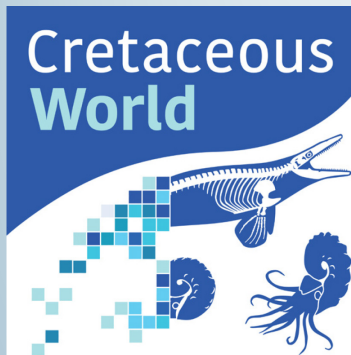




NOVEL USE OF INSELECT IN DIGITIZATION OF PALEONTOLOGY COLLECTIONS

Lutz, Butts, and Norris

Yale



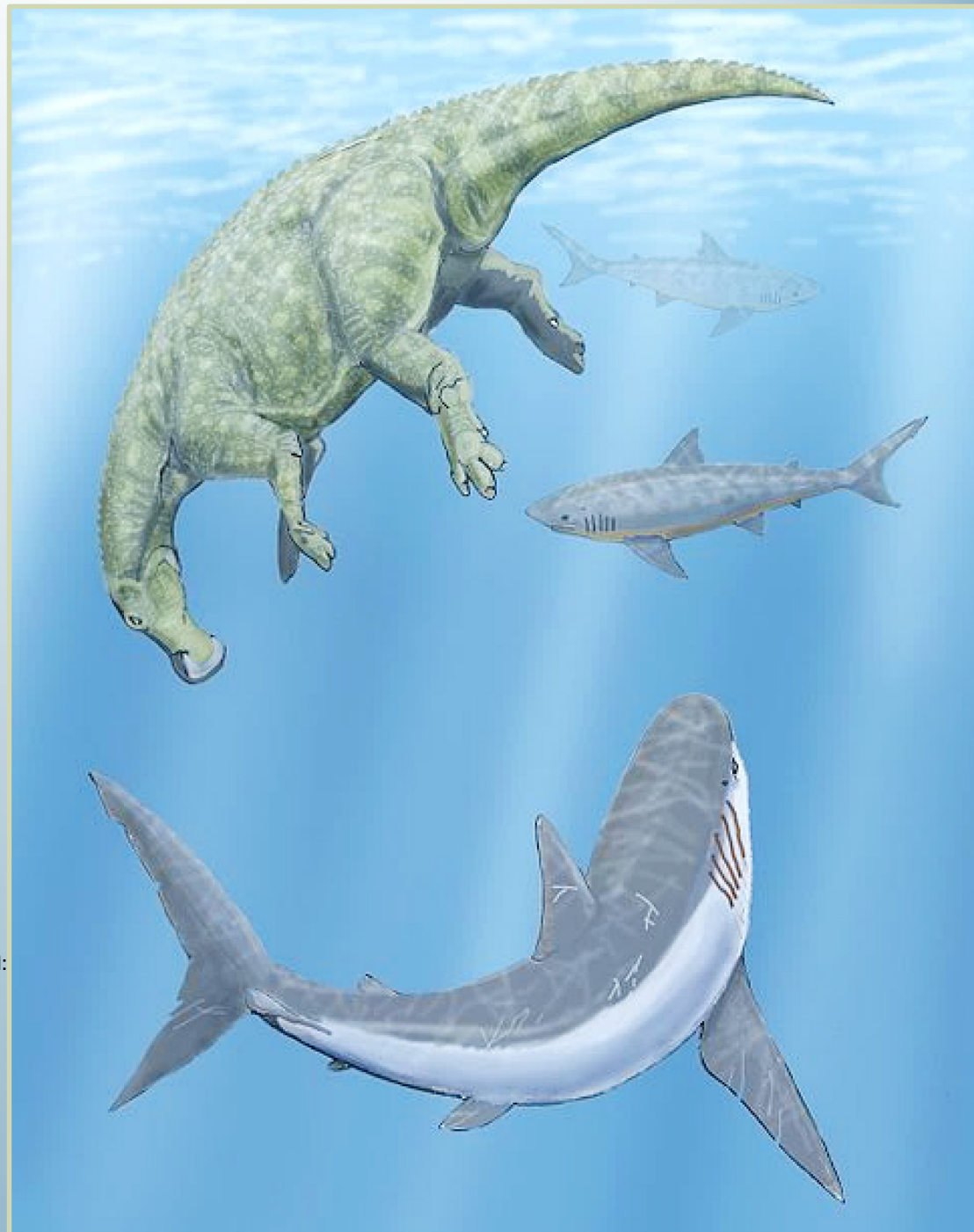
Look at these conditions in the WIS:

- competition
- biodiversity & extinction
- ecosystem evolution during sea level changes

Goal: Digitize tens of thousands of invertebrates, vertebrates, and microfossils from the Western Interior Seaway



NSF DBI Award Number:1601884; Digitization TCN:
Collaborative Research:
The Cretaceous World: Digitizing Fossils to
Reconstruct Evolving Ecosystems
in the Western Interior Seaway



Many Individual Specimens



Concretions



Microfossils

LINTON CONC.
PIERRE

Initial whorls

(Forams - 16 + 18)

A 354



43847-43861 = 1-15; 43862 = 17



YPM IP 043862

Vertebrate Paleontology Collections



Developed by the Natural History Museum, London

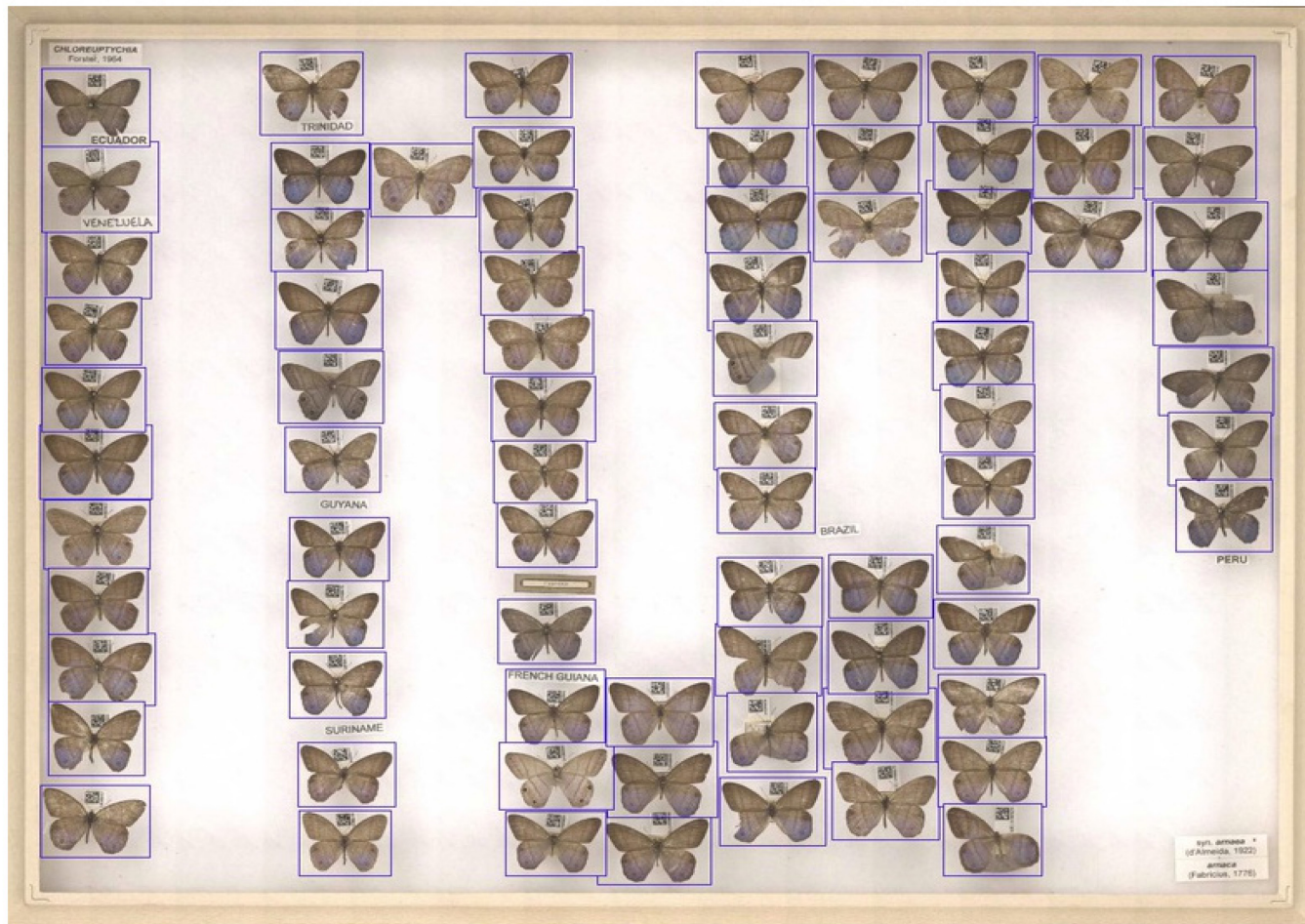


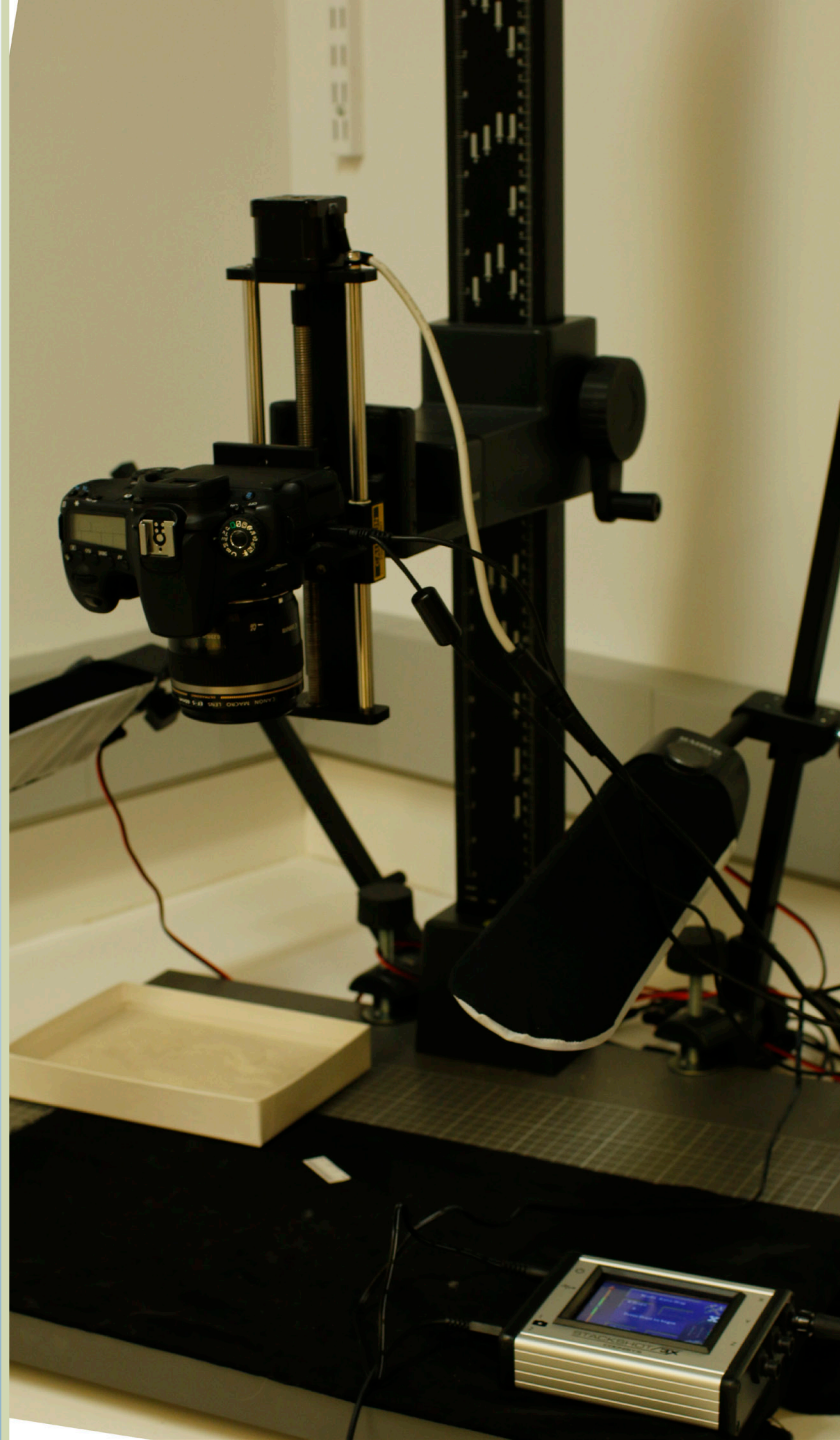
Image from the Natural History Museum, London.

naturalhistorymuseum.github.io/inselect/





Cognisys
Stackshot
Macro
Rail



Helicon
Focus

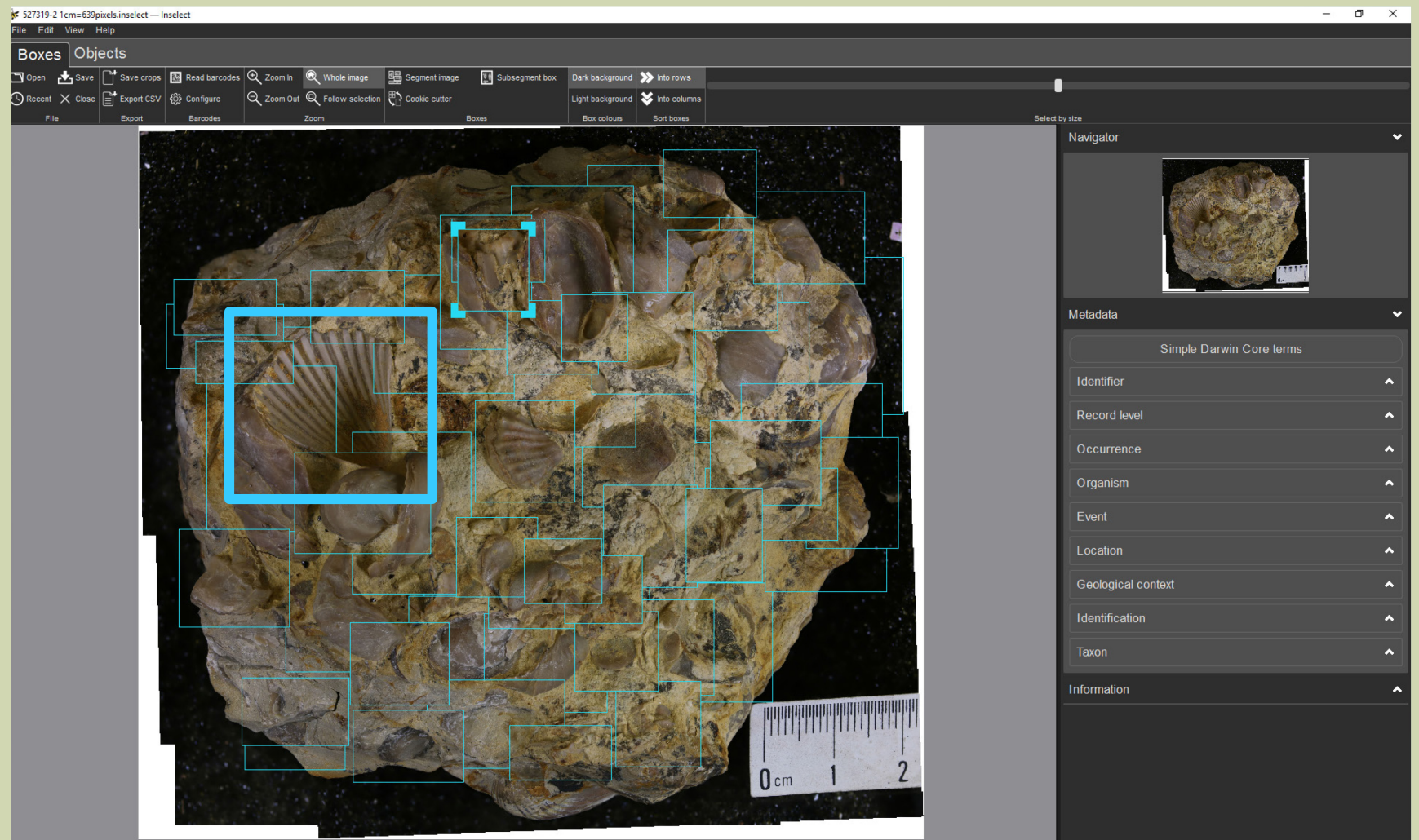
Control
Module



Photomerge



Inselect



Crops drawn manually

Cropped images

527319-2 1cm=639pixels.inselect* — Inselect

File Edit View Help

Boxes Objects

Open Save Save crops Read barcodes Grid Rotate clockwise
Recent Close Export CSV Configure Expanded Rotate counter-clockwise
File Export Barcodes Show objects Orientation

0001 0002 0003 0004 0005 0006

0007 0008 0009 0010 0011 0012

0013 0014 0015 0016 0017 0018

0019 0020 0021 0022 0023 0024

50 boxes / 1 selected / 0002

CTRL + N / P or arrow keys to move between objects | CTRL + G to show objects in a grid | CTRL + E to view a single object expanded

Navigator

Metadata

Simple Darwin Core terms

Identifier

Occurrence ID
Organism ID
Material sample ID
Event ID
Location ID
Geological context ID
Identification ID
Taxon ID

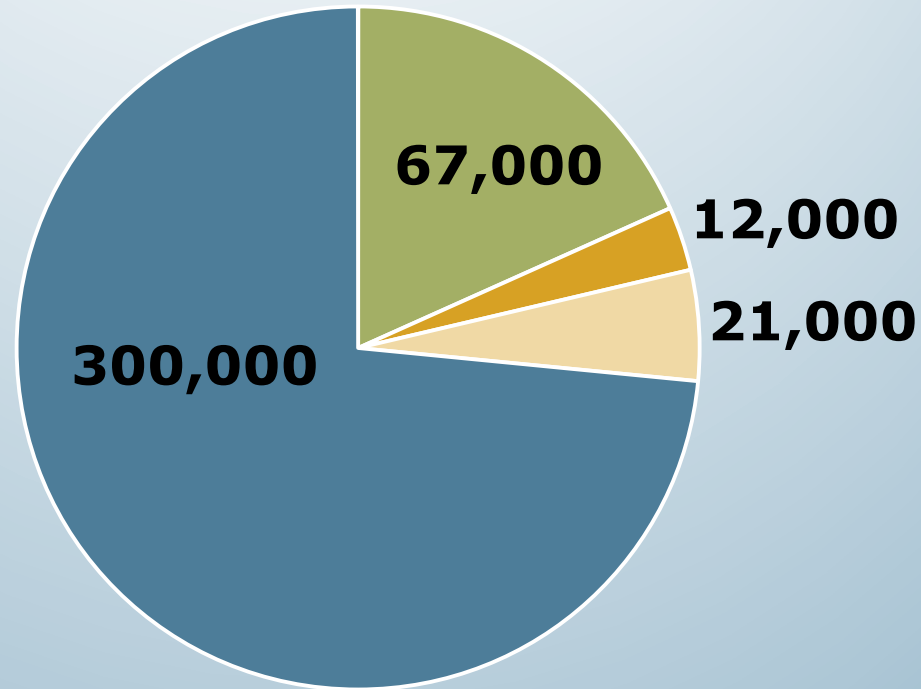
Record level
Occurrence
Organism
Event
Location
Geological context
Identification
Taxon

[illegible]



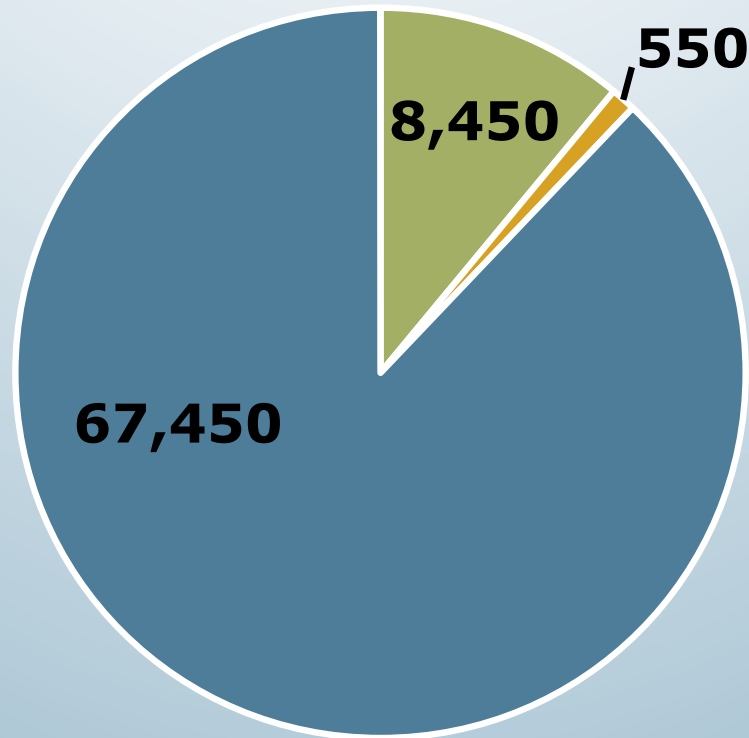
Cropped image after code

YPM-Invertebrate Paleontology

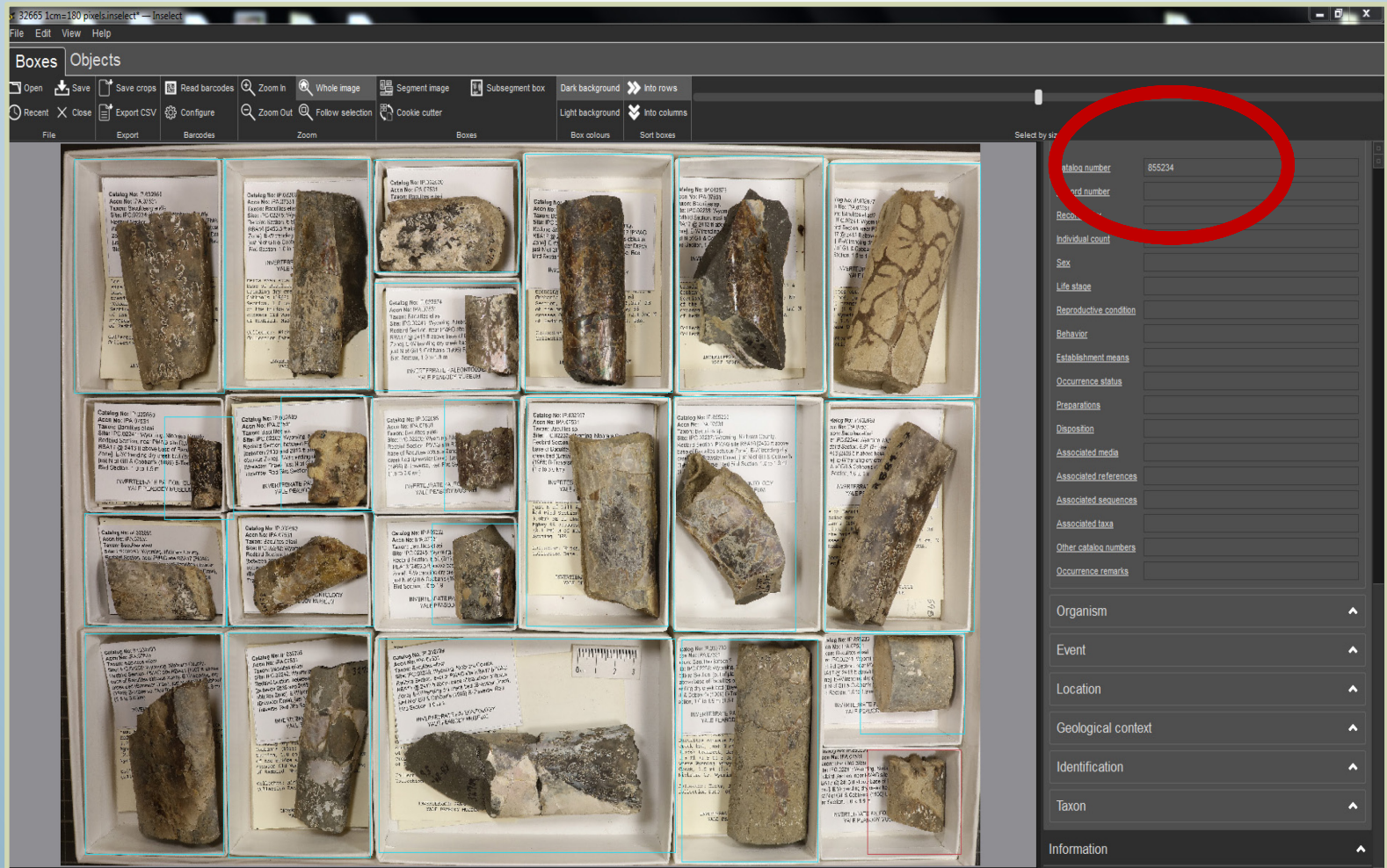


- SPECIMENS WITH PHOTOS NOT ON GRANT
- WIS PHOTOS WITHOUT INSELECT
- WIS PHOTOS USING INSELECT
- SPECIMENS WITHOUT PHOTOS

YPM-Vertebrate Paleontology



- SPECIMENS WITH PHOTOS
- WIS GRANT PHOTOS
- SPECIMENS WITHOUT PHOTOS



Whole drawer imaging

32665 1cm=180 pixels.inselect — Inselect

File Edit View Help

Boxes Objects

Open Save Save crops Read barcodes Grid Rotate clockwise
Recent Close Export CSV Configure Expanded Rotate counter-clockwise

File Export Orientation

0001 0002 0003 0004 0005

0006 0007 0008 0009 0010

0011 0012 0013 0014 0015

0016 0017 0018 0019 0020

22 boxes / 1 selected / 0004

CTRL + N / P or arrow keys to move between objects | CTRL + G to show objects in a grid | CTRL + E to view a single object expanded

Metadata

Simple Darwin Core terms

Identifier

Record level

Occurrence

Organism

Event

Location

Geological context

Identification

Taxon

Information

Name 32665.1cm=180 pixels.inselect

Created by ipstudent

Created on Thursday, May 25, 2017 2:00:08 PM

Last saved by ipstudent

Last saved on Thursday, May 25, 2017 2:58:45 PM

Inselect Crops

Inselect Image



Camera: Canon EOS 5DS R (fancy)

Lens: 35mm

Number of specimens: 15

Time: 10 minutes

Type of photo: 1 photo

Individual Image



Camera: Canon EOS 70D (regular)

Lens: 60mm

Number of specimens: 1

Time: 10 minutes

Type of photo: 20 images focus stacked

Inselect image



Camera: Canon EOS 5DS R
(fancy)

Lens: 100mm

Number of specimens: 28

Time: 7 minutes

Type of photo: 1 photo

Individual image



Camera: Canon EOS 70D
(regular)

Lens: 60mm

Number of specimens: 28

Time: 16.5 minutes

Type of photo: 1 photo

Inselect image



Camera: Canon EOS 70D
(regular)

Lens: 60mm

Number of specimens: 42

Time: 8 minutes

Type of photo: 4 photos
focus stacked

Individual image



Camera: Canon EOS 70D
(regular)

Lens: 60mm

Number of specimens: 42

Time: 23.5 minutes

Type of photo: 1 photo



Christina.lutz@yale.edu



Conclusions

It's free and open source.

Quality of images need not suffer as a result of imaging multiple specimens.

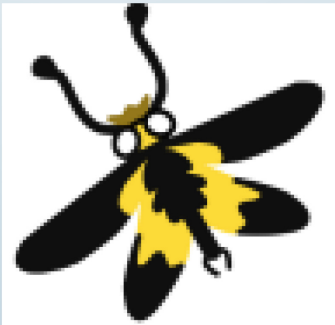
It allows us to capture more data from specimens that have multiple taxa, getting a better indication of the biodiversity.

At least twice as fast for whole drawer imaging.

Can be modified for the specific needs of a collection.

We hope this talk has given you ideas for how you can modify your protocols using Inselect at your institution.

Thank You



Yale PEABODY MUSEUM
OF NATURAL HISTORY

Larry Gall

Jessica
Utrup

References

Hudson LN, Blagoderov V, Heaton A, Holtzhausen P, Livermore L, Price BW, van der Walt S and Smith VS. 2015. *Inselect: automating the digitization of natural history collections*. PLOS ONE. 10 (11), e0143402.
[10.1371/journal.pone.0143402.](https://doi.org/10.1371/journal.pone.0143402)

[naturalhistorymuseum.github.io/inselect/](https://github.com/naturalhistorymuseum/inselect/)