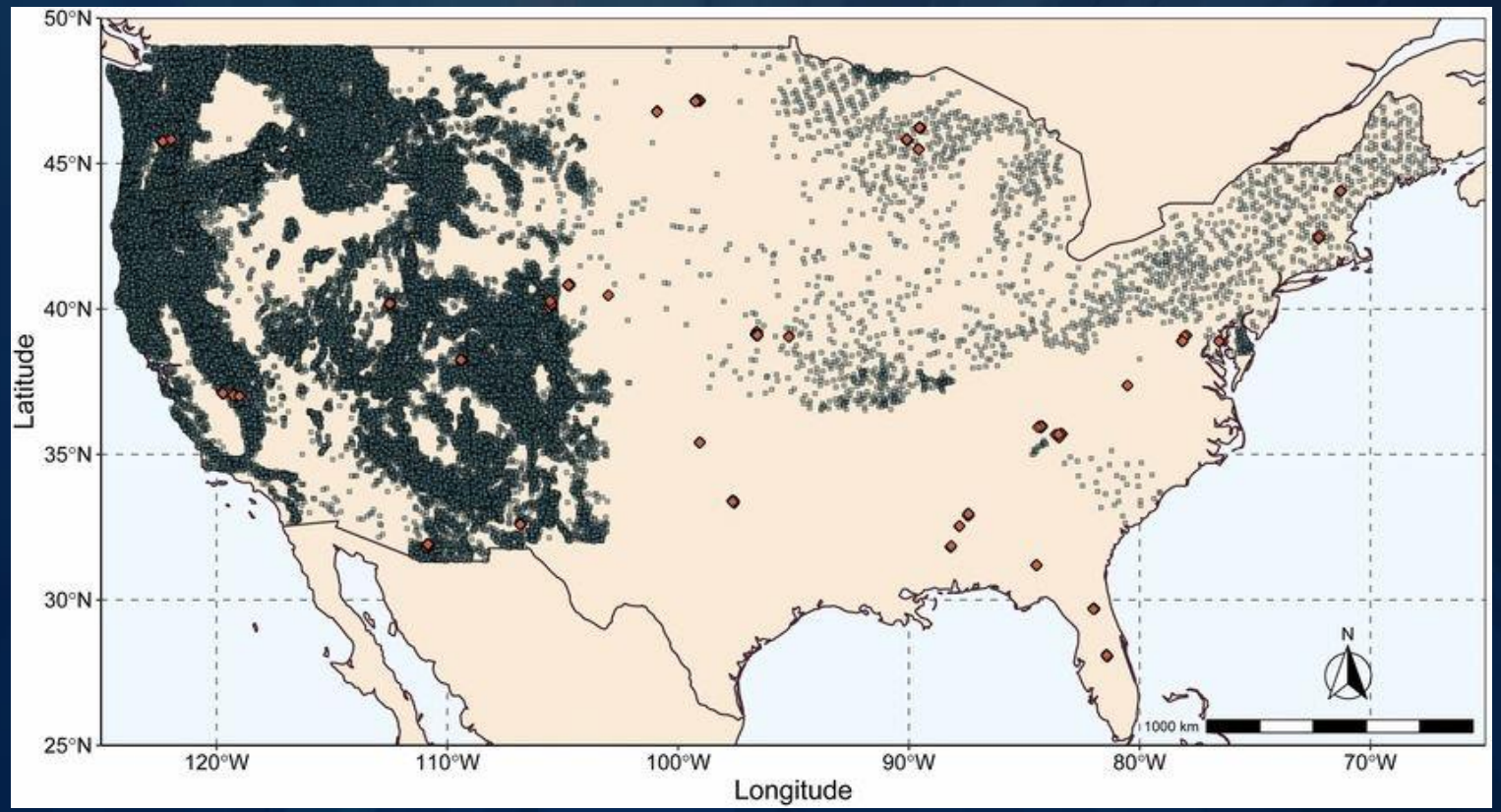
Systematics & Biodiversity Science

PurSUiT and ARTS

Special Programs & Tracks

Bridging Ecology & Evolution	Dimensions of Biodiversity	Ecology and Evolution of Infectious Diseases	Long Term Research in Environmental Biology	Long-Term Ecological Research	Macrosystems Biology & NEON-Enabled Science	Opportunities for Promoting Understanding through Synthesis

Division of Environmental Biology



Darwin had two contradictory ideas about the success of invasive species. Because of continental-scale observations funded by NSF, we now know relatedness to native species matters at certain geographical scales and not as much at others. This information will help us control invasive species such as Japanese pine beetles in the Rocky Mountain west.

Park et al. (Enquist lab)

https://doi.org/10.1073/pnas.1918100117

Division of Biological Infrastructure

Core Programs

Human Resources

Postdoctoral Research Fellowships in Biology
Research Coordination Networks in Undergraduate Biology Education
Research Experiences for Undergraduates
BIO Research Experience for for Undergraduate Sites

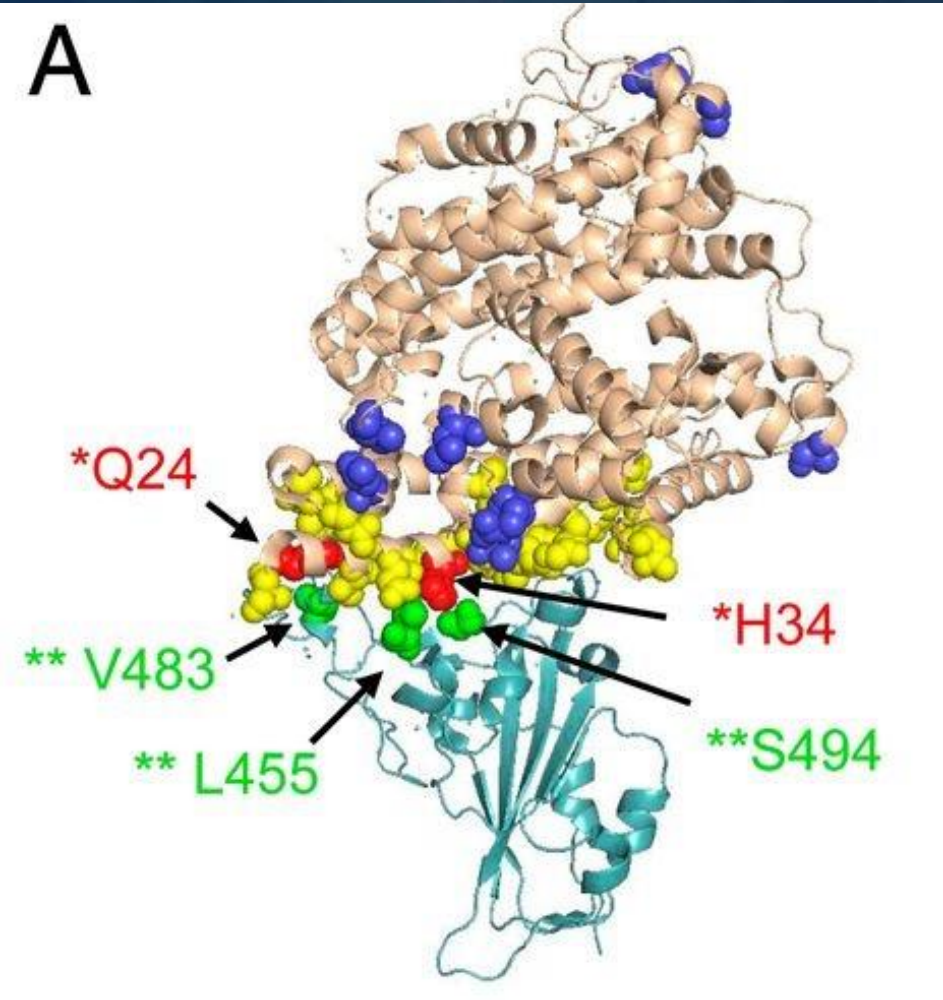
Research Resources

Infrastructure Innovation for Biological Research
Infrastructure Capacity for Biological Research Sustaining
Infrastructure for Biological Research
Major Research Instrumentation Program

BIO Centers, Facilities, and Additional Research Infrastructure

Biology Integration Institutes
Center for Advancement of Synthesis of Open Environmental Data and Sciences
Management of Operations and Maintenance of the National Ecological Observatory Network
Mid-scale Research Infrastructure-1 & -2

Division of Biological Infrastructure

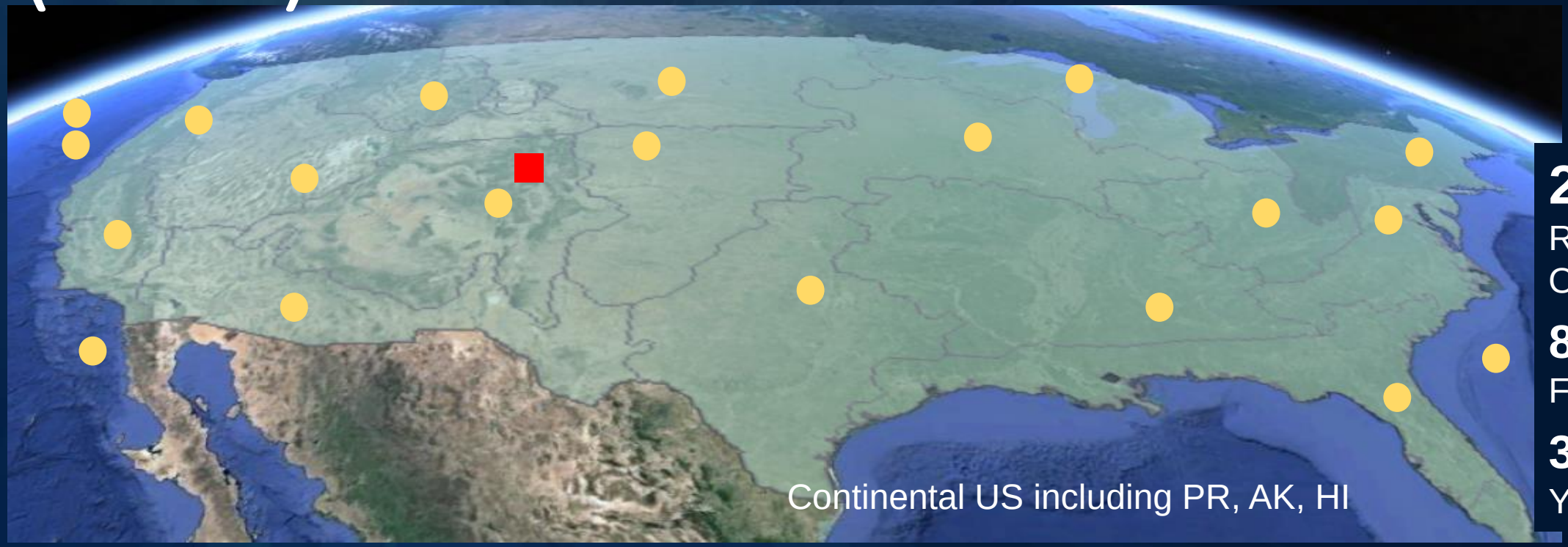


Computational analysis of SARS-CoV-2 Spike protein interactions with the mammalian ACE2 receptor can help predict coronavirus spillover into other animals and whether another zoonotic coronavirus could emerge to infect people.

Damas et al. (Karllson lab)

https://doi.org/10.1073/pnas.2010146117

National Ecological Observatory Network (NEON)



20
Regional Observatories

81
Field sites

30
Years

NSF Biosciences Priorities in FY 2021

Emerging Infectious Diseases

Life on a Warming Planet

Biotechnology to Advance the Bioeconomy

Integration Across the Biological Sciences

Broadening Participation

BIO and Biomedical Research

"…Research with disease-related goals, including work on the etiology, diagnosis or treatment of physical or mental disease, abnormality, or malfunction in human beings or animals, is normally not supported.

…However, research in bioengineering with diagnosis- or treatment-related goals, that applies engineering principles to problems in biology and medicine while advancing engineering knowledge is eligible for support. Bioengineering research to aid persons with disabilities also is eligible."

https://www.nsf.gov/pubs/policydocs/pappg20_1/nsf20_1.pdf

Funding Opportunities for Biological Research Outside BIO

Biological Sciences

Engineering

Mathematical & Physical Sciences

Computer & Information Science & Engineering

Geosciences

Integrative Activities

Education & Human Resources

Social, Behavioral & Economic Sciences

International Science and Engineering

Engineering Biology and Health Cluster

Physics of Living Systems

Polar Programs (Arctic and Antarctic)

Advanced Biomanufacturing of Therapeutic Cells

Biological Oceanography

Biological Anthropology

Chemistry of Life Processes

Environmental Engineering and Sustainability Cluster

Biology at NSF

What kind of science do we fund?
(undergrads + grad students)

How does a scientist apply for NSF funding?

Funding for people at specific career stages

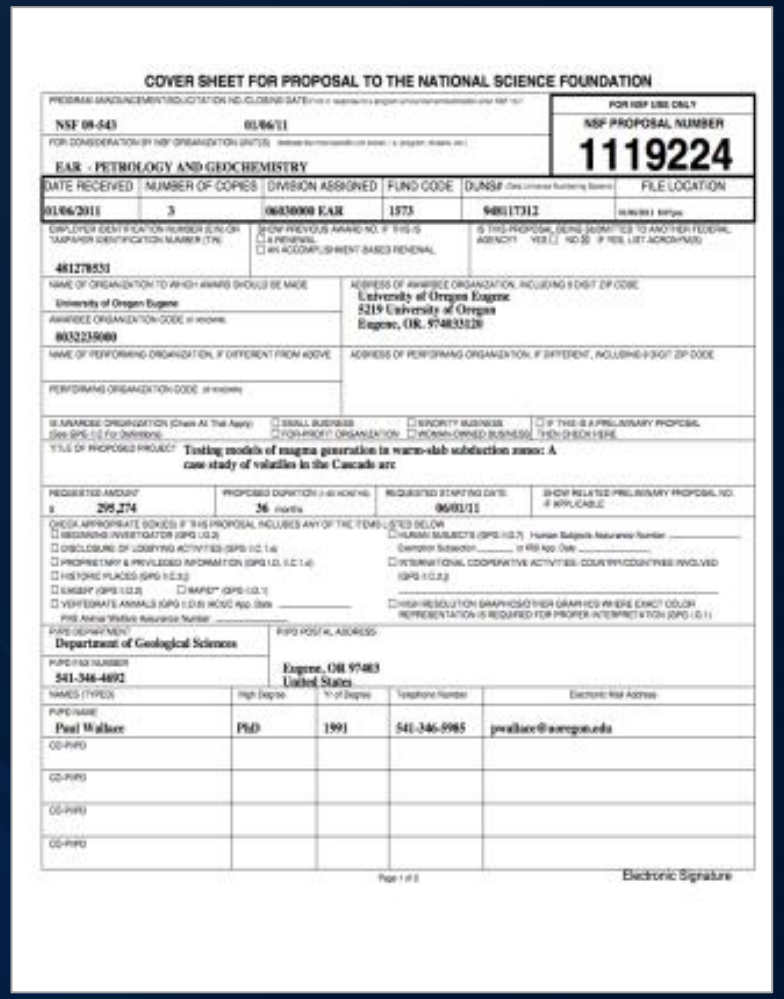
Getting Funded by NSF

- Identify possible programs that fit with your research
- Discuss your idea with a program officer!!!
- Understand the review process and the merit review criteria
  - *Intellectual Merit*
  - *Broader Impacts*
- Review and adhere to submission guidelines in the solicitation and the Proposal & Award Policies & Procedures Guide

Proposal Submission Process: PI Perspective

Merit Review Process

1. No Deadline/Deadline/Target Date/
2. Ad hoc review and/or
3. Panel
4. Program Director makes recommendation



COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

NSF 08-543 01/06/11

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

1119224

EAR - PETROLOGY AND GEOCHEMISTRY

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS#	FILE LOCATION
01/06/2011	3	0630000 EAR	1573	940117312	

481278531

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE: University of Oregon Eugene

AWARDEE ORGANIZATION CODE: 003239000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE: University of Oregon Eugene, 5219 University of Oregon, Eugene, OR. 974033120

TITLE OF PROPOSED PROJECT: Testing models of magma generation in warm-slab subduction zones: A case study of volatiles in the Cascade arc

REQUESTED AMOUNT: $ 295,274

PROPOSED DURATION: 36 months

REQUESTED STARTING DATE: 06/01/11

PI/PD DEPARTMENT: Department of Geological Sciences

PI/PD FAX NUMBER: 541-346-4692

PI/PD POSTAL ADDRESS: Eugene, OR 97403 United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME: Paul Wallace	PhD	1991	541-346-5985	pwallace@uoregon.edu
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Page 1 of 2

Electronic Signature

Note that this varies across NSF

Merit Review Criteria

- **Intellectual Merit (IM):**
  the potential to advance knowledge

- **Broader Impacts (BI):**
  the potential to benefit society and contribute to the achievement of specific, desired societal outcomes

Broader Impacts: Benefitting Society

Teaching, training, and learning (undergrads + grad students)	Broaden participation of underrepresented groups	Build or enhance partnerships (internationally, or with other agencies)
Broad dissemination to enhance scientific + technological understanding	Enhance infrastructure (labs, equipment, + work in developing countries)	Local impacts (policies @ state + local level)

Biology at NSF

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REU Research Experience for Undergraduates

- **Who:** undergraduates currently enrolled in 2 or 4-year college; U.S. citizens
- **What:** undergraduate summer research internship
- **Where:** both international and domestic programs
- **When:** typically **summer**
- **How:** find the list of REU sites on the NSF website; apply directly to an REU through their website
  - **Applications include**: (1) **personal statement**, (2) **transcript** and (3) two **recommendations**

RUI Research in Undergraduate Institutions

- **Who:** faculty at Primarily Undergraduate Institutions
- **What:** an opportunity to support PUI faculty engagement in their professional field, build capacity for research at the institution, and support integration of research and undergraduate education.
- **Where:** At any U.S. PUI (awarded ≤20 PhDs in last 2 years)
- **When:** any time (in BIO)
- **How:**

- **See also:** RUI (Research Opportunity Award) supplements to existing awards to support PUI faculty research at collaborator's institution

Graduate Research Fellowship Program

- **Who:** graduate or undergraduate student pursuing Master's or PhD studies (has to be a U.S. citizen, national, or permanent resident)
- **What:** a 5-year year STEM fellowship (3 years of financial support)
- **Where:** at a U.S. institution
- **When:** can apply as an undergraduate in their final year of study, recent graduates, and graduate students within the first 12 months of study
  - **Applications due:** Oct./Nov. each year
- **How:** to apply go to fastlane.nsf.gov/grfp

PRFB Postdoctoral Research Fellowship in Biology

- **Who:** recent recipients of doctoral degrees; U.S. citizens
- **What:** 2-year postdoctoral fellowship (3 years for Plant Genomics)
  - **Current themes: Rules of Life, Plant Genomics, Broadening Participation**
- **Where:** at a U.S. or foreign institution
- **When:** application deadline is in the Fall
- **How:**

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ONLINE GRANTS MANAGEMENT FOR THE NSF COMMUNITY

Check out the **DBI PRFB webinar questions** on the NSF website

CAREER Faculty Early-Career Development Program

- **Who:** tenure track faculty members at assistant professor level, or equivalent
- **What:** Designed to help junior faculty members develop activities that can **effectively integrate research and education** within the context of his/her organization.
- **Where:** at any U.S. institution
- **When:** application deadline is in the Summer
- **How:** Research.GOV ONLINE GRANTS MANAGEMENT FOR THE NSF COMMUNITY

MCA Mid-Career Advancement

- **Who:** Scientists and engineers at the Associate Professor rank (or equivalent)
- **What:** an opportunity to substantively enhance and advance their research program through synergistic and mutually beneficial mentor partnership, typically at an institution other than their home institution.
- **Where:** At any U.S. academic or non-profit organizations
- **When:** February, annually
- **How:**

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Other cross-cutting programs of interest:

- **BII (Biology Integration Institutes):** Supports collaborative teams of researchers investigating topics that span multiple disciplines
- **CoPe (Coastlines and People):** Investigations of coastal processes & hazards and their interplay with humans.
- **NNA (Navigating the New Arctic):** Convergence research to address the interactions or connections among natural and built environments and social systems in the Arctic.
- **SitS (Signals in the Soil):** Multi-agency program to transform our understanding of soils

NSF Needs You!

Questions?

Thank you

clostroh@nsf.gov

Phoebe Lostroh, PhD

Program Director

Division of Molecular and Cellular Biosciences (MCB)

Directorate for Biological Sciences (BIO)