



US COLLECTIONS PARTNERS PRESENT:

2023

ENVISIONING A

# BIOLOGICAL COLLECTIONS

ACTION CENTER

## Visions of an Action Center from NASEM Report Authors - Part 2

Pam Soltis, Joe Cook, Scott Edwards,  
Talia Karim, Shirley Pomponi

MARCH 14, 2023

## Housekeeping

- This webinar is being **recorded**. The recording will be **available online** at the webinar series Wiki page after the webinar.
- You may use the **chat** feature to interact with panelists and attendees, but please don't use it for asking questions.
- Please use the **Q&A** feature on Zoom to type in your questions for the speakers. Alternatively, you can use the **Raise Hand** feature on Zoom, and we will call on you to ask your question.
- We will also be using the **Discourse** platform to capture questions and comments; more on that later.
- Questions will be addressed **after** the presentations.



# WEBINAR SERIES

## MARCH 7

Visions of an Action  
Center from NASEM  
Report Authors  
Part 1

*Pam Soltis  
Andy Bentley  
Barbara Thiers*

## MARCH 14

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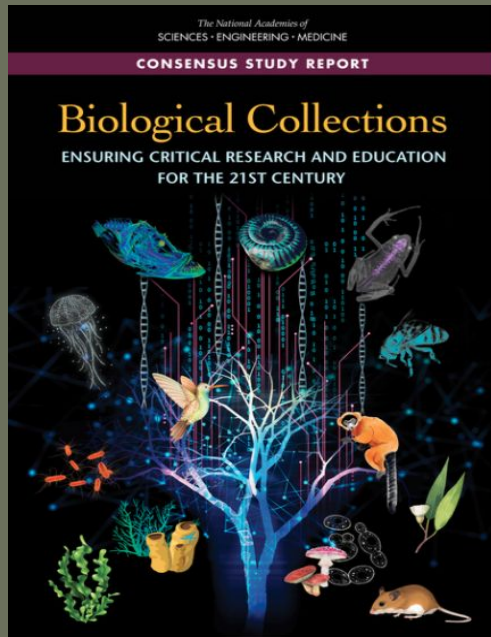
*Pam Soltis  
Joe Cook  
Scott Edwards  
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## MARCH 21

Responses to the  
NASEM report with  
presentations from the  
IWGSC, AIBS, & BCoN

*Scott Miller  
Kevin Hackett  
Diane DiEuliis  
Jyotsna Pandey  
Breda Zimkus*

# What is the Biological Collections Action Center?



NASEM 2020

Action Center for Biological Collections



BCON 2019

Central Organizing Unit



AUGUST 09, 2022

# FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China

[BRIEFING ROOM](#)[STATEMENTS AND RELEASES](#)

In President Biden's first year in office, the Biden-Harris Administration has implemented an industrial strategy to revitalize domestic manufacturing, create good-paying American jobs, strengthen American supply chains, and accelerate the industries of the future. These policies have spurred an historic recovery in manufacturing, adding 642,000 manufacturing jobs since 2021. Companies are investing in America again, bringing good-paying manufacturing jobs back home. The construction of new manufacturing facilities has increased 116 percent over last year.

# Discourse Platform: discourse.idigbio.org



To make launching your new site easier, you are in bootstrap mode. All new users will be granted trust level 1 and have daily email summary emails enabled. This will be automatically turned off when 50 users have joined.

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Categories

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Replies

Views

Activity

Legal Framework & Equity

■ Discussion Topics



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6d

Topic: Biodiversity Data Creation

■ Discussion Topics



1

23

6d

last visit

Participant questions and comments

■ Discussion Topics

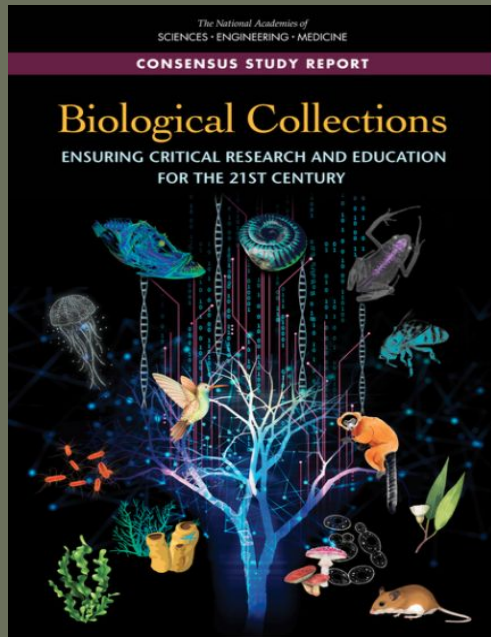


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# What is the Biological Collections Action Center?



NASEM 2020

**Recommendation 8-1:** The National Science Foundation, in collaboration with other institutions that provide funding and other types of support for biological collections, should help **establish a permanent national Action Center for Biological Collections to coordinate action and knowledge, resources, and data-sharing among the nation's biological collections** as they strive to meet the complex and often unpredictable needs of science and society. Such an action center should **include a physical space and cyberinfrastructure to develop and implement collaborative strategic efforts and further build and nurture communities of practice** for research, education, workforce training, evaluation, and business model development, among other community-wide needs.







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## A Global Strategy to Build NextGen Collections for a Changing Planet

Joseph Cook,  
Curator and Professor,  
University of New Mexico



## Biocollections Action Center

Elevate the national standing of biocollections by developing a vision for the fundamental role of specimen infrastructure in science, societal needs, opportunities

e.g., Bioeconomy (Davos 2023)

# Biocollections Action Center

- Challenges (a few, among others)

Our community is

- Diverse
  - Small to large, paleo to living collections, academic to private
- Dispersed
  - Fairbanks to Miami, Tucson to Tucumcari
- Severely Underfunded
- Too Seldom Heard

## Action Center could catalyze collections' role in societal needs

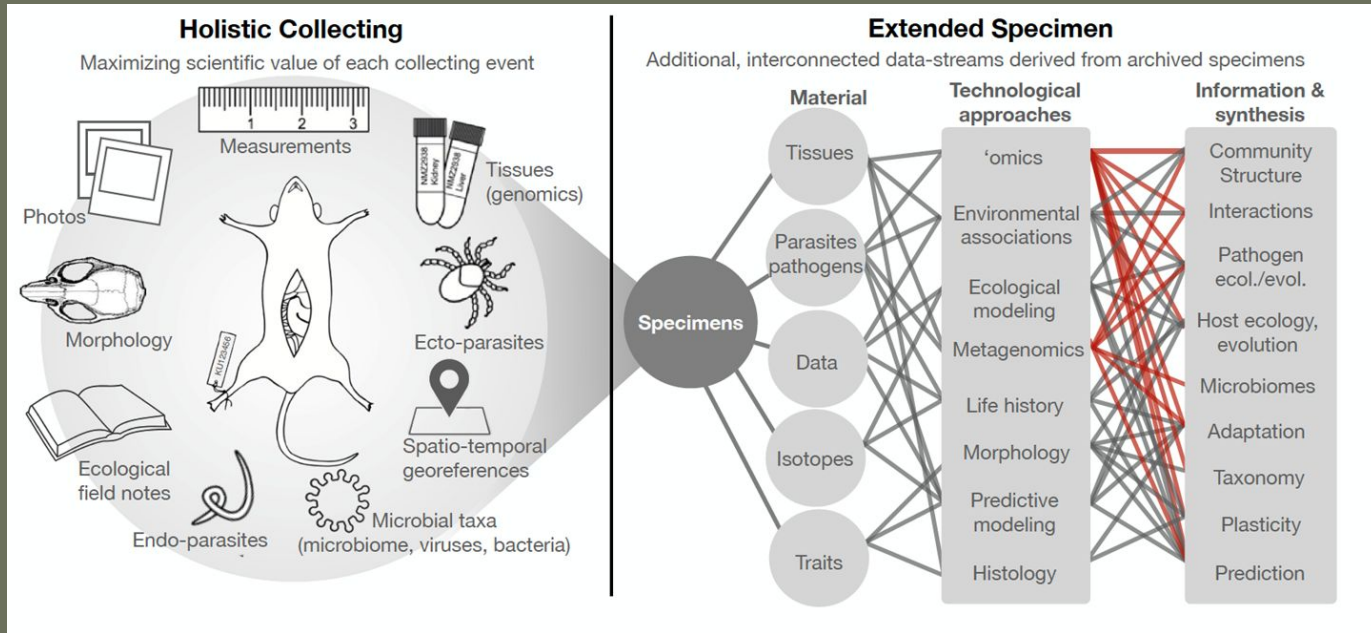
- Climate change
  - Habitat conversion
  - Increased pollutants
  - Food security
  - Introduction of exotics
  - Loss of biotic diversity
  - Emerging pathogens
- Biocollections establish historic baselines  
---- crucial to documenting change

Generally, not built with these issues in mind.



Bud Fay-Univ of Alaska  
Walrus--now declining

# Need to rethink how we build collections —global strategy



Holistic Field Collections Lead to Extended Specimens

# NextGen Collections

- Sample Strategically
  - Time, Space, Diversity, Holistic
  - Connect Human Health to Biodiversity
- Build Infrastructure in Global South
  - Human Capacity
    - Curatorial Staff, Data Scientists, Educators, etc
  - Buildings, Cases, Nitrogen Freezers,
  - Informatics
  - Help Shape Nagoya
- Engage & Benefit Local Communities

# Critical Museum Infrastructure Long-term Tissue Archives





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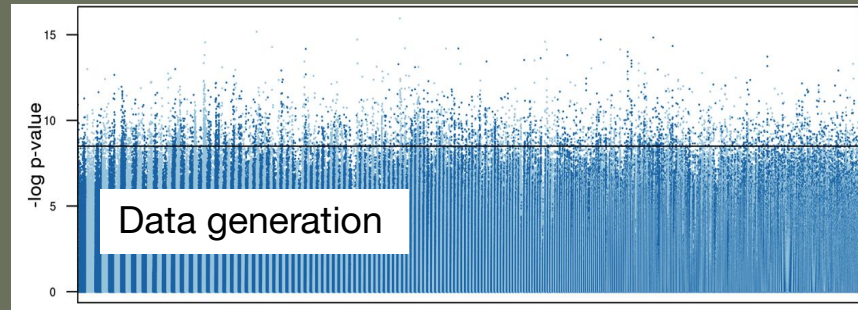
ACTION CENTER

## **An Action Center for Biological Collections: Connecting genomics to biology via collections**

Scott Edwards,  
Professor & Chair, Organismic & Evolutionary Biology  
Curator of Ornithology, Museum of Comp. Zoology  
Harvard University



# The museum genome data life cycle



## Model organism or animal sample from *Dromaius novaehollandiae*

## Digitization

Identifiers	BioSample: SAMN06628349; Sample name: Emu 1B-2889
Organism	<a href="#">Dromaius novaehollandiae</a> (emu) cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Euteleostomi; Sarcopterygii; Dicotyliformes; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Sauria; Theropoda; Coelurosauria; Aves; Palaeognathae; Casuariiformes; Dromalidae; Dromaius
Package	<a href="#">Model organism or animal; version 1.0</a>
Attributes	<b>age</b> missing <b>sex</b> male <b>tissue</b> liver <b>isolate</b> ROM 1B-2889 <b>collection date</b> 1998 <b>environment biome</b> Deciduous forest <b>isolation source</b> blood preserved in ethanol <b>environment feature</b> Emu farm <b>environment material</b> tissue <b>geographic location</b> <a href="#">Canada; vicinity of Toronto</a> <b>isolation and growth condition</b> <a href="http://www.informdurham.com/record/OSH0181">http://www.informdurham.com/record/OSH0181</a> <b>latitude and longitude</b> <a href="#">43.65 N 79.38 W</a> <b>sample material processing</b> DNA isolation <b>sample size</b> 1

Submission [Harvard University](#), Scott Edwards; 2017-03-22

# Genomes without phenotypes are useless

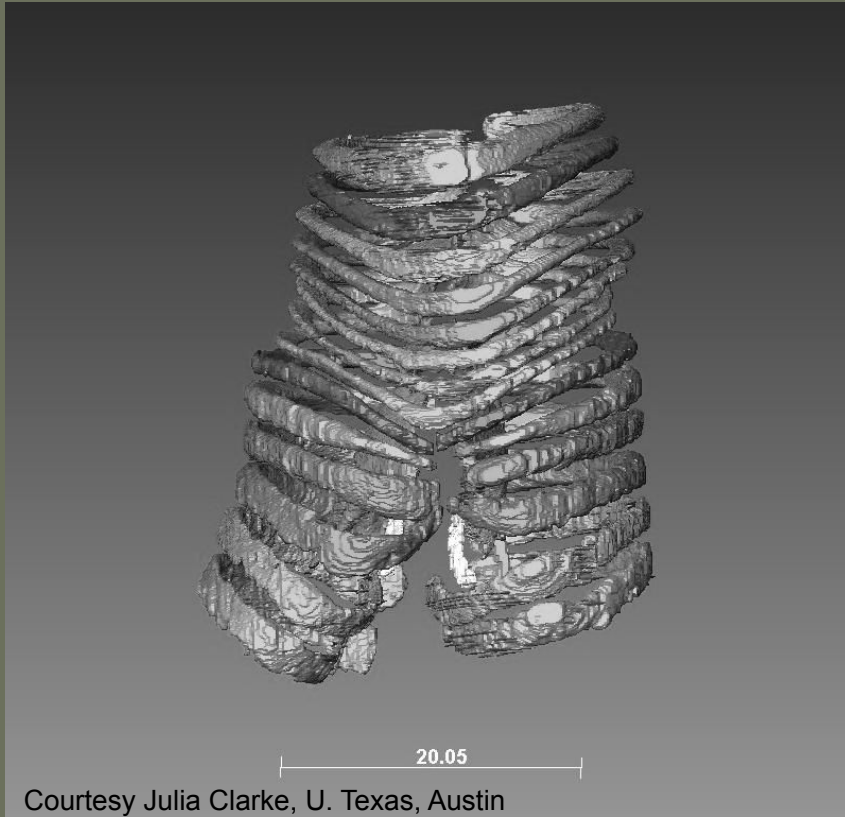


Natural History and Science Museum, University of Porto, Portugal

## *Action center could:*

- Promote best practices for linking genomes and specimen metadata
- Promote best practices for archiving genomic resources
- Help coordinate and prioritize, through community input, which taxa and tissues should be archived

# Support cutting-edge science



Courtesy Julia Clarke, U. Texas, Austin

**Connect genomes and phenotypes via collections**

*Action center could:*

- Provide a forum for showcasing leading examples of cutting-edge collections-based science
- Help recruit the best, most diverse talent to the museum research community
- Promote best practices for linking genomic and voucher data



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## A Paleontologist's View

Talia Karim, University of Colorado Museum  
of Natural History

# Sustaining Community Activities

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## Paleo Data Working Group



Distributed Resource  
Building

Sharing Concepts

Professional  
Development/Training

<https://paleo-data.github.io>

## Breaking Silos between Communities of Practice

Research

Collections

Education



<https://cheezburger.com/7856581120/take-a-swim-in-my-moat>

Biological Sciences

Geological Sciences



Deep Time  
Approach

## Community Needs

Community Supported  
Cyberinfrastructure

Orphan Collections

Professional  
Development/Training

Metrics for Success



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## Living Collections

Shirley Pomponi  
Harbor Branch Oceanographic Institute  
Florida Atlantic University



Phaff Yeast Culture Collection



Duke Lemur Facility



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## Living Collections

Shirley Pomponi  
Harbor Branch Oceanographic Institute  
Florida Atlantic University



# Living Collections

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- **Research & model organisms**
- **Grown & maintained in**
  - genetic stock centers
  - germplasm repositories
  - living biodiversity collections



# Unanticipated Uses - Transformational Discoveries: the PCR Story

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- From the discovery of a heat loving microbe and its heat-tolerant enzymes
- To the development of the polymerase chain reaction



# Vision & goals for Action Center: benefits & best practices for living collections



Different needs  
from natural  
history  
collections

Infrastructure

Workforce

Uses/applications

Business models



SMITHSONIAN'S NATIONAL ZOO  
& CONSERVATION BIOLOGY INSTITUTE



OCEAN GENOME LEGACY CENTER



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# THANK YOU FOR YOUR PARTICIPATION



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