

HBCU-UP: EXCELLENCE IN RESEARCH (EIR)

Supporting STEM and STEM education projects at HBCUs that are research focused and enhance research capacity

You will not be able to speak during the presentation. If you have questions you can submit them using the Q&A function.



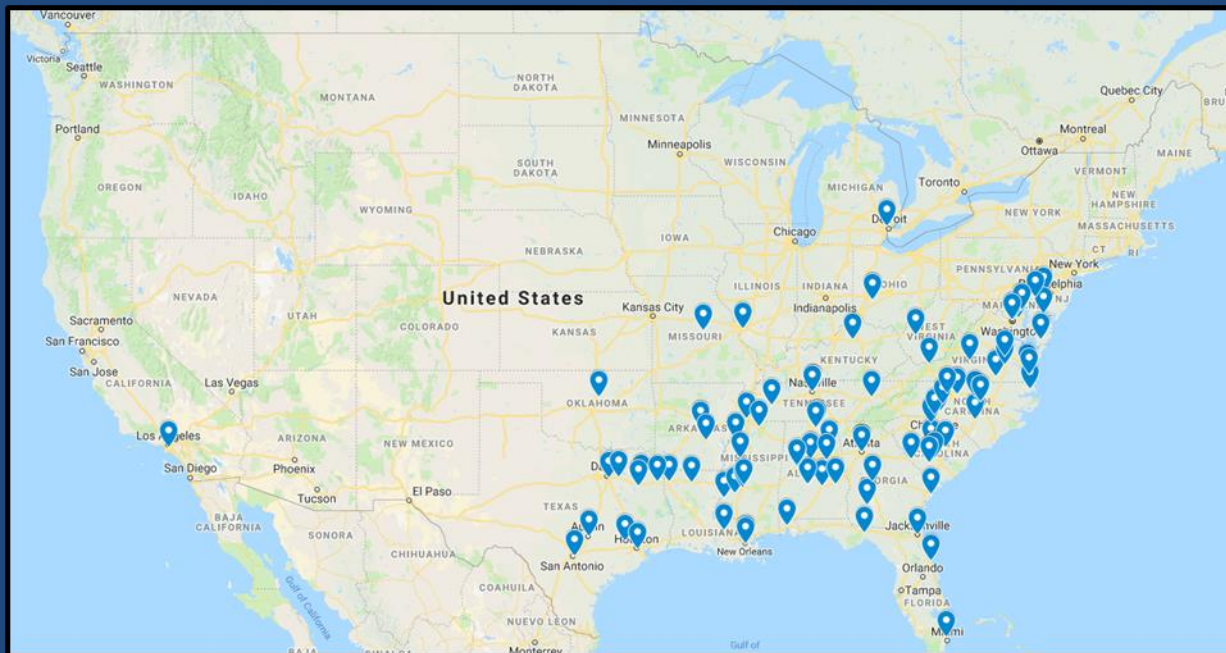
AGENDA

1. Introduction of National Science Foundation Panel of Program Directors
2. HBCU-UP EiR and RIA background and important information
3. Description of the four divisions within NSF's BIO Directorate
4. Questions from webinar participants



HBCU-UP: EXCELLENCE IN RESEARCH (EIR) AND RESEARCH INITIATION AWARD (RIA)

EiR and RIA aim to accelerate support of research at HBCUs across the National Sciences Foundation's full portfolio



HBCU-UP EXCELLENCE IN RESEARCH (EIR) (20-542)

- The HBCU Excellence in Research (EiR) component in HBCU-UP was developed in response to Congressional mandate to increase support for research at HBCUs
- Awards can be single investigator or collaborative
- Important dates
 - Letter of Intent: 4th Thursday in July (July 23, 2020)
 - Full EiR proposal: 1st Tuesday in October (Oct 6, 2020)



EIR SPECIFIC INFORMATION: LETTER OF INTENT (LOI)

- A Letter of Intent (LOI), submitted through FastLane, must be received by July 23, 2020
 - ✓ See NSF solicitation 20-542 for full guidance
 - ✓ Indicate type of proposal to be submitted (e.g. Excellence in Research)
 - ✓ Minimum of 1 and maximum of 4 senior project personnel
 - ✓ Project synopsis (no more than 500 words) that describes proposed research and/or implementation activities
 - ✓ Indicate which NSF program(s) you believe to be most appropriate to review the EiR project



HBCU-UP: RESEARCH INITIATION AWARD (RIA) (20-559)

- The HBCU Excellence in Research Initiation Award (RIA) component of HBCU-UP was developed to provide support to STEM faculty with no prior or recent research funding
- Provides up to \$300k, for up to 3 years of support:
 - Must include undergraduates in the research experience
 - Can conduct research at home institution, national laboratory, NSF-funded research center, or research-intensive institution
- Important dates
 - Letter of Intent: 4th Tuesday in July (July 28, 2020)
 - Full RIA proposal: 1st Tuesday in October (Oct 6, 2020)



RIA SPECIFIC INFORMATION: LETTER OF INTENT (LOI)

- A Letter of Intent (LOI), submitted through FastLane, must be received by July 28, 2020
- ✓ See NSF solicitation 20-559 for full guidance
- ✓ Indicate type of proposal to be submitted (e.g. Research Initiation Award)
- ✓ **Only PI can be listed under senior personnel**
- ✓ Project synopsis (no more than 500 words) that describes proposed research and/or implementation activities



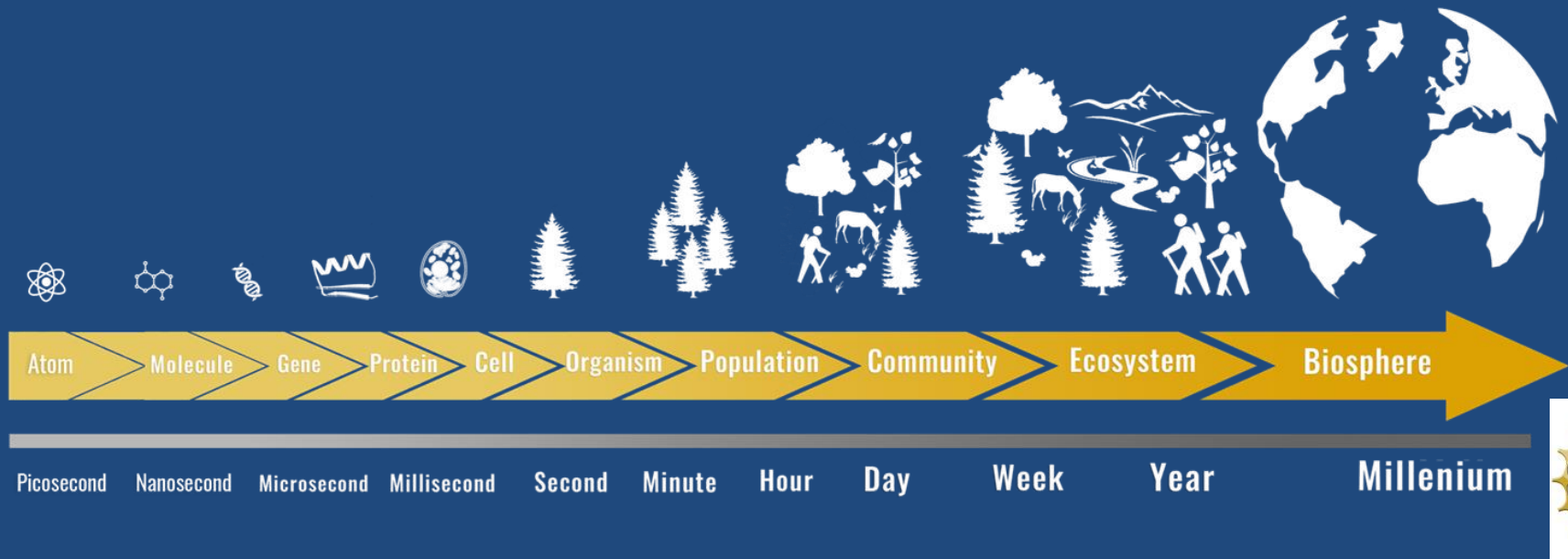
NSF ORGANIZATIONS PARTICIPATING IN EIR

- Directorate for Biological Sciences (BIO)
- Directorate for Computer and Information Science and Engineering (CISE)
- Directorate for Education and Human Resources (EHR)
- Directorate for Engineering (ENG)
- Directorate for Geosciences (GEO)
- Directorate for Mathematical and Physical Sciences (MPS)
- Directorate for Social, Behavioral and Economic Sciences (SBE)
- Office of Integrative Activities (OIA)



DIRECTORATE FOR BIOLOGICAL SCIENCES (BIO)

“To enable discoveries for understanding life, advance the frontiers of biological knowledge, increase our understanding of complex systems, and provide a theoretical basis for original research in many other scientific disciplines.”



WHAT DOES EACH DIVISION ‘DO’?

Division of Biological Infrastructure (DBI)

Supports infrastructure (research and human resources) for contemporary research in biology

Division of Environmental Biology (DEB)

Supports fundamental research on the *origins, functions, relationships, interactions, and evolutionary history of populations, species, communities, and ecosystems*

Division of Integrative Organismal Systems (IOS)

Supports research aimed at *understanding the living organism – plant, animal, microbe – as a unit of biological organization*

Division of Molecular and Cellular Biosciences (MCB)

Fundamental research across the *molecular, subcellular and cellular scale*

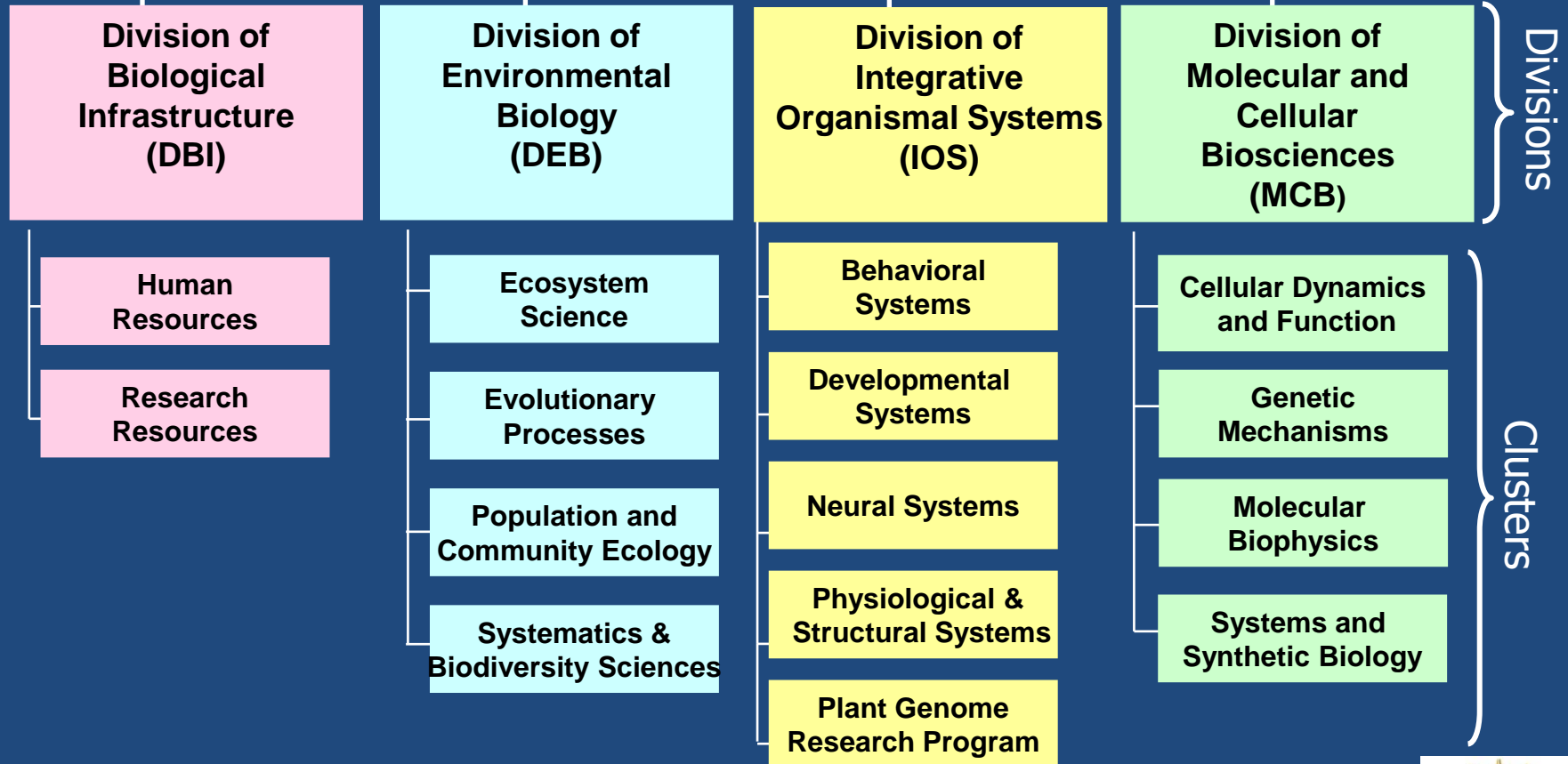


Joanne Tornow
Asst. Director

Alan Tessier
Deputy Asst. Director

Directorate for Biological Sciences (BIO)

Emerging Frontiers (EF)





NSB

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Environmental Biology (DEB)

Emerging Frontiers (EF)

Integrative Organismal
Systems (IOS)

Molecular and Cellular
Biosciences (MCB)

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Molecular and Cellular Biosciences (MCB)

MCB supports quantitative and interdisciplinary approaches to deciphering the molecular underpinnings of complex living systems

NAVIGATING THE BIO PAGES ON NSF.GOV

READ MORE

Announcements

Changes to Proposal Submissions in
FY2018 [Read More >](#)

Employment Opportunities for BIO Program
Director Positions [Read More >](#)

BIO Program Director and Reviewer
Opportunities [Read More >](#)

[See All >](#)

News



New dinosaur with heart-shaped tail offers clues to
evolution of Africa's ecosystems

FEBRUARY 13, 2019



The flip side of a reef: Coral, seaweed -- or both?

FEBRUARY 12, 2019



NSF selects Joanne Tornow to head its Biological
Sciences directorate

FEBRUARY 11, 2019

[See All >](#)



Division of Biological Infrastructure DBI

Human Resources

Supporting the training of next generation of scientists

- Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)
- REU sites
- Postdoctoral Research Fellowships in Biology (PRFB)

REU Site:
Nanobioengineering
Alabama State
University
Award: 1659166



Photo Courtesy David Campbell/Alabama State University

Research Resources

Supporting the infrastructure that makes science possible

- Innovation (IIBR)
- Capacity (ICB)
- Sustaining (SABI)
- Advancing Digitization of Biodiversity Collections
- NEON (National Ecological Observatory Network)



A LIFE CYCLE OF RESOURCES FOR INFRASTRUCTURE

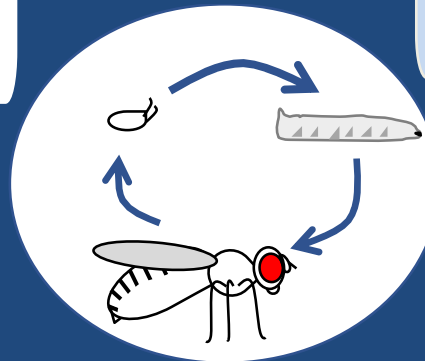
Instrumentation
and associated
methods

Biological
informatics

Rules of life

Multidisciplinary

**Infrastructure
Innovation for
Biological
Research**



Cyber-
infrastructure

Collections

Instrument
capacity

**Infrastructure
Capacity for
Biology**

Improvements
to field stations
marine labs

**Sustained
Availability of
Biological
Infrastructure**

Experimental or
observational
facilities

Biological
living stocks

Instrumentation

Cyberinfrastructure

DBI: 1901793

Excellence in Research: Deep Learning based approaches for protein post-translational modification site prediction

PI: Robert Newman

North Carolina Agricultural & Technical State University

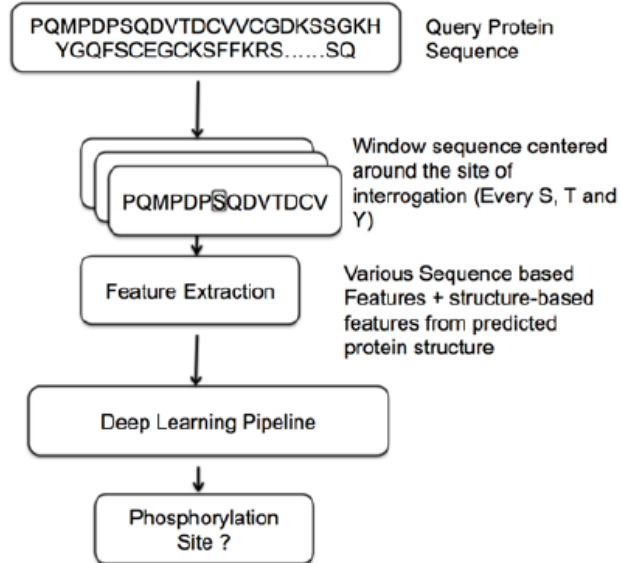


Fig 2(a). Overall approach for Deep-learning based phosphorylation site predictor

DIVISION OF ENVIRONMENTAL BIOLOGY (DEB)

*We support basic research projects that
contribute to the development of the fields of
evolutionary biology and ecology.*

*This includes biodiversity sciences and
evolutionary processes as well as ecosystem and
population and community ecology*



PROGRAM OFFICERS IN THE DIVISION OF ENVIRONMENTAL BIOLOGY (DEB) 2020

Evolutionary Processes (EP)



Sam Scheiner, PO



Leslie Rissler, PO



Chris Balakrishnan, PO



Matt Herron, PO



Matt Olson, PO

Ecosystems Sciences (ES)



Kendra McLauchlan, PO



John Schade, PO



Matt Kane, PO



Ford Ballantyne, PO



Elizabeth Blood, PO

Systematics & Biodiversity Science (SBS)



Amanda Ingram, PO



Chris Schneider, PO



David Cannatella, PO



Katharina Dittmar, PO

Population & Community Ecology (PCE)



Diana Pilson, PO



Andrea Porras-Alfaro, PO



Daniel Gruner, PO



Doug Levey, PO



Betsy Von Holle, PO



ECOLOGY CLUSTERS

Population and Community Ecology

- Supports research that advances the conceptual or theoretical understanding of population ecology, species interactions, and community dynamics.
- Topics include: mutualist and parasitism, mechanisms of coexistence, community assembly, paleoecology, landscape ecology, conservation and restoration biology, behavioral ecology and macroecology.

Ecosystems Science

- Supports research on ecosystem structure and function across a diversity of spatial and temporal (including paleo) scales.
- Topics include: ecosystem dynamics, resilience, material and energy fluxes and transformations, linkages among ecosystems in space, time and across spatial and temporal scales, roles and relations of ecosystem components.



EVOLUTION CLUSTERS

Evolutionary Processes

- Supports empirical or theoretical research that makes inferences about evolutionary dynamics and consequences
- Appropriate scales: molecules to species
- All mechanisms of evolution are of interest

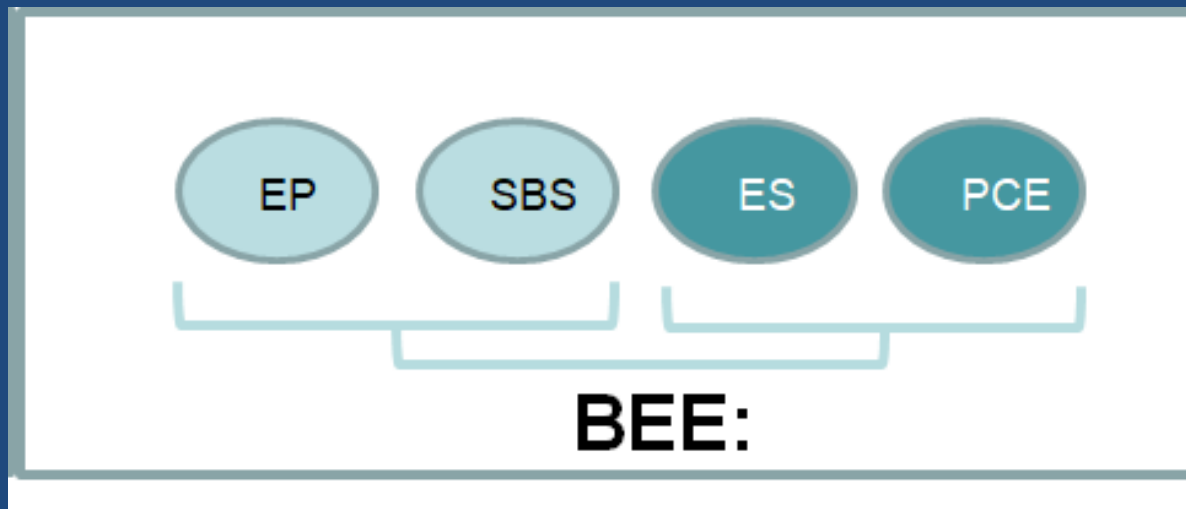
Systematics and Biodiversity Science

- Supports research to advance our understanding of the diversity, systematics, and evolutionary history of extinct or extant organisms in natural systems. Includes:
 - Expeditionary and exploratory research to advance discovery and classification of biodiversity
 - Research to resolve questions of relationships among taxa
 - Phylogeny-based studies of character evolution and comparative biology



BEE TRACK BRIDGING ECOLOGY & EVOLUTION

- Applies to all DEB core programs
- Targets research that spans ecology and evolution
 - Welcomes proposals that reciprocally address hypotheses in both disciplines



SOME RECENTLY FUNDED HBCU-EIR PROJECTS IN DEB

I655957: Jennifer Kovacs, RUI: Evolutionary and ecological impacts of horizontal gene transfer in arthropods

I831958: Yonas Tekle, Excellence in Research: Genome Evolution of Amoebozoa: Resolving the deep phylogeny of Amoebozoa through genomic and proteomic features.

I832140: Courtney Robinson, Excellence in Research: Contribution of Terrestrial Bacteria to Iodine Biogeochemical Cycling

I900885: Jianwei Li, Excellence in Research: Mechanistic Prediction of Soil Microbial Response to Temperature Change



DIVISION OF INTEGRATIVE ORGANISMAL SYSTEMS (IOS)

Supports research to understand how organisms develop, function and behave through interactions among genotypes, and between genotypes and environments

“IMAGiNE”

Integrating
Mechanisms of
Adaptation with
Genes
in
Networks and across
Environments

- Behavioral Systems
- Developmental Systems
- Neural Systems
- Physiological and Structural Systems
- Plant Genome Research Program
- Enabling Discovery through Genomic Tools Program



INTEGRATIVE ORGANISMAL SYSTEMS

- Behavioral Systems Cluster

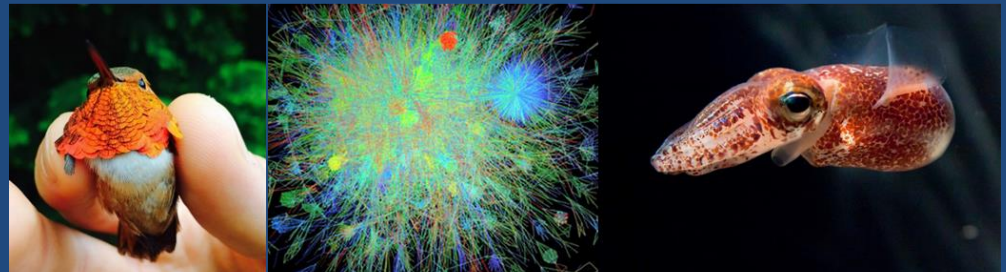
- Jodie Jawor jjawor@nsf.gov

- Developmental Systems Cluster

- Plant, Fungal & Microbial Mechanisms Program
- Animal Development Mechanisms Program
- Evolution of Developmental Mechanisms Program
- Steve Klein sklein@nsf.gov

- Neural Systems Cluster

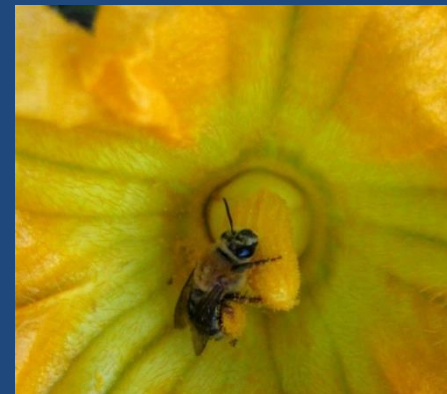
- Organization Program
- Activation Program
- Modulation Program
- Floh Thiels ethiels@nsf.gov



INTEGRATIVE ORGANISMAL SYSTEMS

- Physiological and Structural Systems Cluster
 - Symbiosis, Defense and Self-recognition Program
 - Physiological Mechanisms and Biomechanics Program
 - Integrative Ecological Physiology Program
 - NSF-NIFA Plant Biotic Interactions Program
 - **Kathy Dickson** kdickson@nsf.gov

- Plant Genome Research Program
 - Research-PGR Track
 - TR Tech-PGR Track
 - Postdoctoral Fellowships
 - **Gerald Schoenknecht** gschoenk@nsf.gov



ENABLING DISCOVERY THROUGH GENOMIC TOOLS, EDGE (NSF 20-532)

- **Functional Genomic Tools track:** for developing tools for gene manipulation and/or phenotyping, analytical approaches or infrastructure to overcome one or more blocks to direct tests of gene function
- **Complex Multigenic Traits track:** for hypothesis-driven research to understand **causal mechanisms** connecting genomes and complex multigenic organismal phenomes across environmental, developmental, social, and/or genomic contexts



BIOEDGE@NSF.GOV

DIVISION OF MOLECULAR AND CELLULAR BIOSCIENCES (MCB)

Supports fundamental research and related activities designed to promote understanding of complex living systems at the molecular, subcellular, and cellular levels.

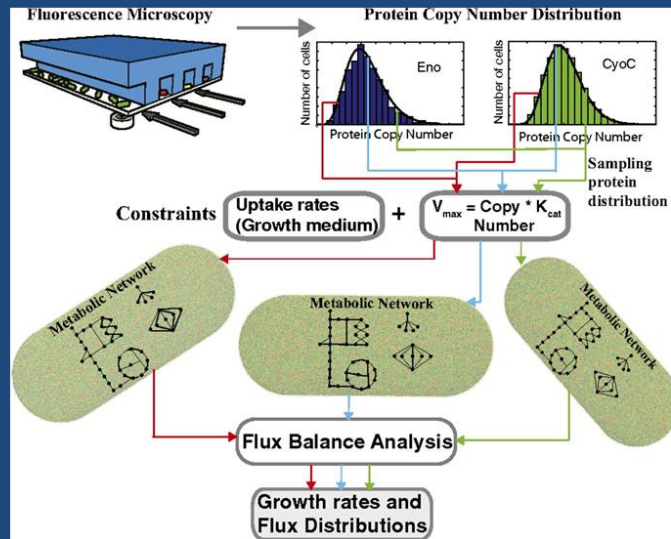
The Division welcomes proposals that incorporate theories and concepts from physics, mathematics, chemistry, engineering and computer science in search of the most fundamental Rules of Life, as well as proposals that offer technological innovations to enable cross-cutting research activities.



MOLECULAR BIOPHYSICS CLUSTER

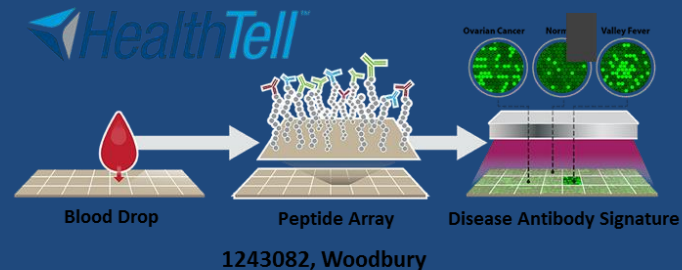
Research Focus: Integration of computational and experimental approaches to understand the physical principles that govern biological systems from molecules to cells

SYNERGY BETWEEN EXPERIMENT AND THEORY

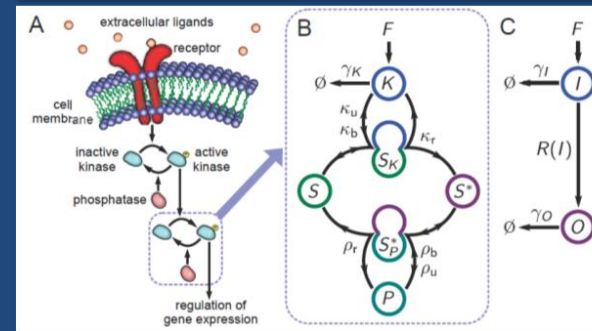


1244570, Luthey-Schulten

BASIC SCIENCE TO COMMERCIAL PRODUCT



DESIGNING AN ADAPTIVE CELL *IN SILICO*



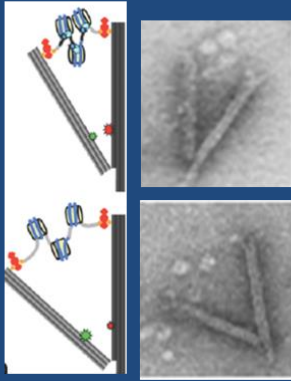
1523098, Thirumalai

- Large scale (millions of atoms) computations incorporating experimental constraints, using a variety of techniques.
- Methodological developments providing insight into molecular dynamics on multiple timescales, with a goal of understanding roles in molecular recognition and function.
- Determination of the structure and interactions of very large assemblies (e.g., ribosomes, photosystems) at high resolution.

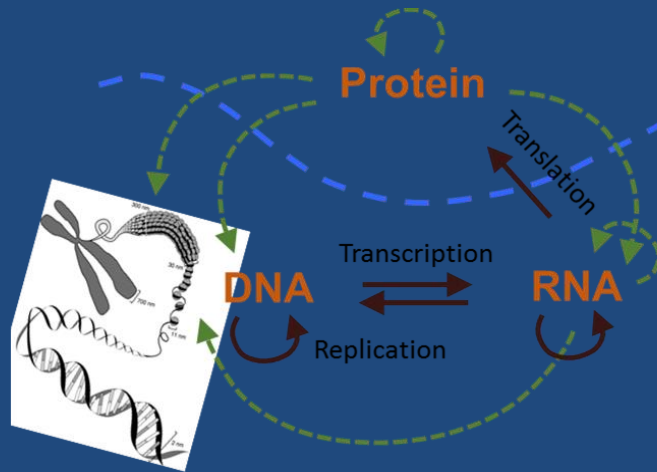
GENETIC MECHANISMS CLUSTER

Research Focus: How genetic information is maintained, propagated and utilized

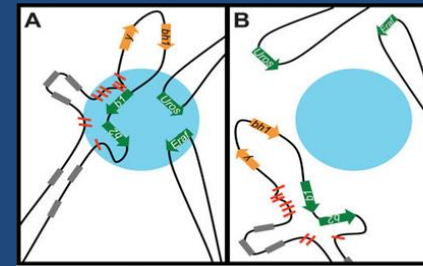
MOLECULAR SCALE



1516976, Poirier, Castro



CELLULAR SCALE



1518345, Gross

EVOLUTIONARY SCALE



1518060, Lynch

Leading Edges: How organisms control these functions in space (atomic – environment) & time (millisecond – evolution)

Funding priority for proposals that employ quantitative frameworks & promise high-impact advances in:

- Chromatin- and RNA-mediated regulatory mechanisms.
- Dynamics and spatiotemporal coordination of genome replication, DNA repair, chromatin modification, transcription, and translation.
- Origin and evolution of genetic polymers, including DNA, RNA and proteins

CELLULAR DYNAMICS AND FUNCTION CLUSTER

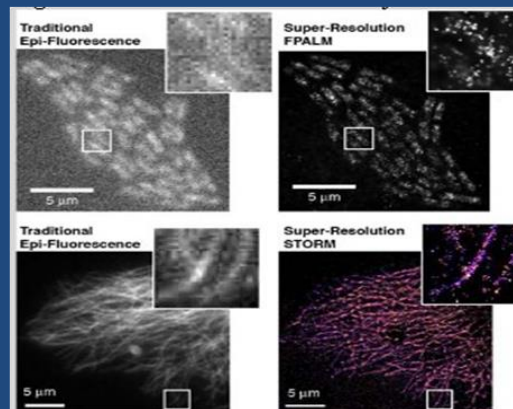
Research Focus: Theoretical and experimental approaches that deliver a quantitative and predictive understanding of cell origin, behavior, function and evolution

COMMUNITY BUILDING



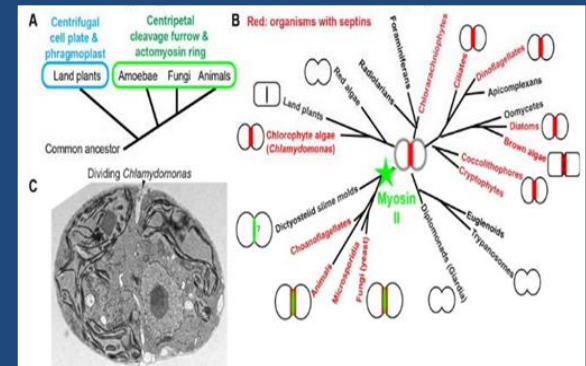
1411898, Marshall

THE UNIVERSAL LAWS GOVERNING CELLS



1344203, Ross

THE ANCESTRY OF CELLULAR PROCESSES



1548533, Pringle

Leading Edge: Developing a theory-driven discipline defining the rules of cell behavior

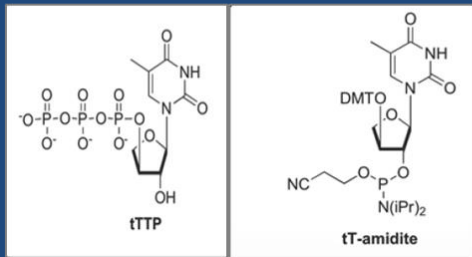
Encourages proposals in the following areas:

- Predictive understanding of the behavior of living cells through integration of modeling and experimentation.
- Evolutionary approaches to understanding the rules governing cellular functions.
- Integration of function with emerging cellular properties across broad spatiotemporal scales.

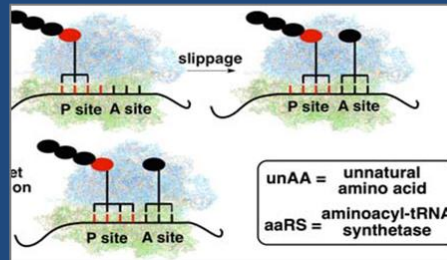
SYSTEMS AND SYNTHETIC BIOLOGY CLUSTER

Research Focus: Explore the fundamental principles of biology (The Rules of Life) using the tools of Systems and Synthetic Biology

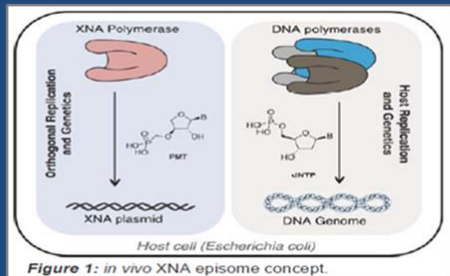
EXPLORING THE DESIGN SPACE THAT CAN SUPPORT LIFE



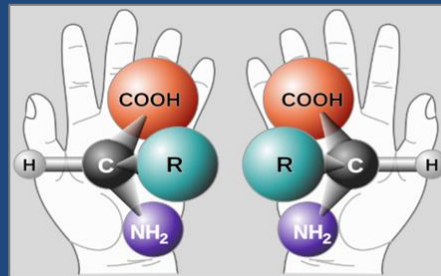
1542118, Chaput



1553041, Guo



1545158, Chang



1443228, Dawson

Leading Edge: Uncovering rules of life by modeling and building life-mimicking systems; systems approaches to examine mechanisms of regulation and control of biological processes; development of new paradigms at intersection of biology, mathematics, physics, chemistry and engineering to explore the “Rules of Life”

Encourages proposals in the following areas:

- Systems-level analysis of regulatory, signaling, and metabolic networks, including the interactions among networks.
- Synthetic biology approaches for understanding the origin of life, the minimal cell and emerging behaviors of complex interactions.
- Experimental and computational tool development to facilitate systems and synthetic biology studies.
- Microbiome studies with the potential to reveal rules of assembly and function in well-defined natural and synthetic communities using systems and synthetic biology approaches.

QUESTIONS

BLOG pages for BIO Divisions:

- DBI: <https://dbiblog.nsfbio.com/>
- DEB: <https://debblog.nsfbio.com/>
- IOS: <https://iosblog.nsfbio.com/>
- MCB: <https://mcbblog.nsfbio.com/>

