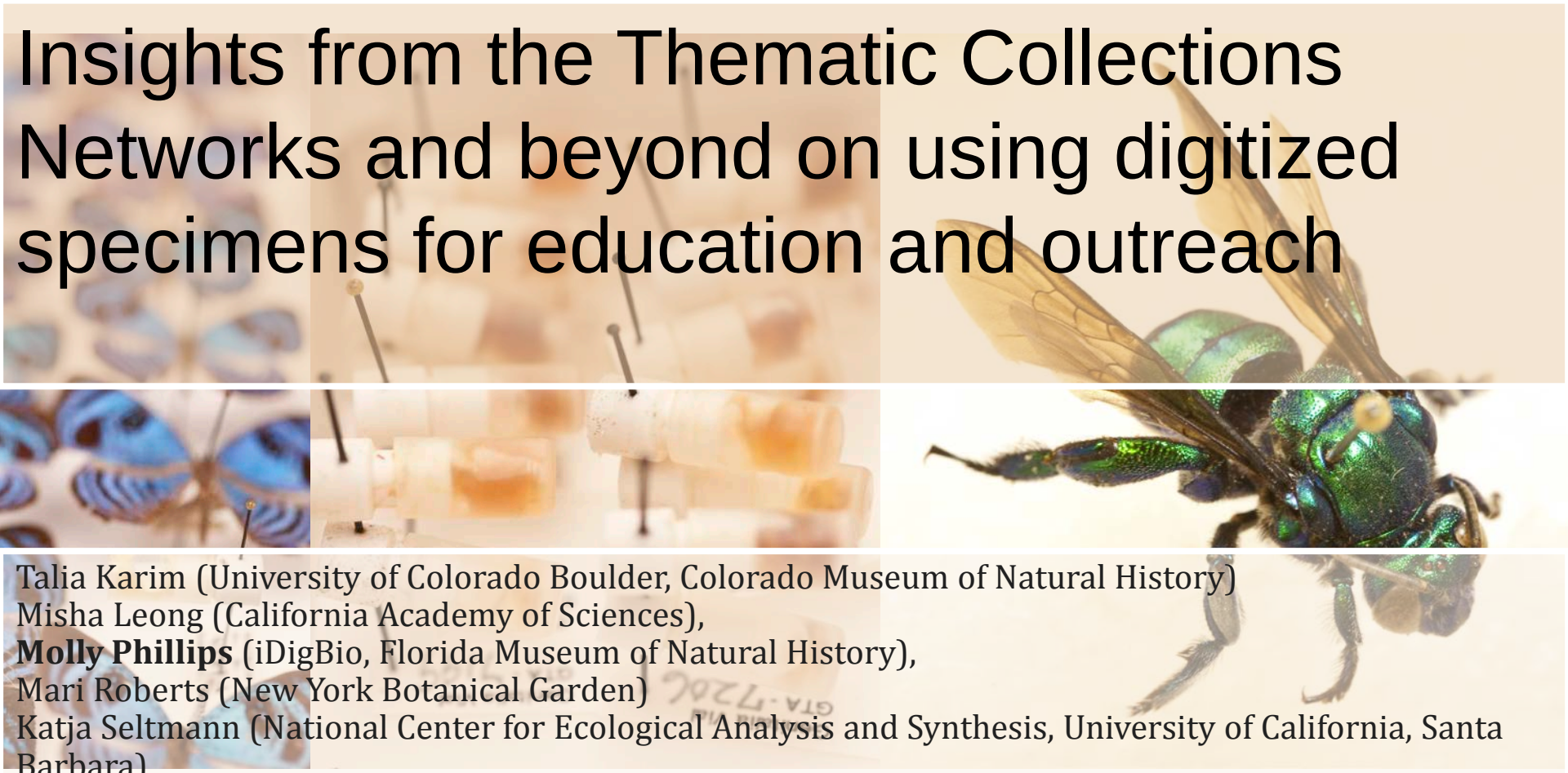
Insights from the Thematic Collections Networks and beyond on using digitized specimens for education and outreach



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Misha Leong (California Academy of Sciences),
Molly Phillips (iDigBio, Florida Museum of Natural History),
Mari Roberts (New York Botanical Garden)
Katja Seltmann (National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara)

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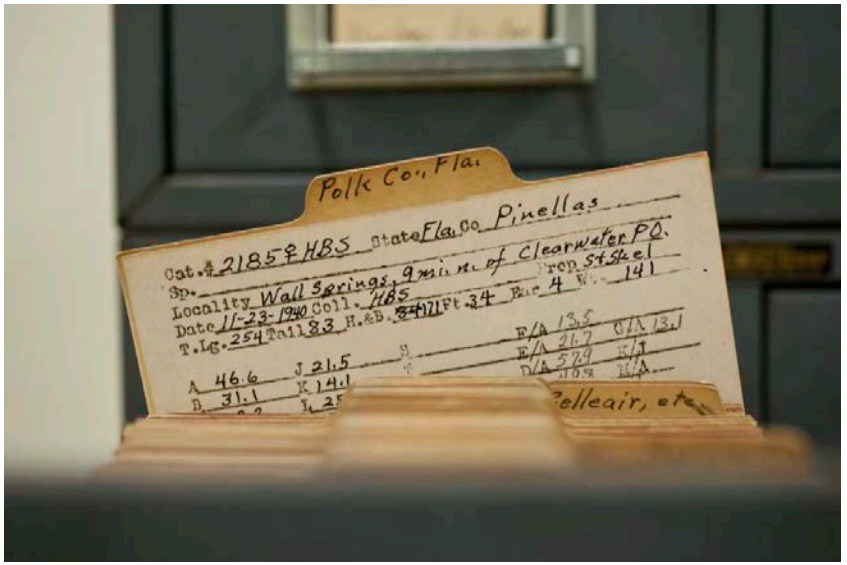
Natural History Collections are arguably the richest source of biodiversity data in the world

Photos courtesy of the Florida Museum of Natural History

The problem is accessibility

However, specimens (along with their data) are not always available for researchers and educators…



Photos courtesy of the Florida Museum of Natural History

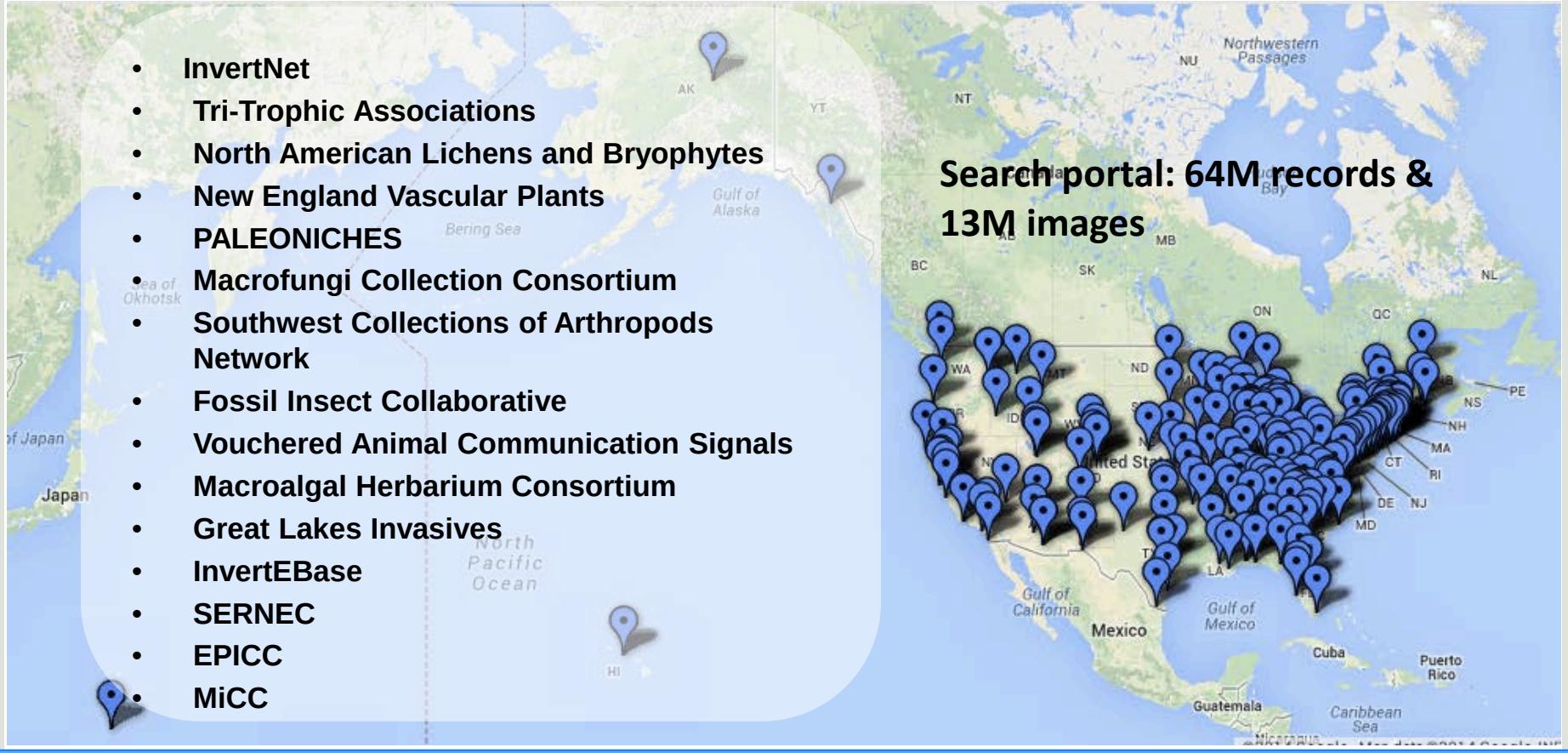
In an effort to make these collections universally accessible to taxonomists, ecologists, researchers, and the general public, in 2011 the U.S. National Science Foundation launched a $100 million, 10-year **Advancing Digitization of Biodiversity Collections (ADBC)** program and named the University of Florida and Florida State University jointly as the coordinating center and national resource for digitization.

The scope of our work is limited to public, non-federal, U.S. collections, though NSF has encouraged us to develop international collaborations.

The goal is to digitize and make available via the Web records for **all biological and paleontological collection objects in N. America** over the 10-year life of the project.

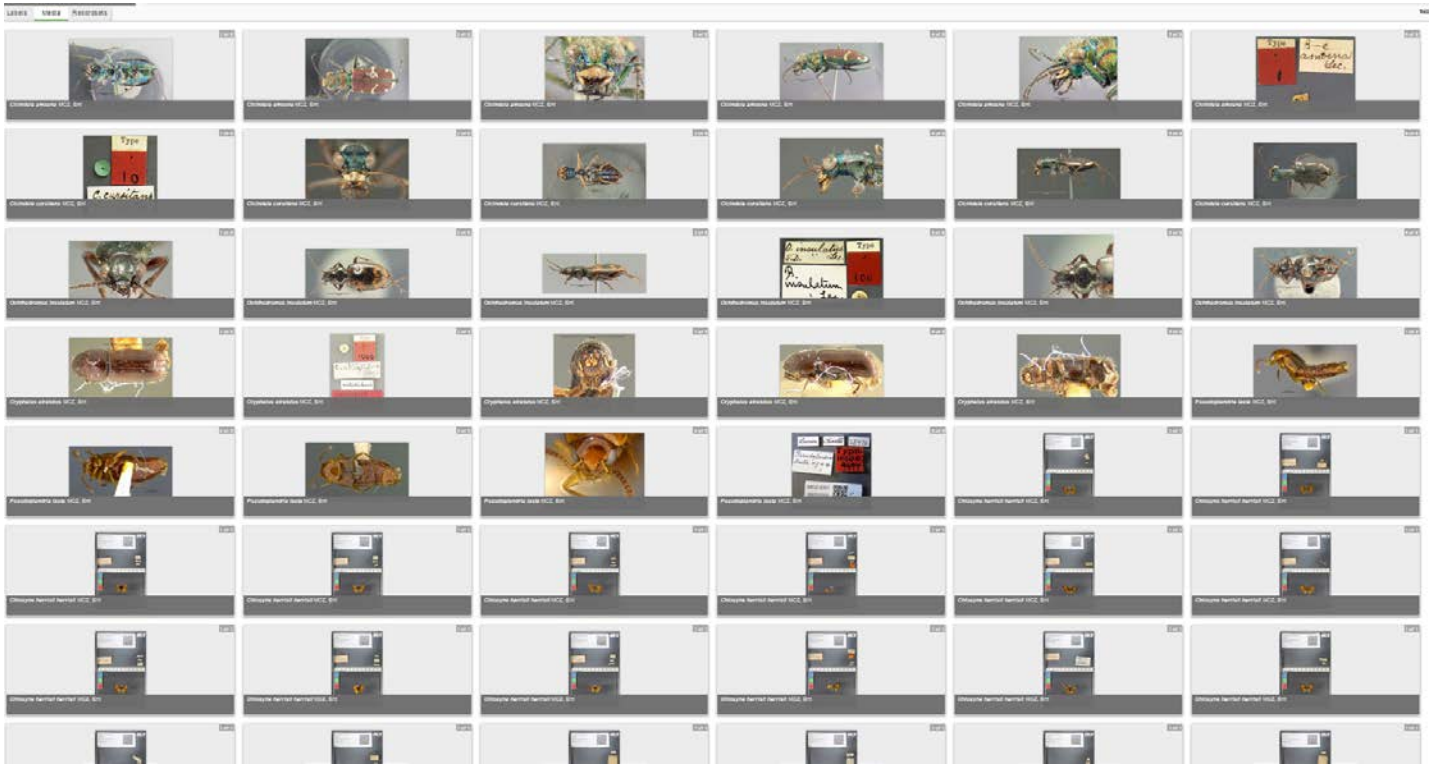
Thematic Collections Networks (TCNS) & Other Collaborating Institutions

- InvertNet
- Tri-Trophic Associations
- North American Lichens and Bryophytes
- New England Vascular Plants
- PALEONICHES
- Macrofungi Collection Consortium
- Southwest Collections of Arthropods Network
- Fossil Insect Collaborative
- Vouchered Animal Communication Signals
- Macroalgal Herbarium Consortium
- Great Lakes Invasives
- InvertEBase
- SERNEC
- EPICC
- MiCC



439 collections in 268 institutions in 50 states (17 TCNS & others)

What can we do to engage students, educators, and the public in biodiversity using digitized natural history collections?



www.idigbio.org has well over 9 million insect records…

Using Digitized Collections for E&O

1. User-friendly online databases
2. Workshops and training
3. Collections-based educational materials
4. Digitization AS outreach

ADBC Examples and Beyond

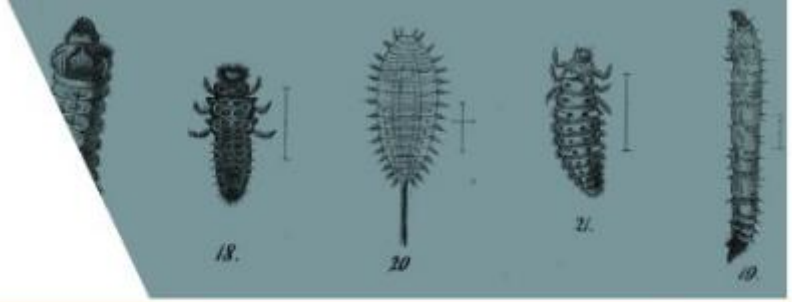
1. User-friendly Online Databases

K- 12 Educational Site

- Aggregate data from fossil insect project (FIC)
- Provide tools for educational access to these data
- Central resource to interact with bio and geo cyberinfrastructure initiatives

fossil insect COLLABORATIVE

Making data and images of millions of insect specimens available on the web



ABOUT NEWS BROWSE JOIN EDUCATION

Search

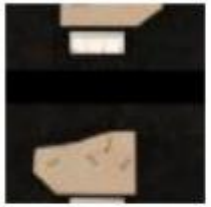
News

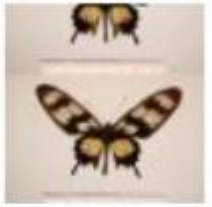
Society for the Preservation of Natural History Collections Annual Meeting

More

undet. Hexapoda (YPM IP 584656).

Featured Fossils

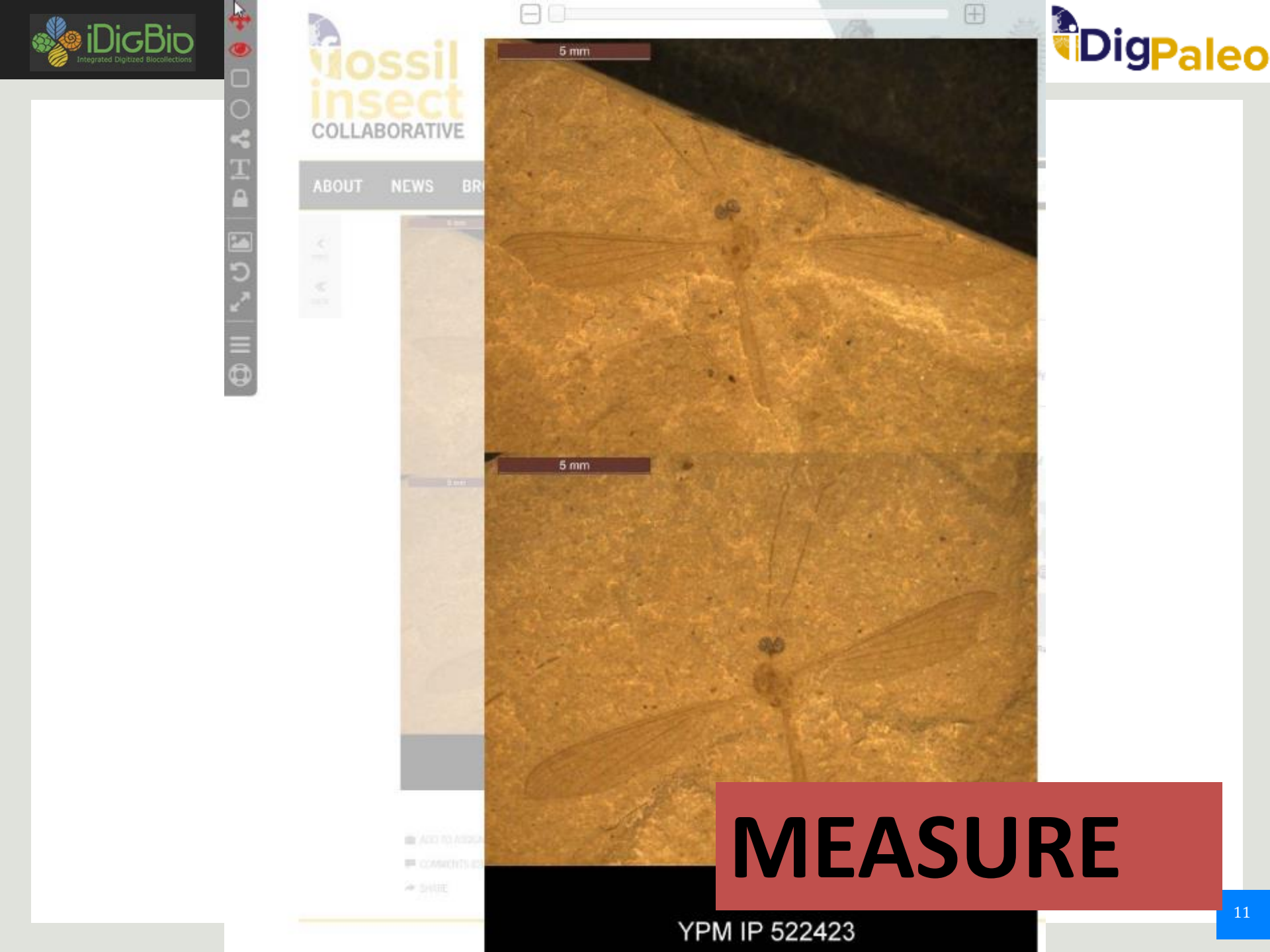




YPM IP 585232

Latest Comments

Featured Institution


iDigBio
Integrated Digitized Biocollections
DigPaleo
fossil insect
COLLABORATIVE
ABOUT
NEWS
5 mm
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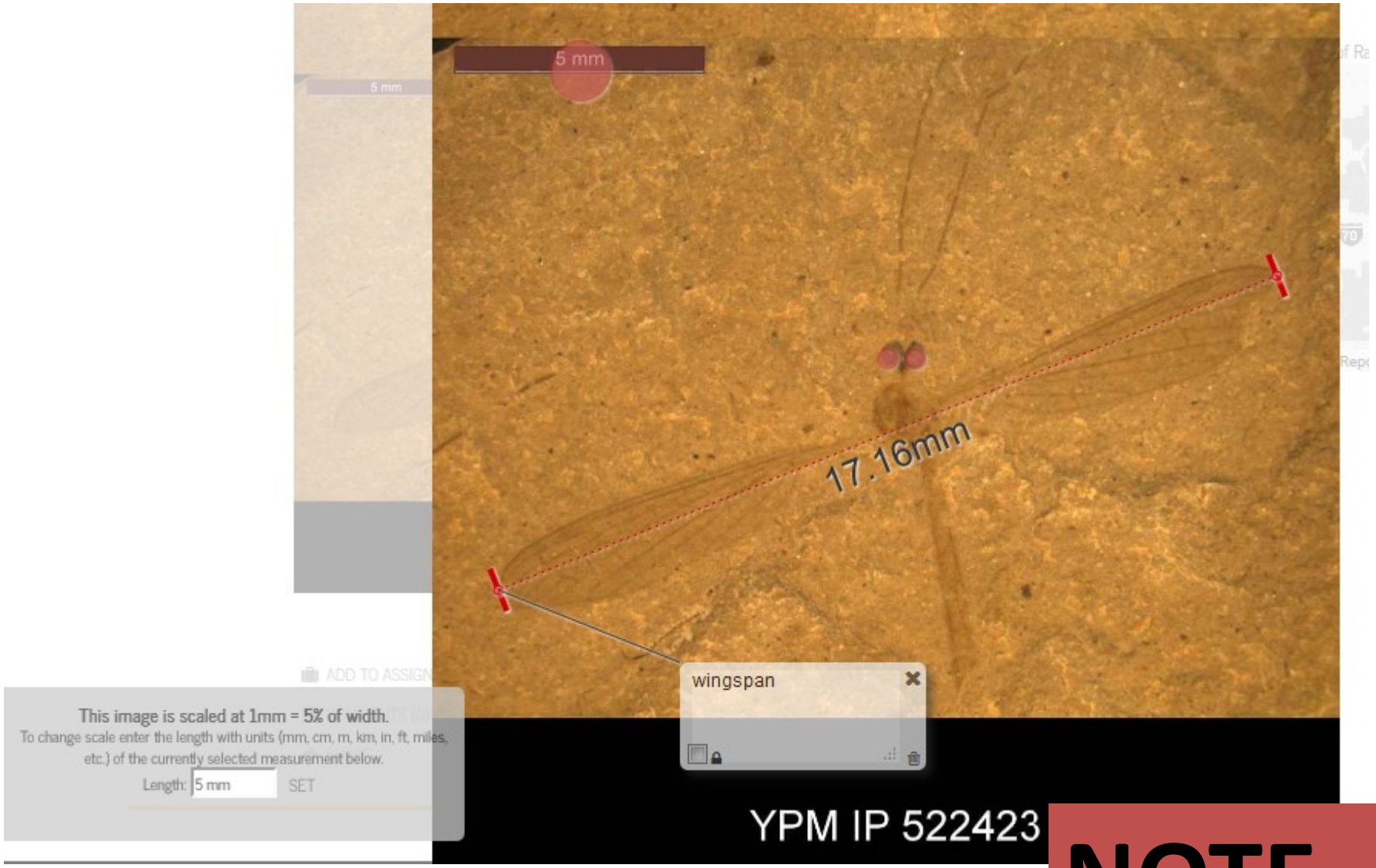
MEASURE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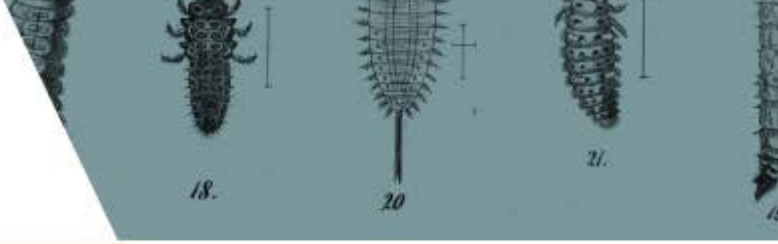
NOTE

fossil insect COLLABORATIVE

Making data and images of millions of insect specimens available on the web



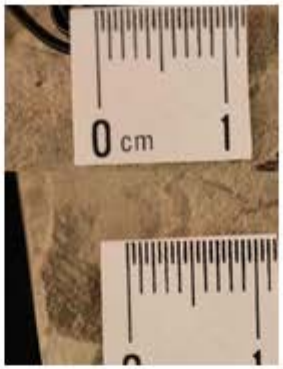
ABOUT NEWS BROWSE JOIN EDUCATION

Search

5 SPECIMEN RESULTS

SOURCE: YALE PEABODY MUSEUM OF NATURAL HISTORY ⊗ HAS MEDIA: HAS MEDIA ⊗ FOSSIL/MODERN: FOSSILS ⊗ SERIES: EOCENE ⊗
COMMON NAME: ROBBER FLIES ⊗

YPM IP 454405
undet. Asilidae



YPM IP 584576
undet. Asilidae

YPM IP 584521
undet. Asilidae

YPM IP 454423
Asilidae?

YPM IP 454441

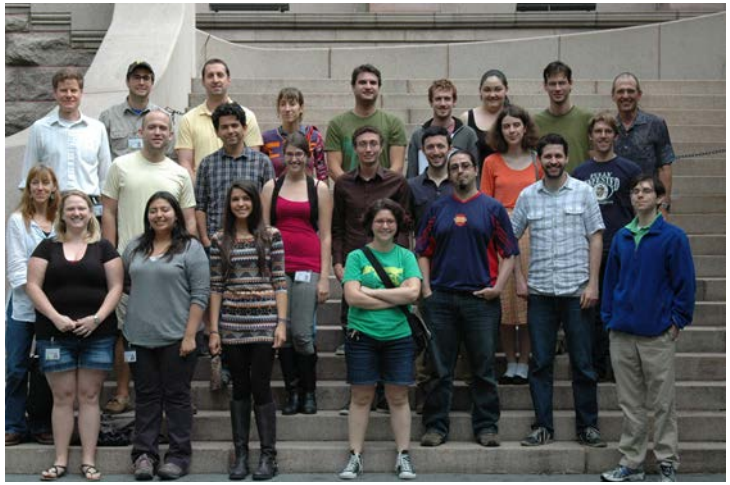
FILTER BY

CONTINENT
North America

GROUP

2. Workshops and training

- Collections Community Training
  - Biological Specimen Informatics Short Course
  - Data Mining Workshops
  - Data Carpentry with iDigBio
  - Georeferencing Workshops



Outreach Workshops

- Digitization Workshops at Everett Children's Adventure Garden
- Goldman Sachs Volunteer Digitization Event
- Georeferencing as Professional Development Incentive
  - Student volunteers receive training in the GIS Laboratory
  - Learn to use GIS to analyze data sets in an environmental context and produce maps.

- Teacher Workshop at the Yale Peabody Museum
  - Outcome include lesson plans based on NGSS

Kids in Nature Program at UC Santa Barbara

Field trips and classroom visits use both living and preserved collections at UCSB and plant specimens collected in school gardens for a variety of lesson plans

- Early training in collections for 4-6th grade students
- Training for undergraduates interested in science education
- Online lessons: https://www.ccber.ucsb.edu/education/resources-teachers

3. Collections-based educational materials

- WeDigBio https://www.wedigbio.org/content/educational-exercises
- AIM-UP! http://aimup.unm.edu/for-educators/index.html now also a QUBES Hub https://qubeshub.org/groups/aimup
- SERNEC - http://sernec.appstate.edu/education-outreach
- iDigPaleo - http://peabody.yale.edu/collections/invertebrate-paleontology/idigpaleo-teacher-workshop-2015

Biodiversity Literacy in Undergraduate Education

Biodiversity Literacy

Undergraduate Institutions

We welcome educators from colleges and universities of all shapes and sizes, including community colleges, HBCUs (Historically Black Colleges and Universities), MSIs (Minority-serving Institutions, research universities, and small colleges.

Partners

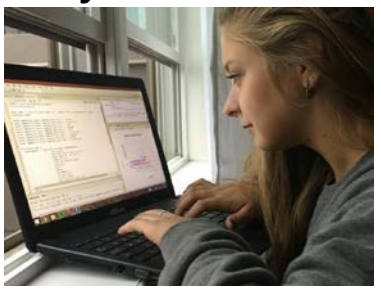
We are biodiversity researchers, science educators, ecologists, geographers, taxonomists, and natural history collections managers. Join us in creating resources that arm students with multi-discplinary skills.

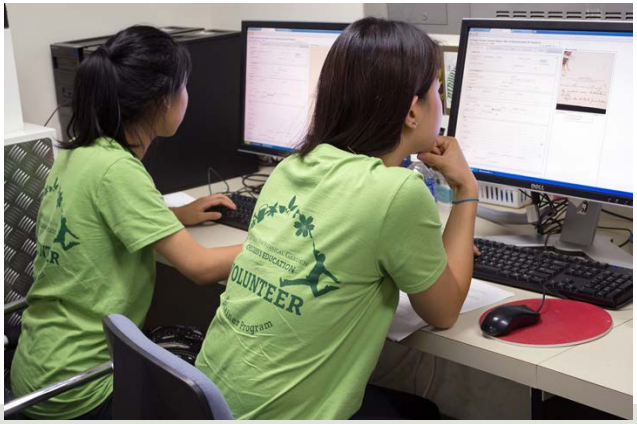
Products

We're developing modules that merge best practice teaching methods with current datasets to present students with timely research- and peer-reviewed literature-based activities.

4. Digitization AS Outreach

- Undergraduates
  - Volunteer recruitment: career fairs and work with faculty
  - Volunteer incentives: internships and course credits
    - Collections curation skills class
- High School
  - Summer programs, and extra credit
- Corporate Relations
  - Some large companies have mandatory volunteer requirements for employees





CalBug

The major terrestrial arthropod collections in California = CalBug

Since 2010, hundreds of thousands of records have been added to the California Terrestrial Arthropods Database.

- Essig Museum, UC Berkeley
- California Academy of Sciences
- LA County Museum
- Santa Barbara Museum of Natural History
- California State Collection of Arthropods
- Bohart Museum, UC Davis
- Museum of Natural History Collections, UC Santa Cruz
- San Diego Natural History Museum
- Entomology Research Museum, UC Riverside

NOTES FROM NATURE

Pinned Specimens

EXPEDITIONS FOR PINNED SPECIMENS

CalBug Leaf-cutter Bees 1

90.00% complete

Trechine Ground Beetles

7.94% complete

WeDigBio

- An event of collective, interactive, mass digitization of biodiversity collections.
- Global – October 20-23
- Visit WeDigBio https://www.wedigbio.org/ to find out more!

iDigBio Education & Outreach Working Group

- Quarterly virtual meetings
- Two upcoming workshops
  - Incorporating K-12 Outreach into Digitized Collections Programs (**Dec, 2016**)
  - Building and Disseminating Resources for Collections-Based Undergraduate Education (**May, 2017**)
- Webinar Series: the purpose is to share resources, tools, and expertise centered on E&O activities for ADBC partners and the collections community. Recordings of past webinars available.
- Find out more by visiting the WG Wiki: https://www.idigbio.org/wiki/index.php/E%26O_Working_Group

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ADBC

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FIC: T. Karim and D. Smith (NSF# 1305066)

MiCC: A. Miller (NSF#1502735)

SERNEC: Z. Murrell (NSF#1410069)

GLI: K. Cameron (NSF# 1410683)

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NEVP: P. Sweeney (NSF# 1209149)

MaCC: B. Thiers (NSF# 1206197)

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Notes from Nature: https://www.notesfromnature.org/about (NSF# 1458550)

CalBug: http://calbug.berkeley.edu/index.html (NSF#0956389)

BLUE: A Monfils, L. Ellwood, D. Linton and M. Phillips

Thank you!

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