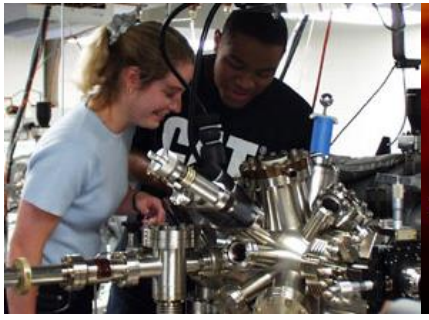
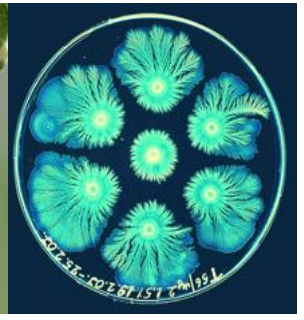
Mechanisms of community input and the future of digitization at NSF

Scott V. Edwards
Division Director
Division of Biological Infrastructure
National Science Foundation







NSF supports almost 50% of academic research in non-biomedical STEM fields

Engineering	40%
Physical Sciences	44%
Social Sciences	55%
Mathematical Sciences	59%
Environmental Sciences	60%
Biology (excluding NIH)	66%
Computer Science	87%

James Olds
Asst. Director BIO

Directorate for Biological Sciences (BIO)

Emerging Frontiers (EF)

Division of Biological Infrastructure (DBI)

- Human Resources
- Research Resources

Division of Environmental Biology (DEB)

- Ecosystem Science
- Evolutionary Processes
- Population and Community Ecology
- Systematics & Biodiversity Science

Division of Integrative Organismal Systems (IOS)

- Behavioral Systems
- Developmental Systems
- Neural Systems
- Physiological & Structural Systems
- Plant Genome Research Program

Division of Molecular and Cellular Biosciences (MCB)

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

Divisions

Clusters

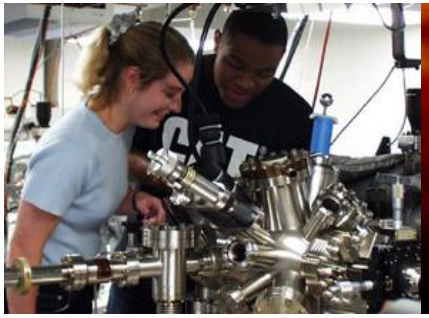
Scientific Collections:

Mission-Critical Infrastructure for Federal Science Agencies

A Report of the
Interagency Working Group on Scientific Collections
(IWGSC)

IMPLEMENTATION PLAN FOR THE NETWORK INTEGRATED BIOCOLLECTIONS ALLIANCE

Division of Biological Infrastructure (DBI)



Biological Infrastructure (DBI)

Human Resources Cluster

- Research Coordination Networks (RCN-UBE)
- Postdoctoral Research Fellowships in Biology
- Research Experiences for Undergraduates (REU)

Research Resources Cluster

- Advances in Biological Informatics (ABI)
- Collections in Support of Biological Research (CSBR-previously BRC)
- Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Labs (FSML)
- Instrument Development for Biological Research (IDBR)

Centers

- NESCent, NIMBIOS, STCs (BEACON), etc.

How iDigBio is Different

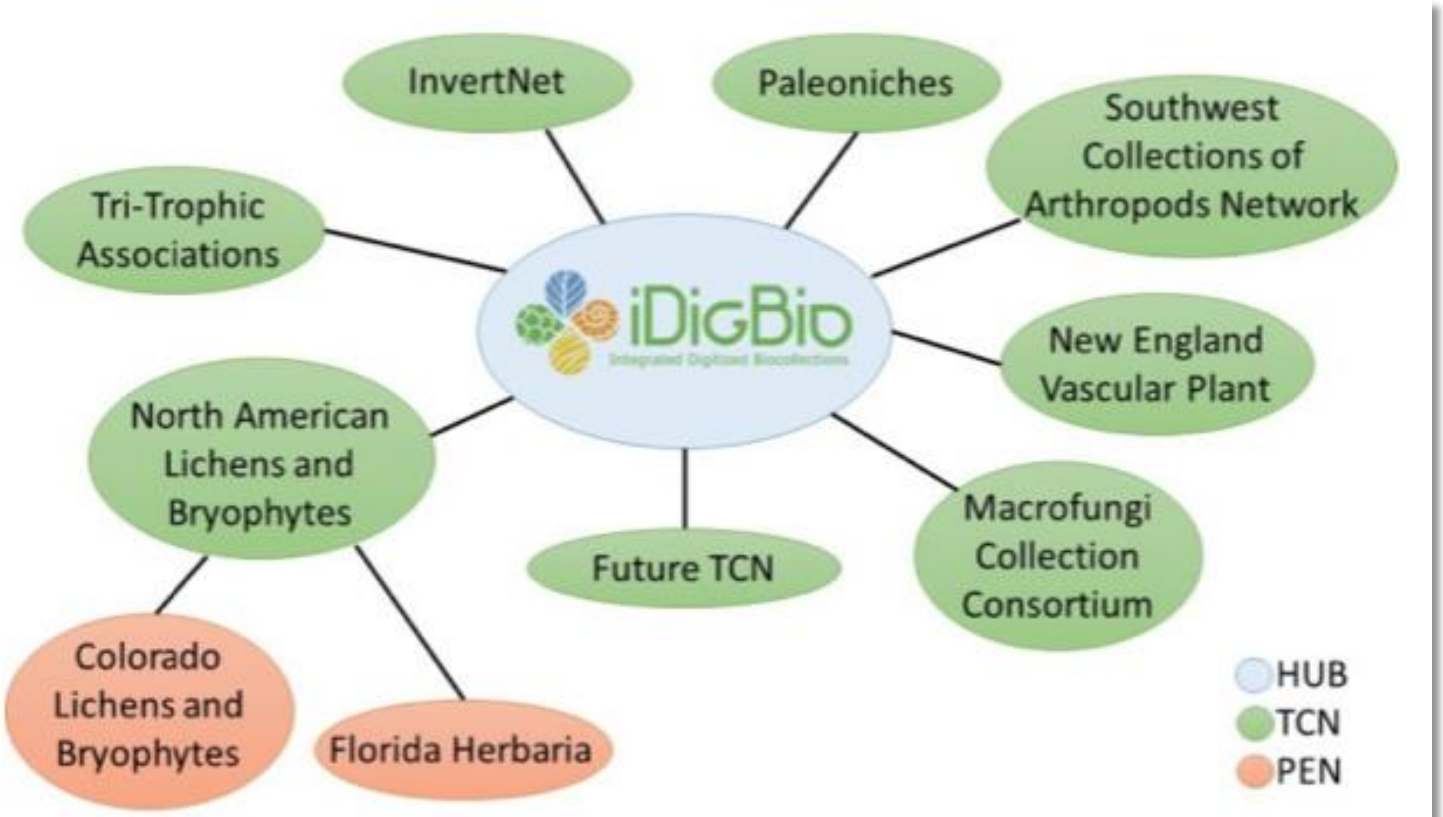
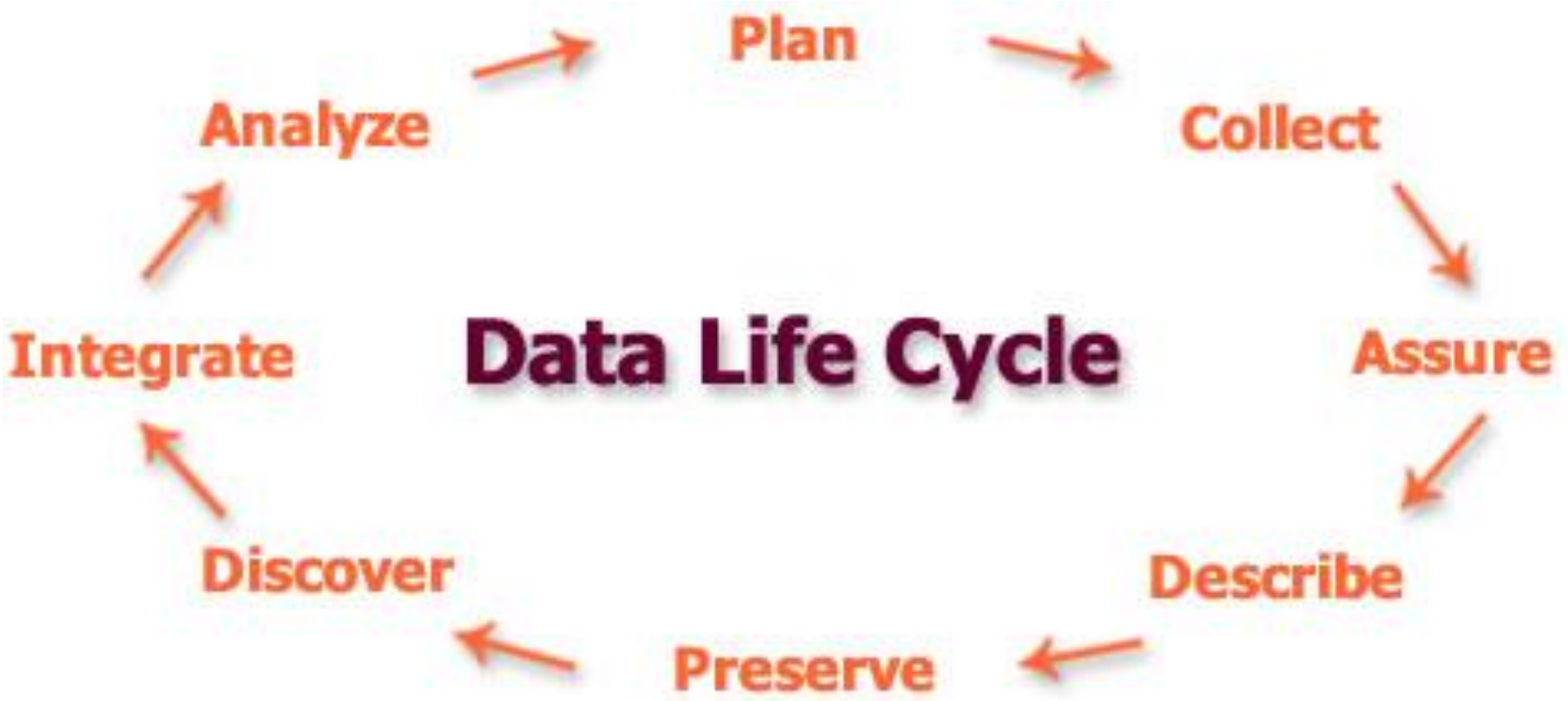


Fig. 1. Advancing Digitization of Biodiversity Collections (ADBC) program organized as hub-and-spoke, with iDigBio serving as the Home Uniting Biocollections (HUB), and currently working with 7 Thematic Collections Network (TCNs) and 2 Partner to Existing Network (PENs), involving more than 130 institutions in 49 states (as of April 2013).

A. Matsunaga, et al. 2013 *IEEE e-Science.* 2013: 78-87

Community Input: Now and Future



http://www.dataone.o

Related investments from DBI and BIO

- CSBR: Collections in Support of BIO Research
- Postdoctoral Research Fellowships in Biology
- Advances in Biological Informatics
- IDBR: Instrument Development for BIO Research
- Genealogy of Life (DEB/BIO)

morphbank
http://morphbank.net

SALIX

Symbiota
Promoting Bio-Collaboration

Specify 6

HUB

NSF

Directorate for Biological Sciences

Postdoctoral fellowships in Biology - 2015

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DUE DATES

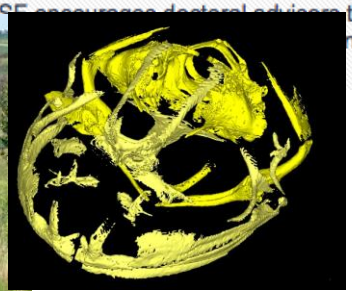
Full Proposal Deadline Date: January 8, 2015

SYNOPSIS

The Directorate for Biological Sciences (BIO) awards Postdoctoral Research Fellowships in Biology to recent recipients of the doctoral degree for research and training in *selected* areas supported by BIO and with special goals for human resource development in biology. The fellowships encourage independence at an early stage of the research career to permit Fellows to pursue their research and training goals in the most appropriate research locations regardless of the availability of funding for the Fellows at that site. For FY 2015 and beyond, these BIO programs are ***(1) Broadening Participation of Groups Under-represented in Biology, (2) Research Using Biological Collections, and (3) National Plant Genome Initiative (NPGI) Postdoctoral Research Fellowships.*** These areas change periodically as new scientific and infrastructure opportunities present themselves. For this reason, this solicitation will be changed as necessary to reflect the areas being funded.

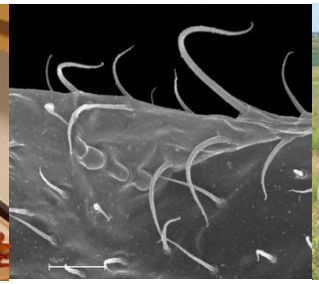
The fellowships are also designed to provide active mentoring of the Fellows by the sponsoring scientists who will benefit from having these talented young scientists in their research groups. The research and training plan of each fellowship must address important scientific questions within the scope of the BIO Directorate and the specific guidelines in this fellowship program solicitation. Because the fellowships are offered to postdoctoral scientists only early in their careers, NSF encourages doctoral advisors to discuss the availability of t ntage of this funding opportunity. Fe

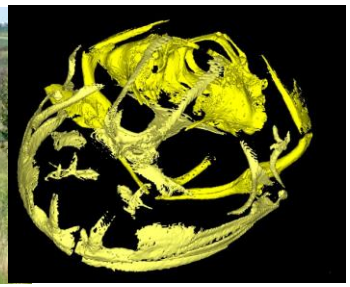


Other upcoming events

- NIBA renewal, PI Rob Gropp/AIBS
- “Bugs in a box” competition - $1M, through AIBS
- Collections pamphlet – DBI/CSBR
- Innovations in bio-collections research – DC area, summer/fall 2015 – Rohlf Mueller, VTU
- NIBA workshop on communications @ Field Museum, fall 2015



Advances in Biological Informatics (ABI)

ABI funds research in methods and development of tools for capture, management, and analysis of digital biological information.

Protein evolution

Analysis methods

Virtual communities

Software

Databases

Phylogenetic analysis

Population genomics

Phenotypes

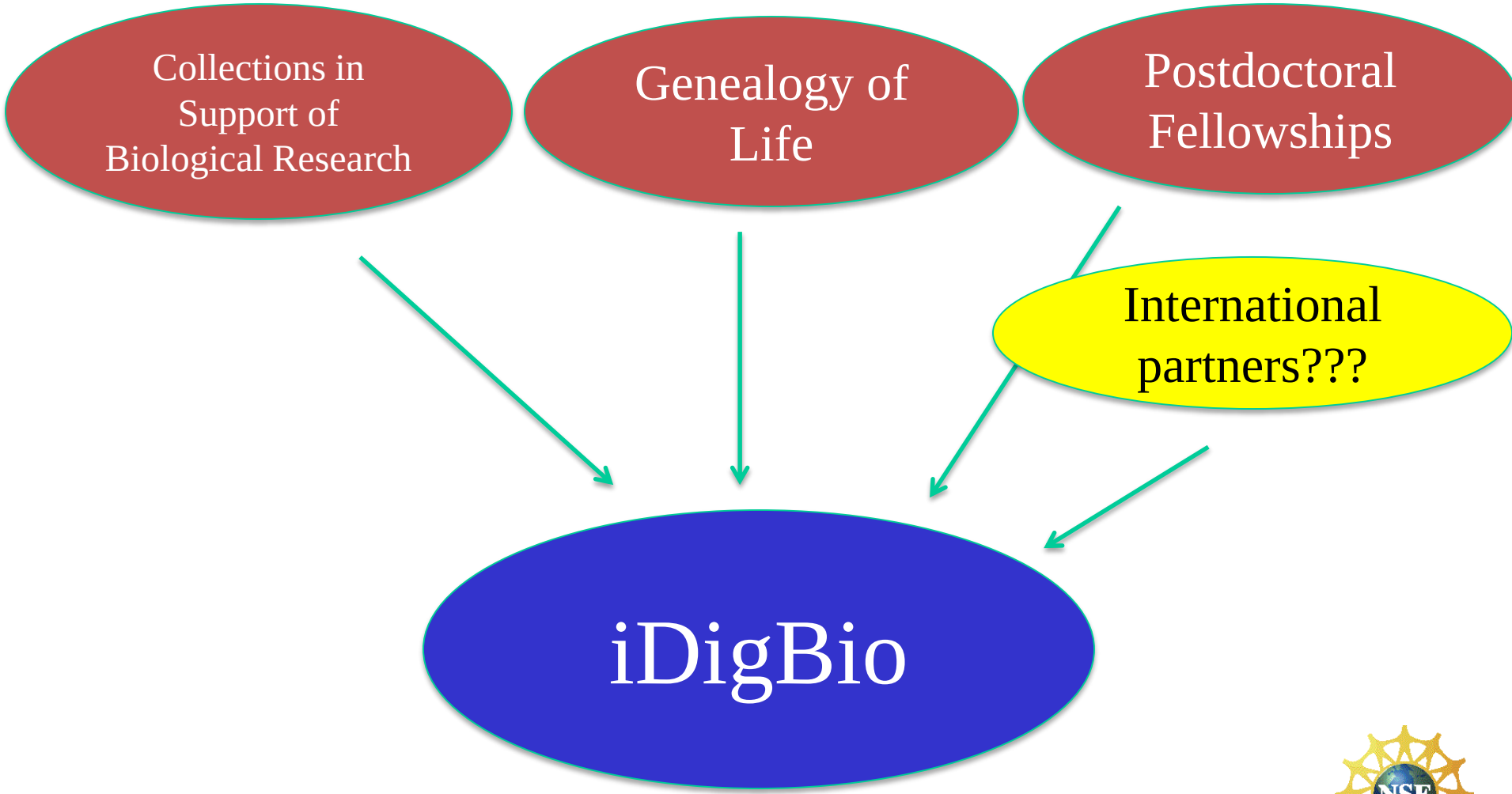
Morphbank
http://morphbank.net

TIME TREE
THE TIMESCALE OF LIFE

Specify 6

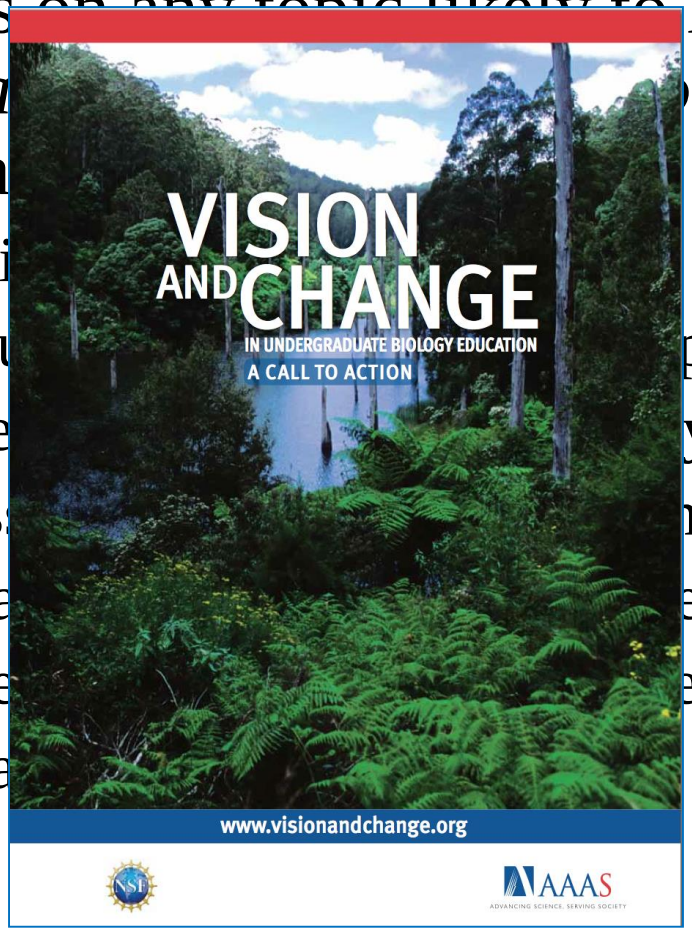
Symbiota
Promoting Bio-Collaboration

Building digitization infrastructure at NSF



Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)

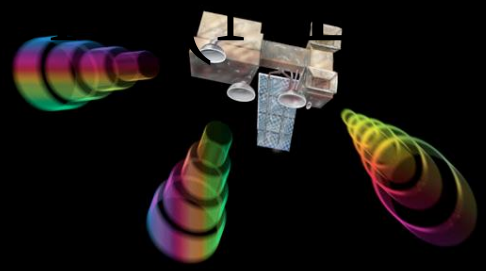
- Goal: "focus on any topic likely to lead to *improved pa* *r assessment* in undergradua
  - active and i
  - engage facu pment
  - incorporate y curriculum
  - improve as ng
  - improve tra ear institutions
  - Incorporate ences into undergra



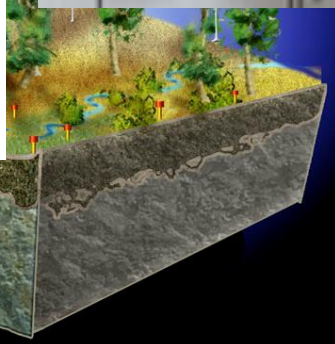
AIM-UP!: Advancing Integration of Museums into Undergraduate Programs
http://www.aim-up.org/

PI: Joe Cook, U. New Mexico
Participating institutions: Harvard, Berkeley, University of Alaska, Occidental College

National Ecological Observatory Network (NEON)



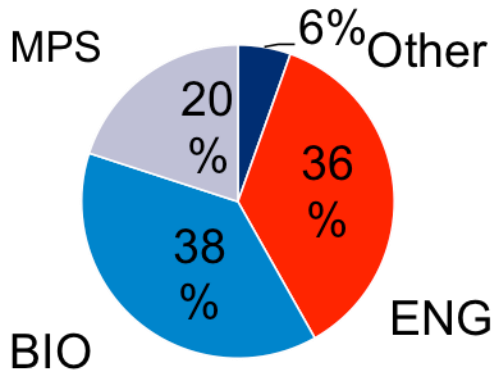
- **Continental scale ecological data**
- **116 sites**
- **Standardized measures and collection protocols**
- **Data publicly accessible**



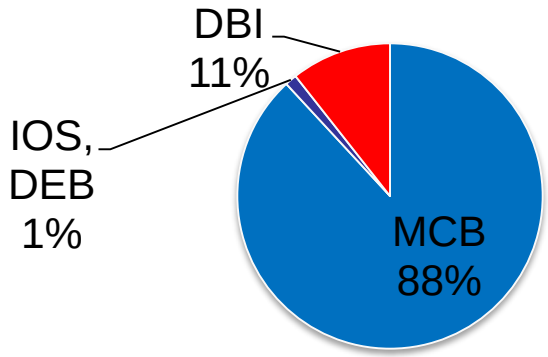
Synthetic Biology

- **The design and whole-sale construction of new biological parts and systems, and the redesign of existing, natural biological systems for tailored purposes, integrating engineering and computer assisted design approaches with biological research.**

Funding across NSF



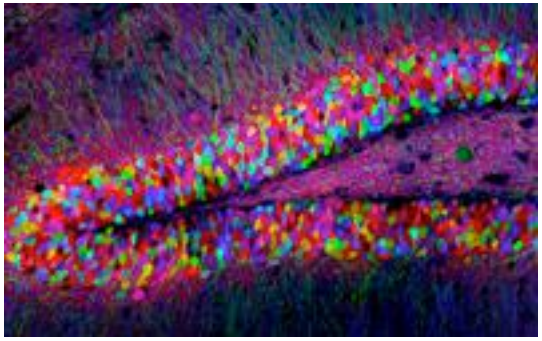
Funding across BIO



BRAIN Initiative at NSF

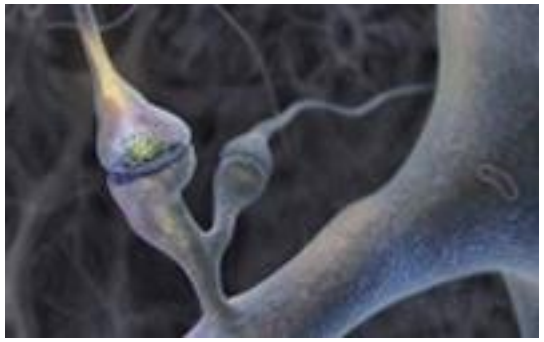
Multi-scale Integration of the Dynamic Activity and Structure of the Brain

Brain-Inspired Concepts and Designs



Neurotechnology and Research Infrastructure

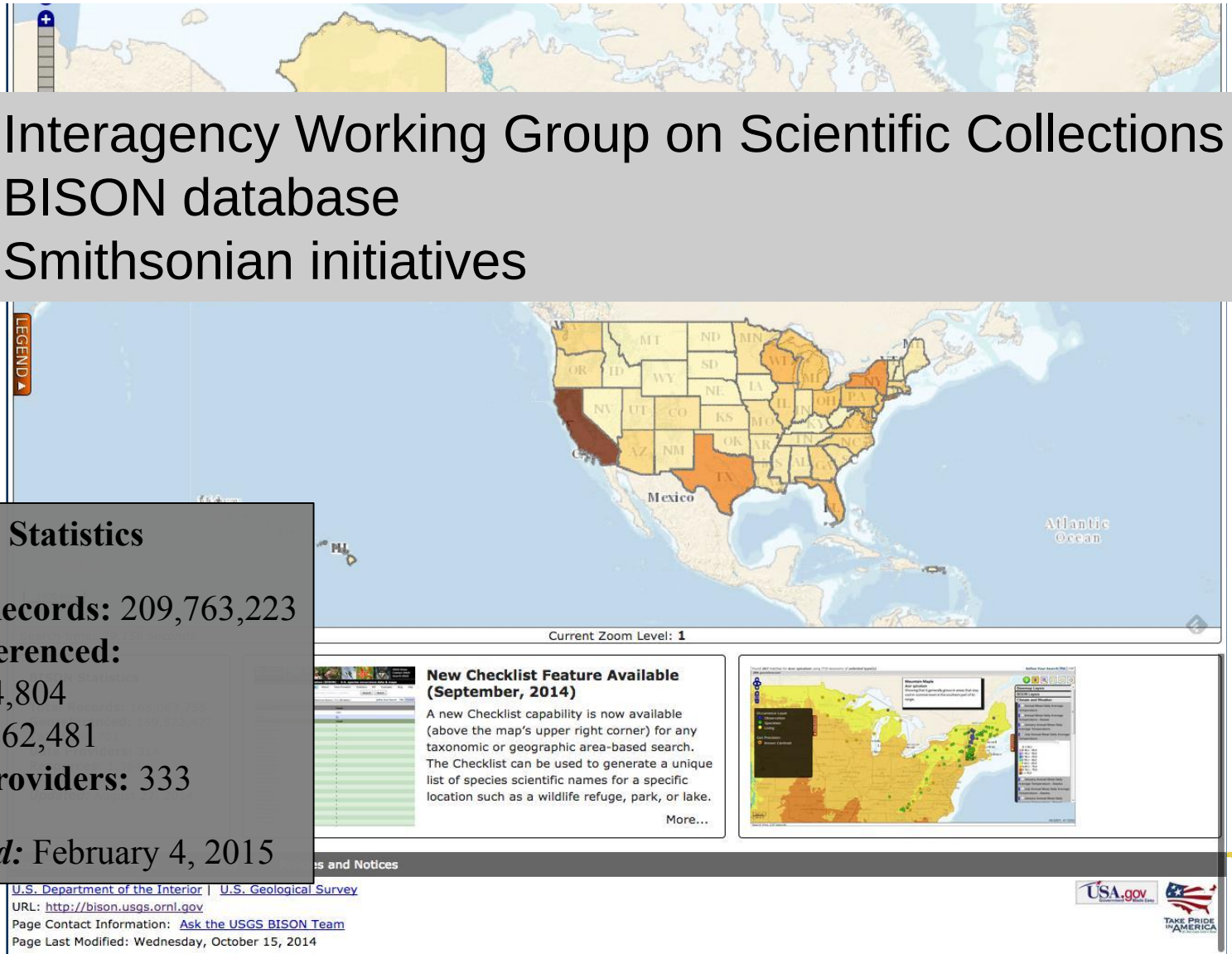
BRAIN Workforce Development



Quantitative Theory and Modeling of Brain Function

Federal Initiatives in Digitization

- Interagency Working Group on Scientific Collections
- BISON database
- Smithsonian initiatives



BISON Statistics

Total Records: 209,763,223
Georeferenced: 204,454,804
Taxa: 362,481
Data Providers: 333

Updated: February 4, 2015

Get involved with NIBA and NSF

- **Serve on panels or working groups**
- **Contact NIBA with ideas (PI: Rob Gropp)**
- **Do a rotation at NSF**
  - Division Director
  - Program Officer
  - IPA versus Visiting Scientist