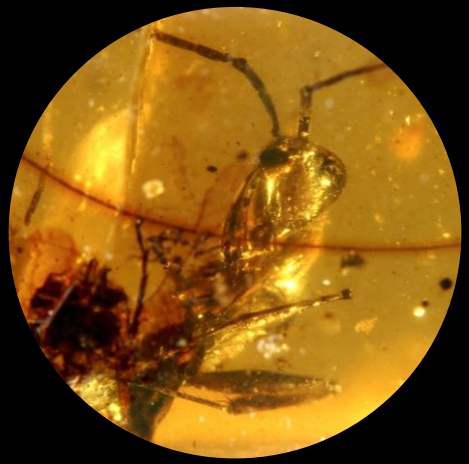
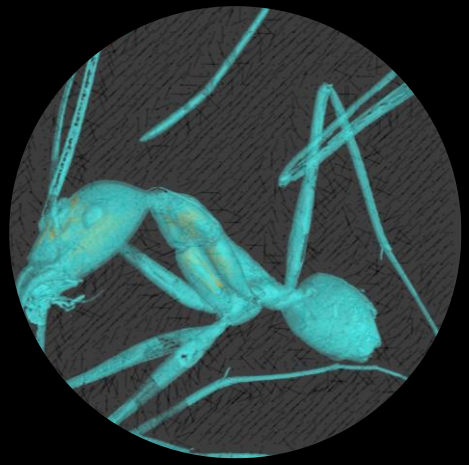
Digitization improves dissemination, discovery, and long-term preservation in fossil amber collections.

Phil Barden
Department of Biological Sciences
New Jersey Institute of Technology

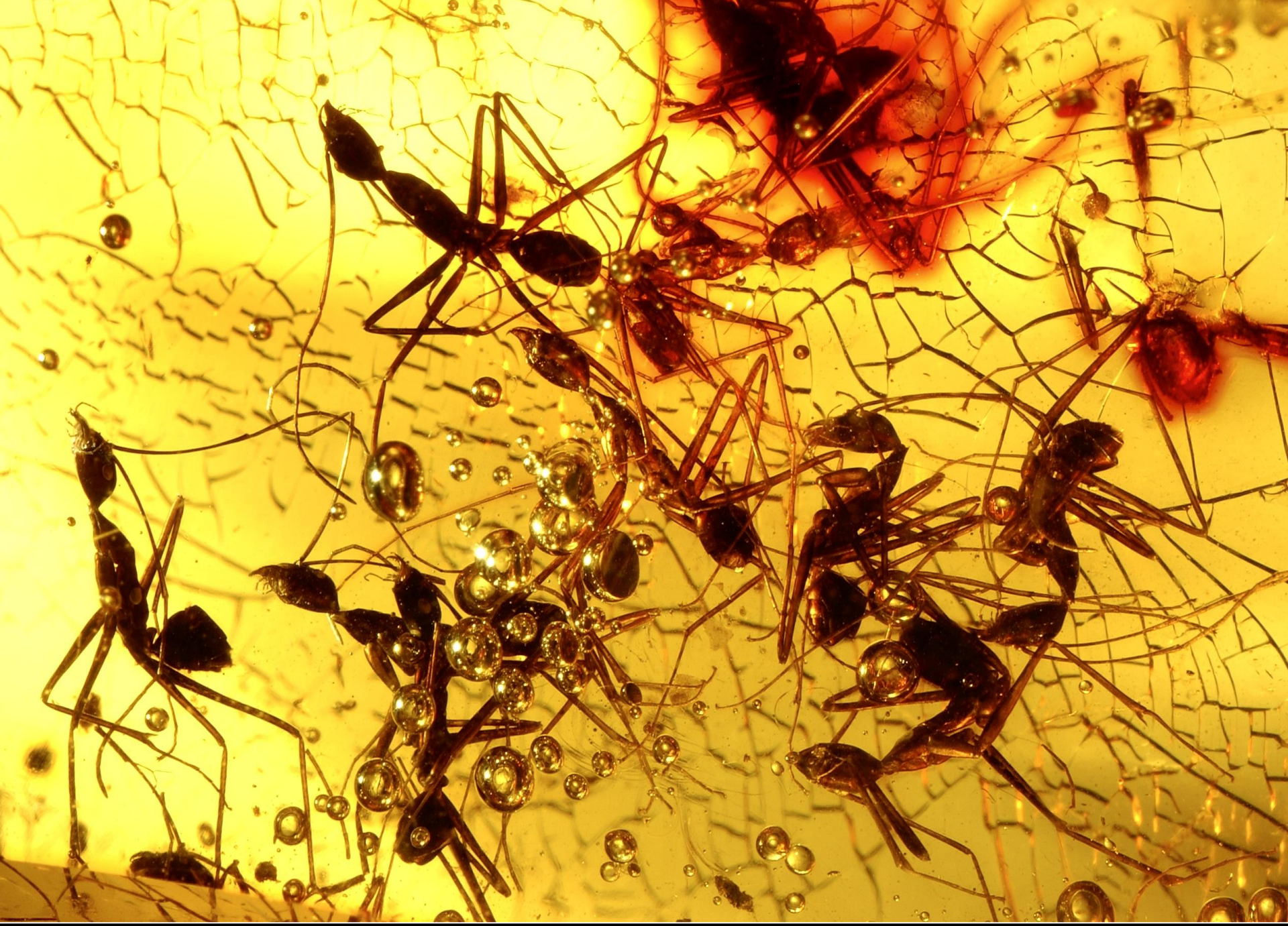


Discovery



Dissemination

Improving Preservation



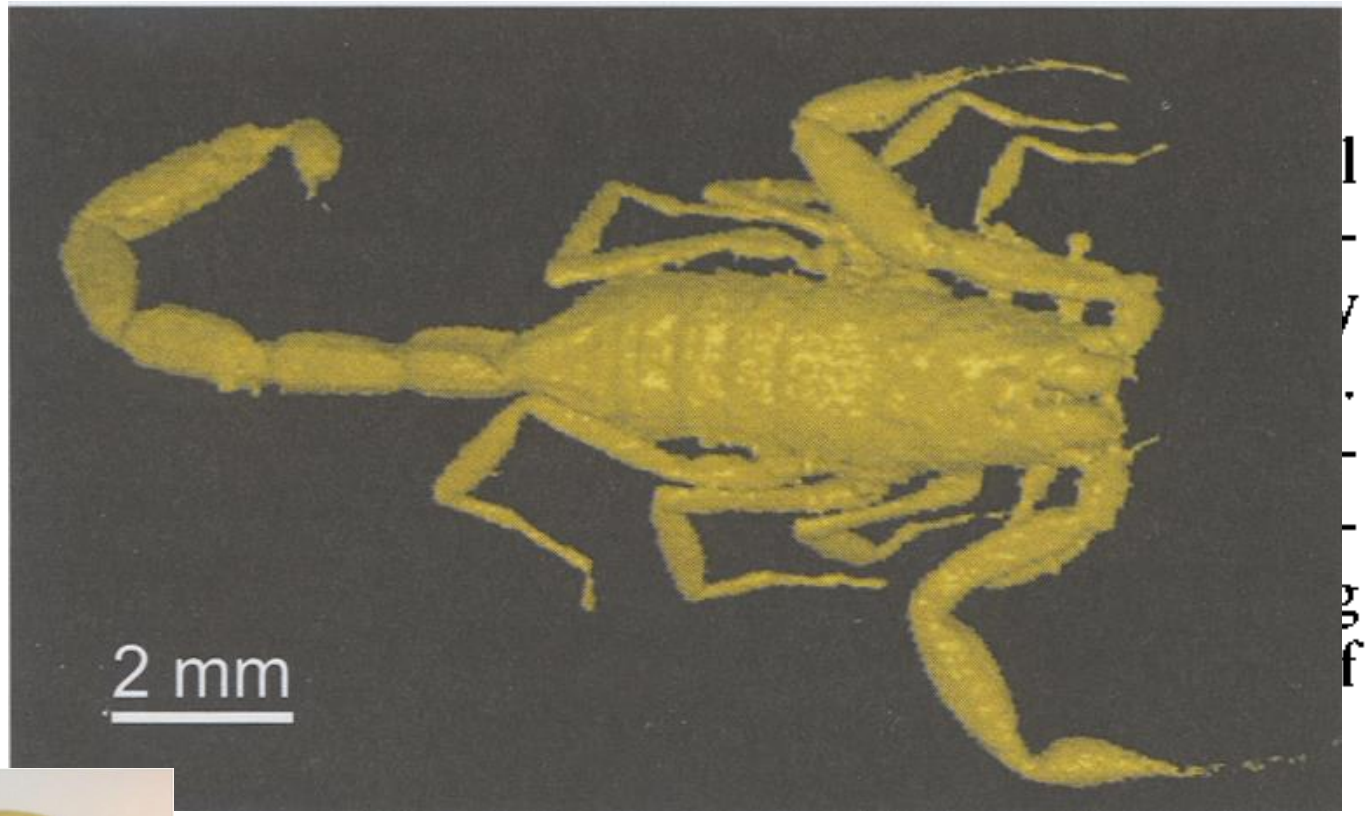
Leptomyrmex neotropicus from ~20 million year old Dominican amber (Barden, Boudinot, & Lucky 2017)

2003

dvantages of X-ray computed tomography r geological investigations

he best-known advantage of X-ray CT is its bility to quickly and non-destructively image e interior of opaque solid objects in three mensions. For rare or irreplaceable specimens

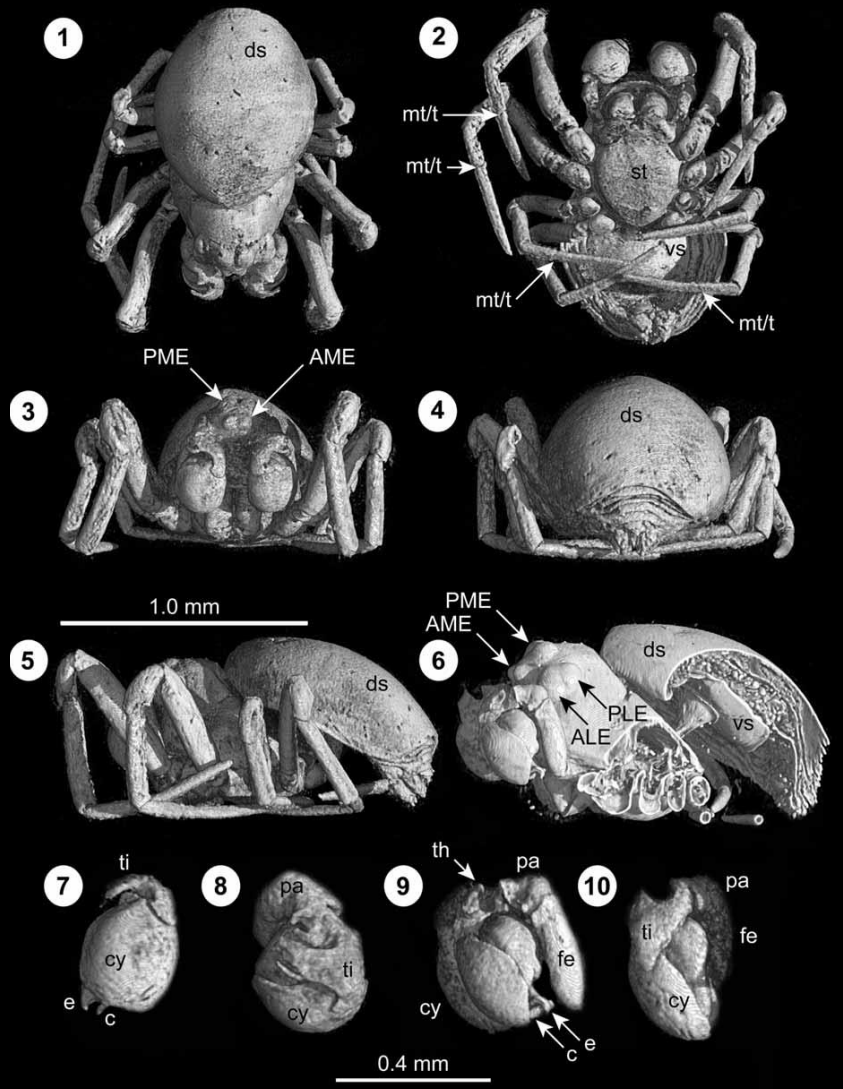
means of archiving and exchanging informatio For example, few of the many palaeontologist interested in dinosaurs will ever have a chance t handle the skull of the world's oldest dinosau *Herrerasaurus* – only a single complete specime is known and it resides in a museum in Arge tina – but a high quality CT dataset provide unlimited virtual access, while offering informa

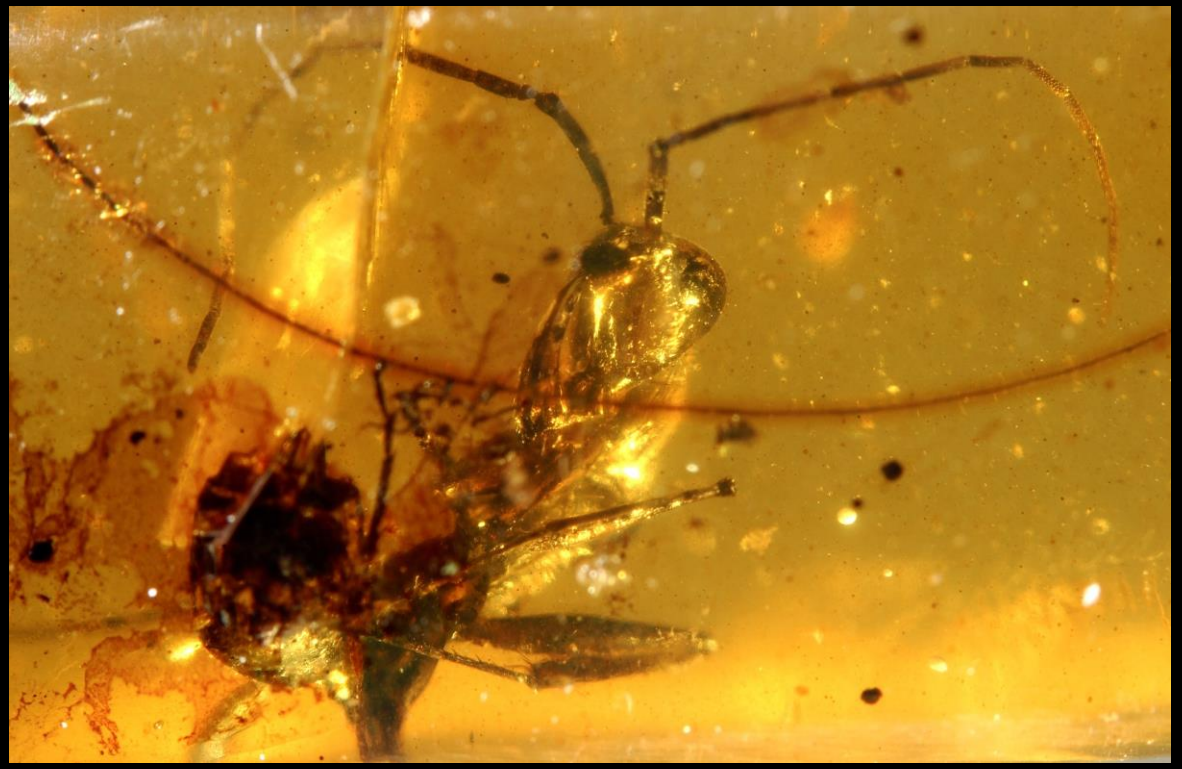


2007

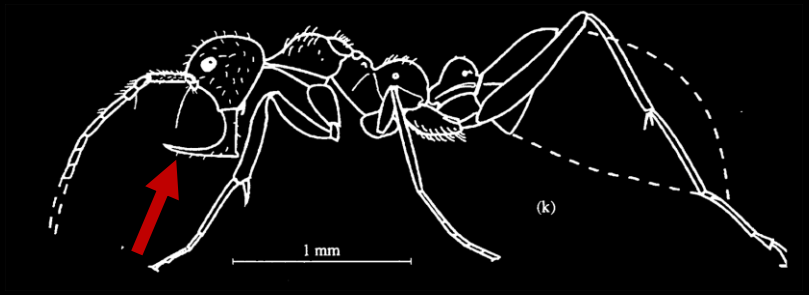
First fossil Micropholcommatidae (Araneae), imaged in Eocene Paris amber using X-Ray Computed Tomography

DAVID PENNEY[1,4], MANUEL DIERICK[2], VEERLE CNUDDE[2], BERT MASSCHAELE[2], JELLE VLASSENBROECK[2], LUC VAN HOOREBEKE[2] & PATRIC JACOBS[3]



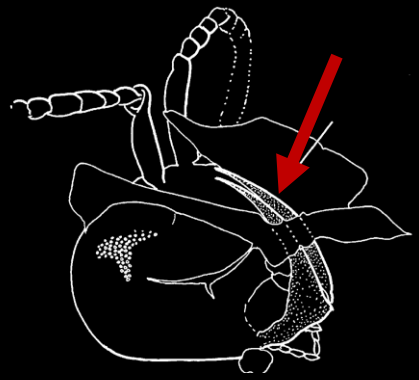


Haidomyrmex scimitarus in ~99 million year old Burmese amber (Barden & Grimaldi 2012)



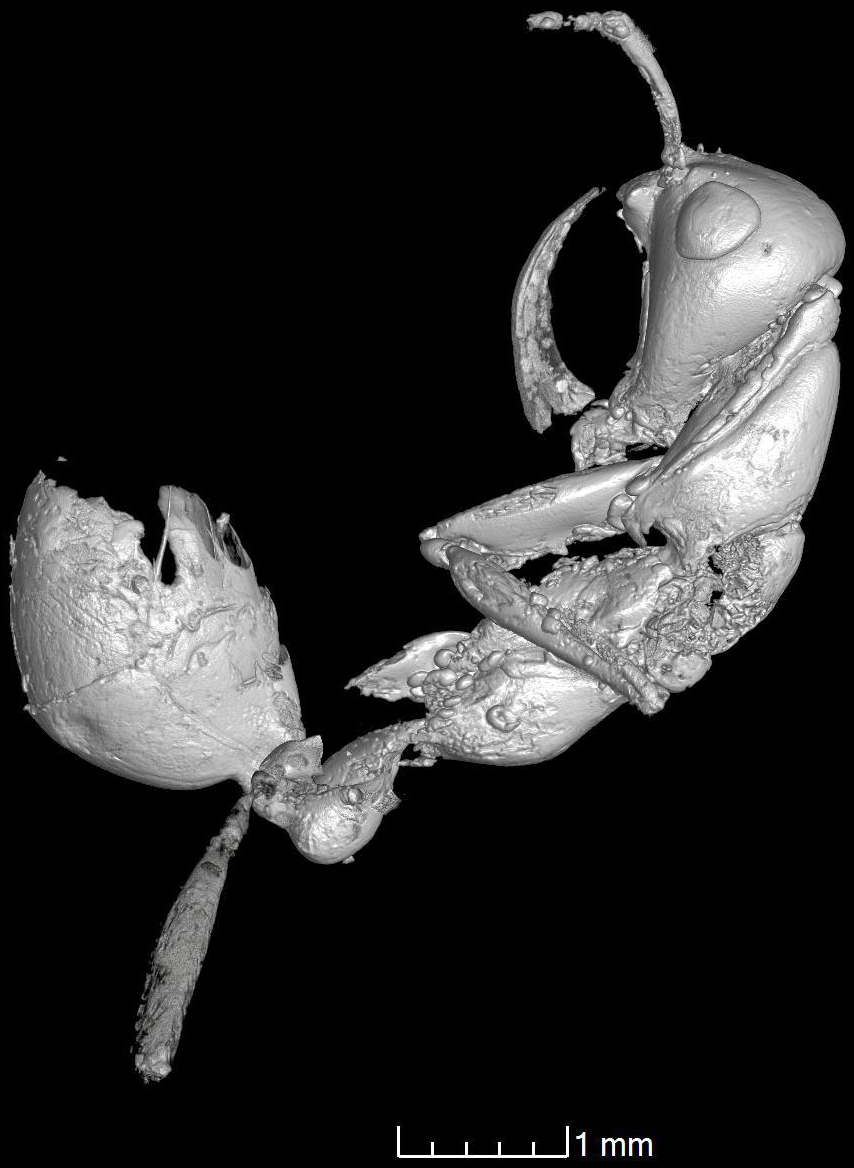
Haidomyrmex cerberus Dlussky 1996

Antweb & Vincent Perrichot



Haidomyrmodes mammuthus Perrichot et al. 2008

Haidomyrmex scimitarus in ~99 million year old Burmese amber (Barden & Grimaldi 2012)



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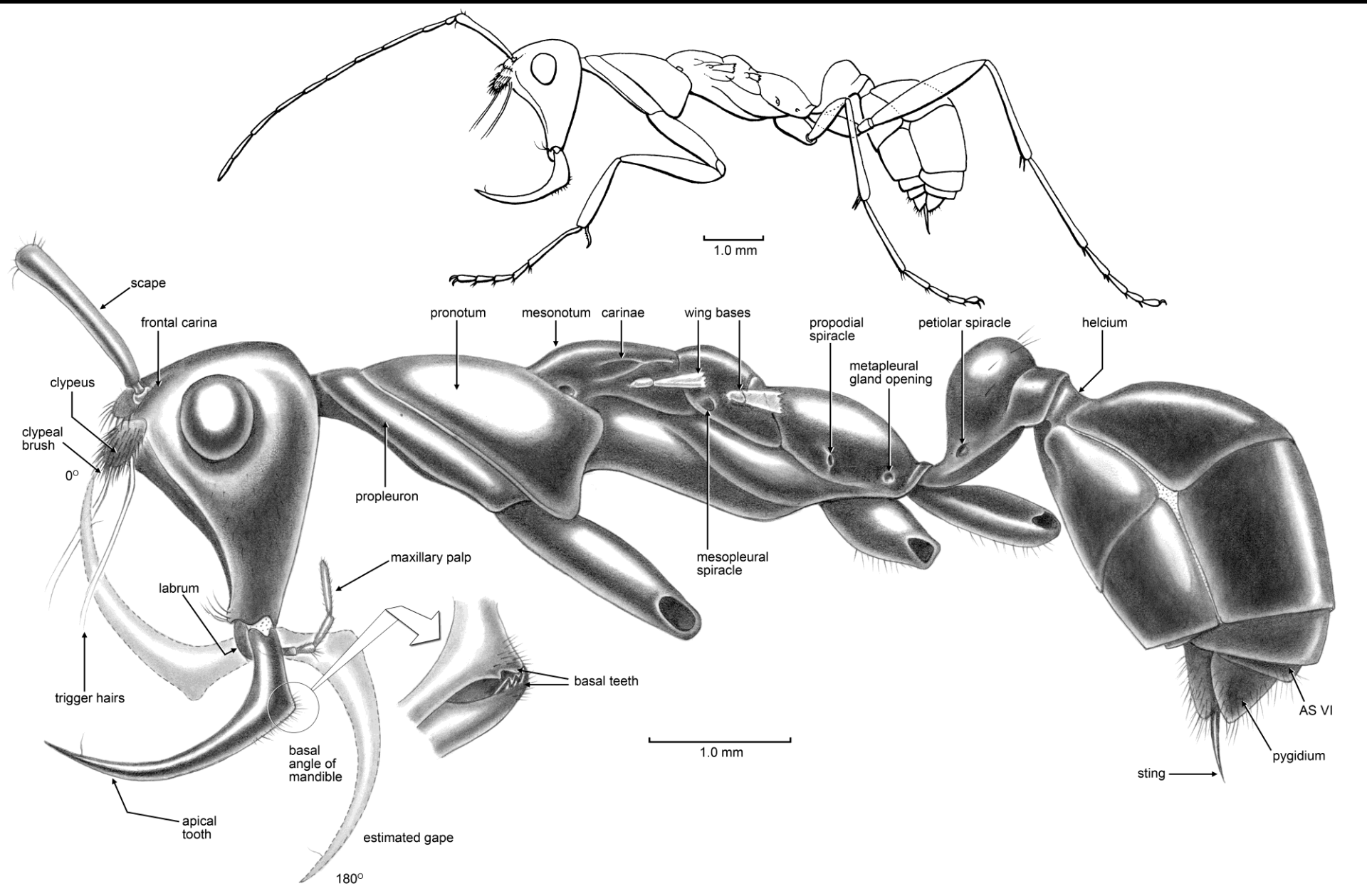

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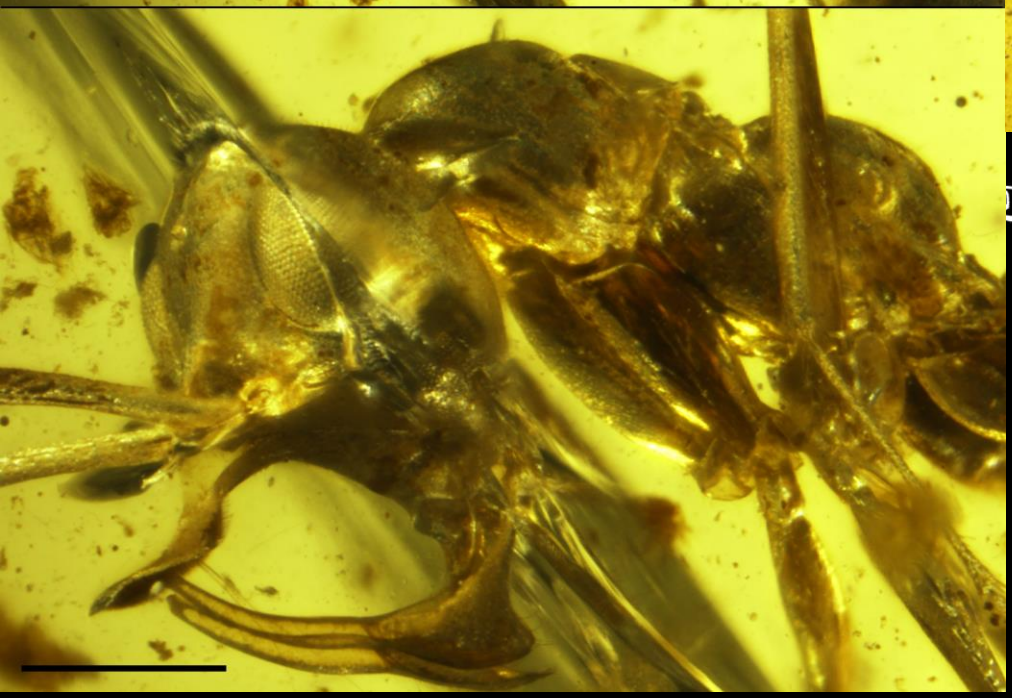
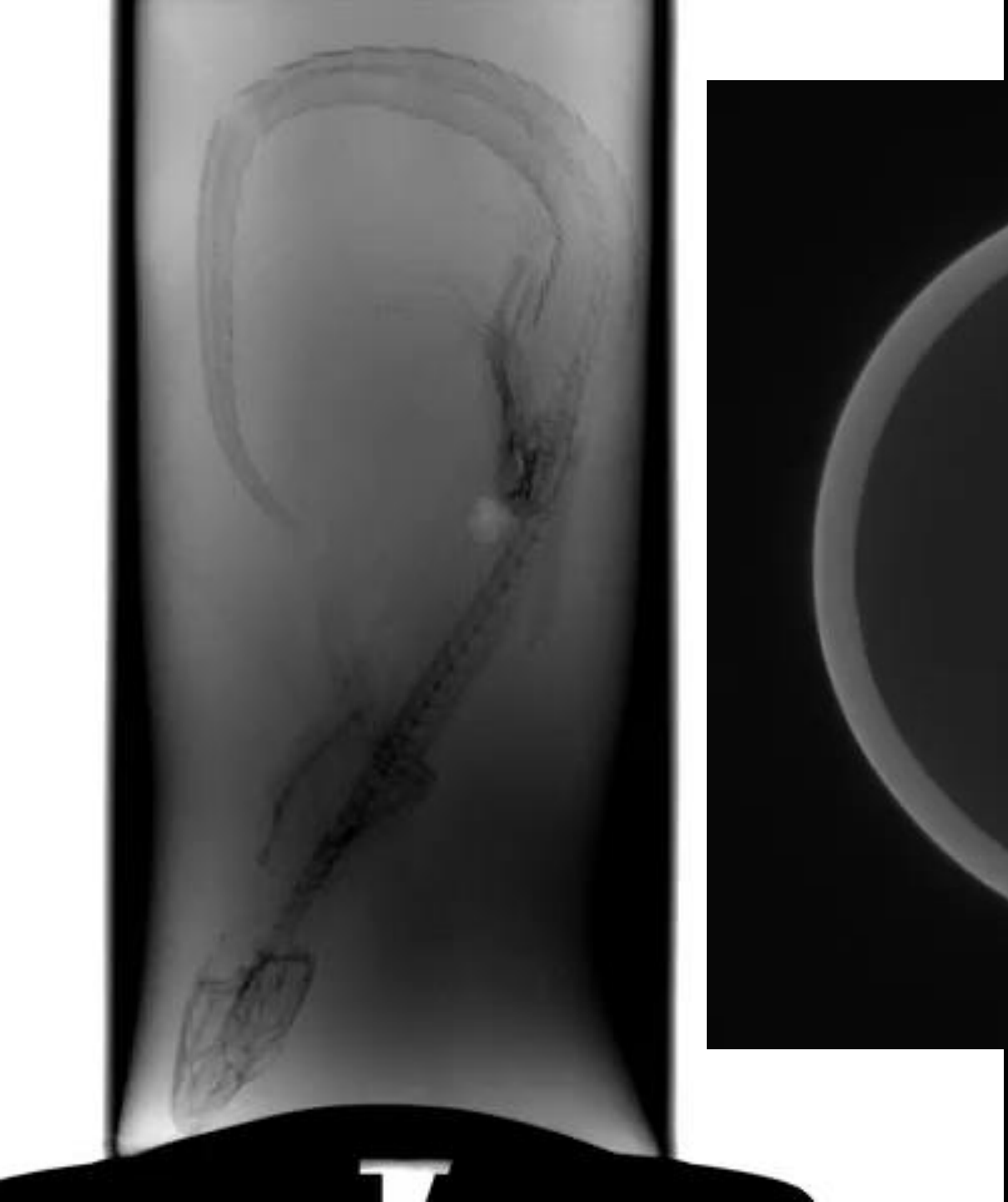
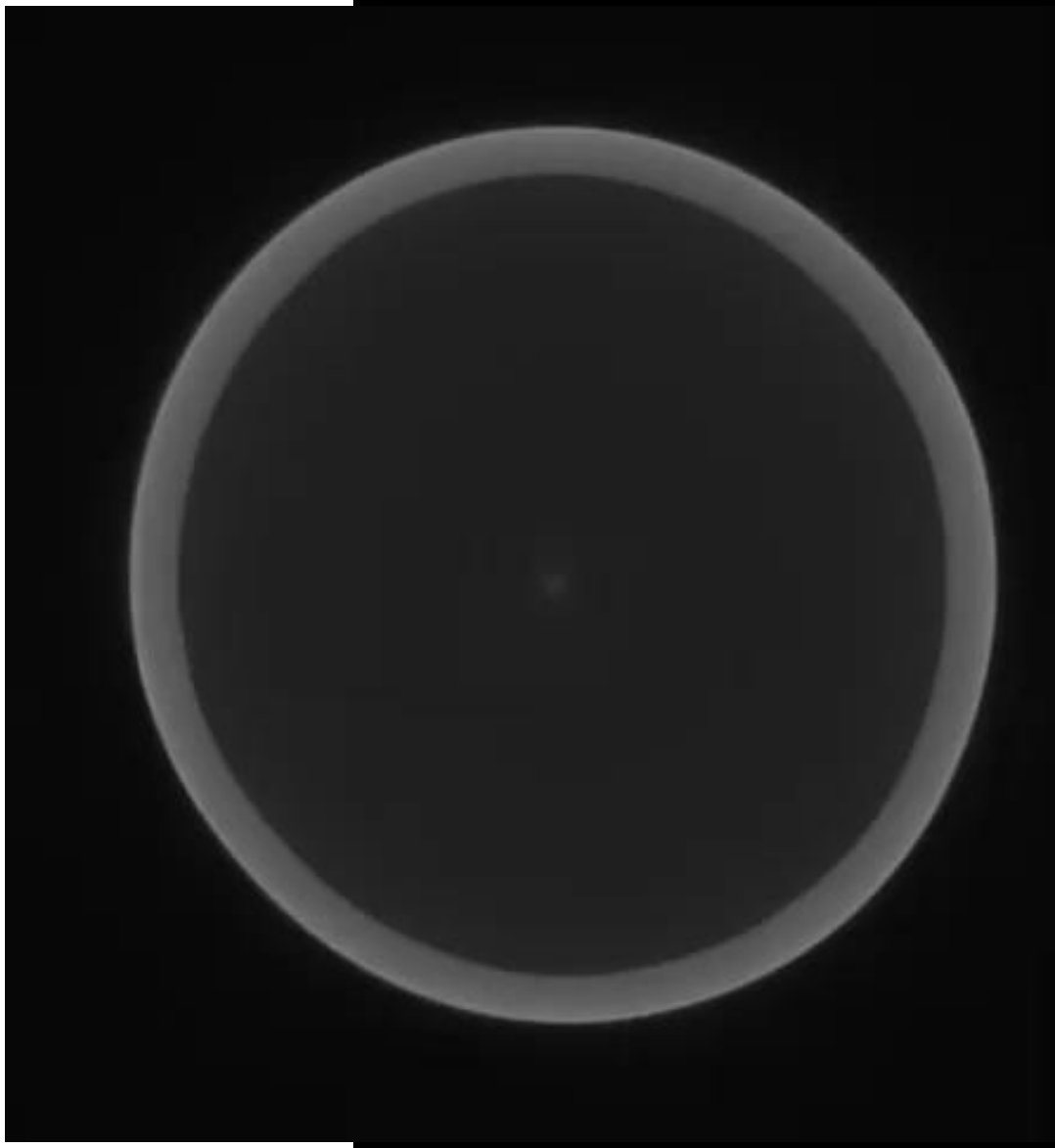


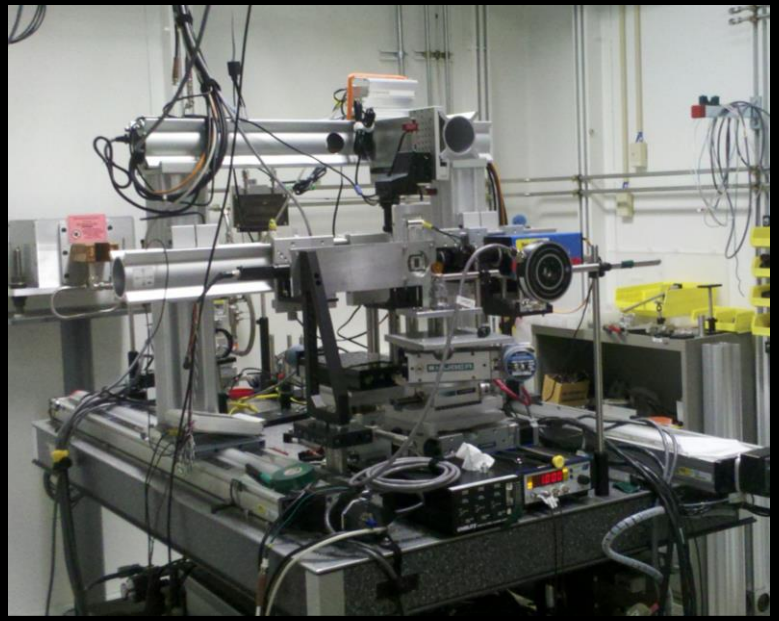
Linguamyrmex vladi in ~99 million year old Burmese amber (Barden *et al*. 2017)



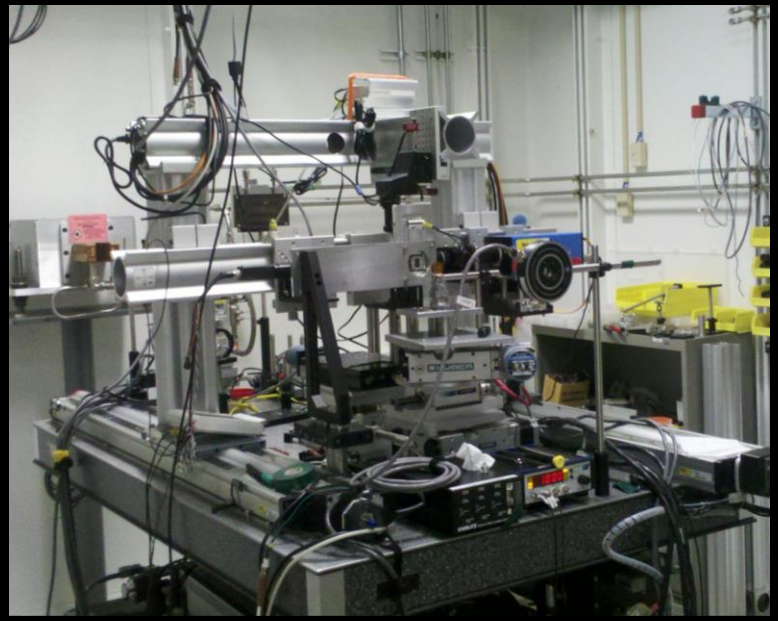


Courtesy Ed Stanley

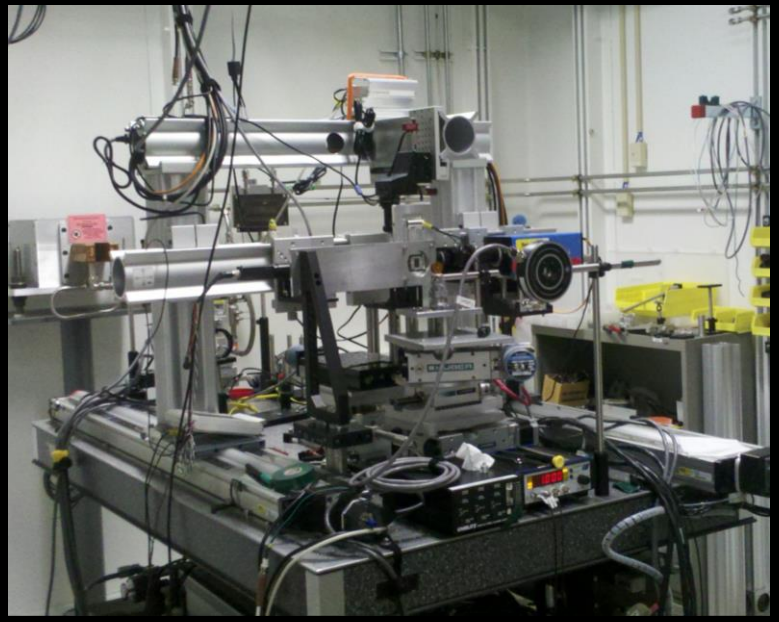

phoenix|x-ray




SKYSCAN 1275
X-RAY MICROTOMOGRAPH
BRUKER



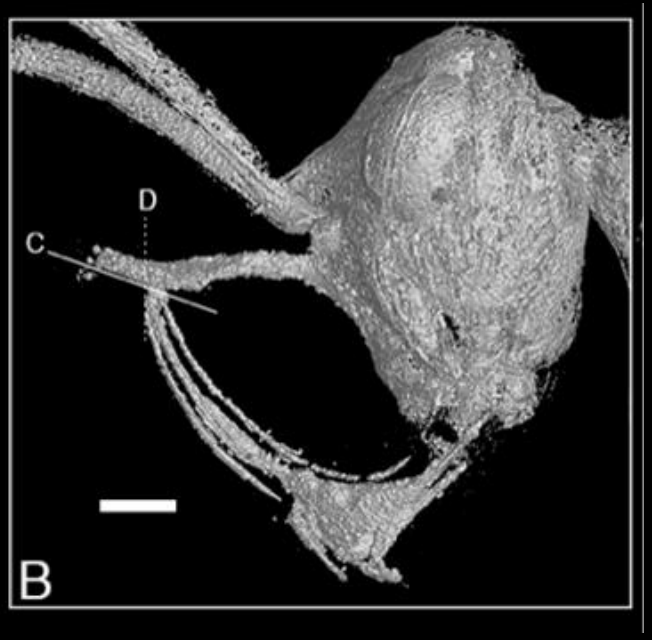

CCTV DOWNSTREAM

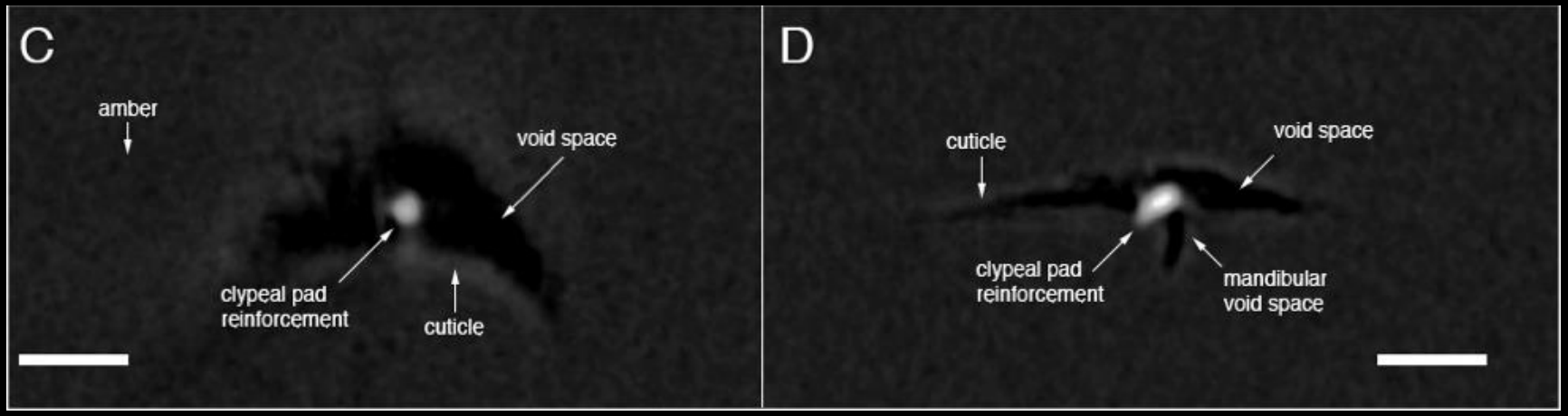


What kind of data does CT scanning generate?

Brighter areas result from sample absorption meaning less photons
Darker areas result from sample transmittance meaning more photons

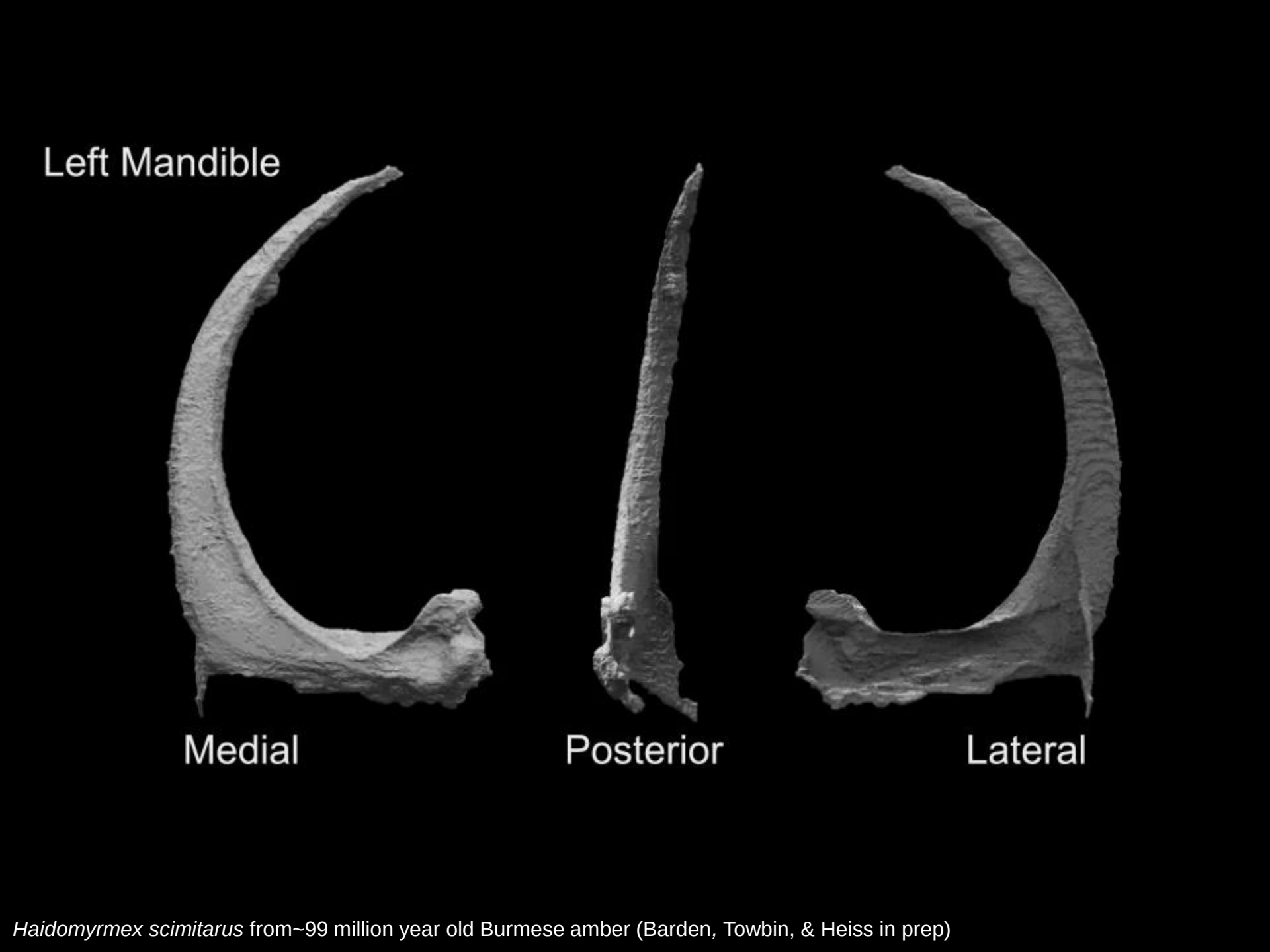
Linguamyrmex vladi in ~99 million year old Burmese amber (Barden, Herhold, & Grimaldi 2017)





Linguamyrmex vladi in ~99 million year old Burmese amber (Barden, Herhold, & Grimaldi 2017)

Haidomyrmex scimitarus from~99 million year old Burmese amber (Barden, Towbin, & Heiss in prep)



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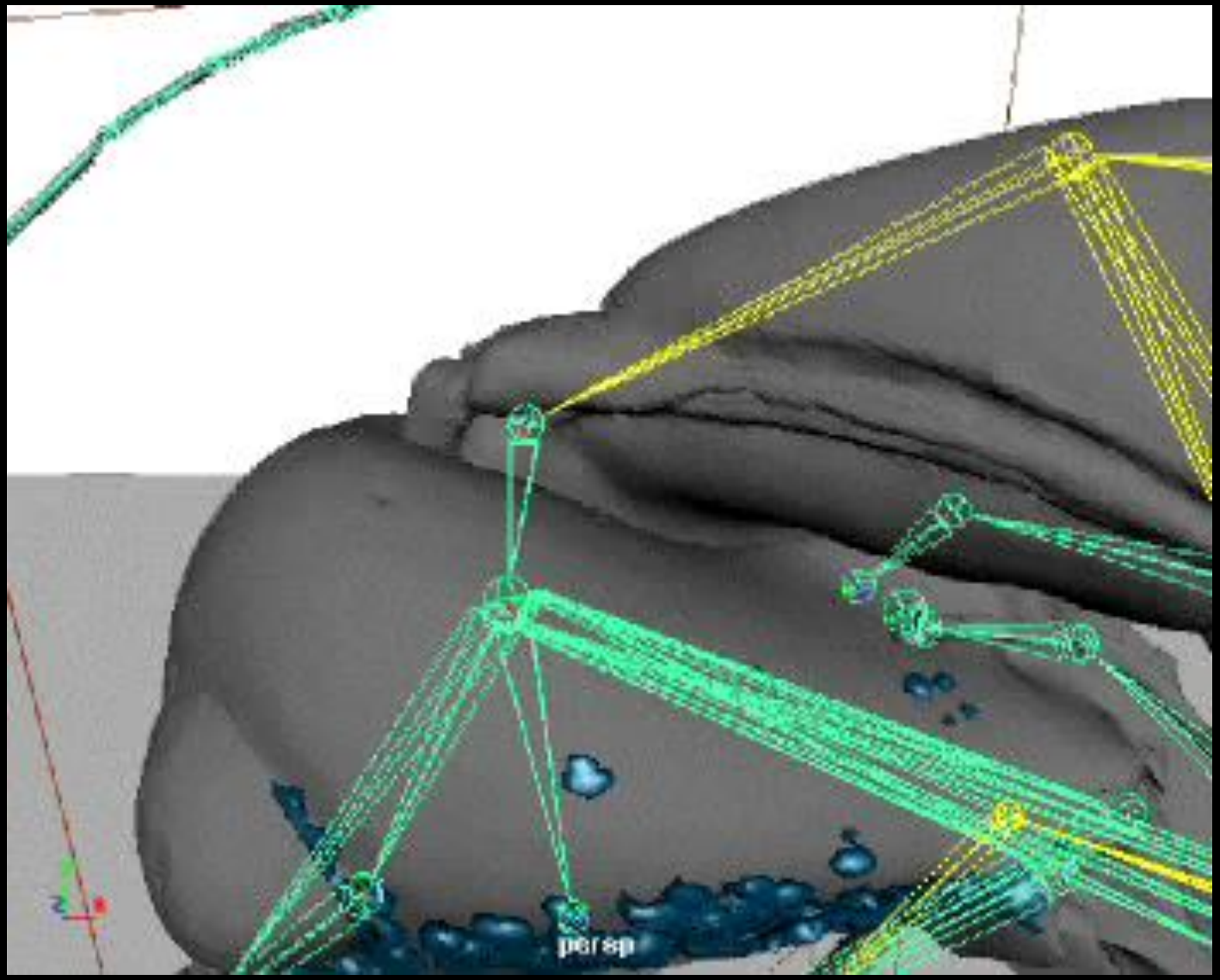


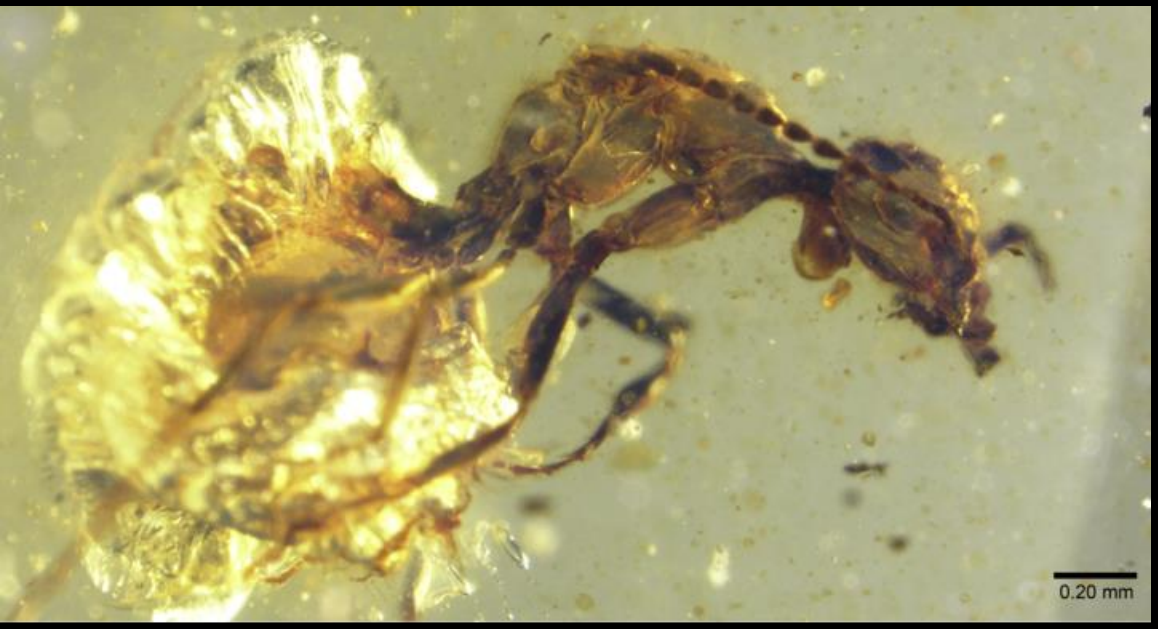
Haidomyrmex scimitarus from~99 million year old Burmese amber (Barden, Towbin, & Heiss in prep)

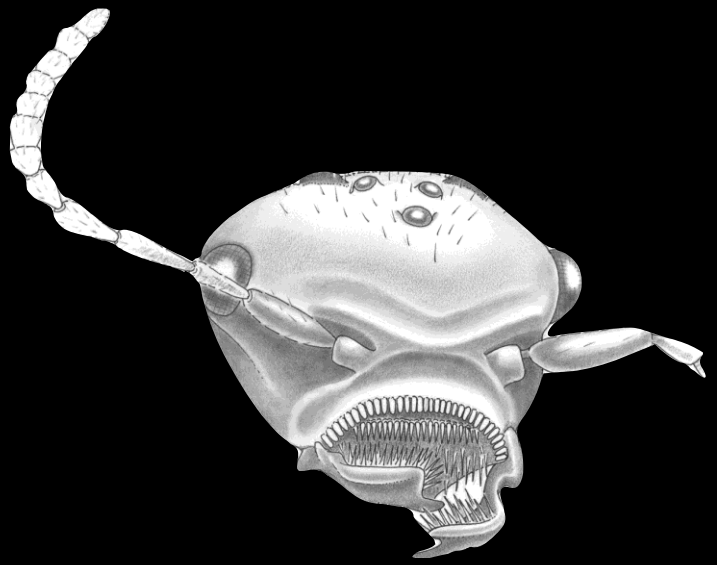
Haidomyrmex scimitarus from~99 million year old Burmese amber (Barden, Towbin, & Alaric in prep)

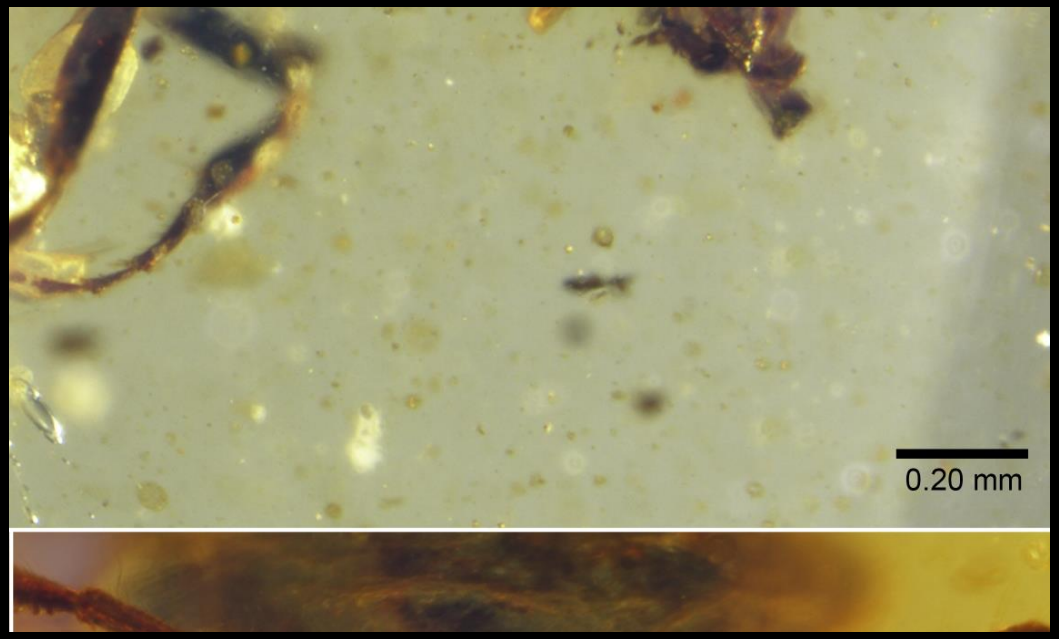
Haidomyrmex Scimitarus Mandible Articulation

Mandible Pivot Closeup
with Palps and Maxilla
Not Visible

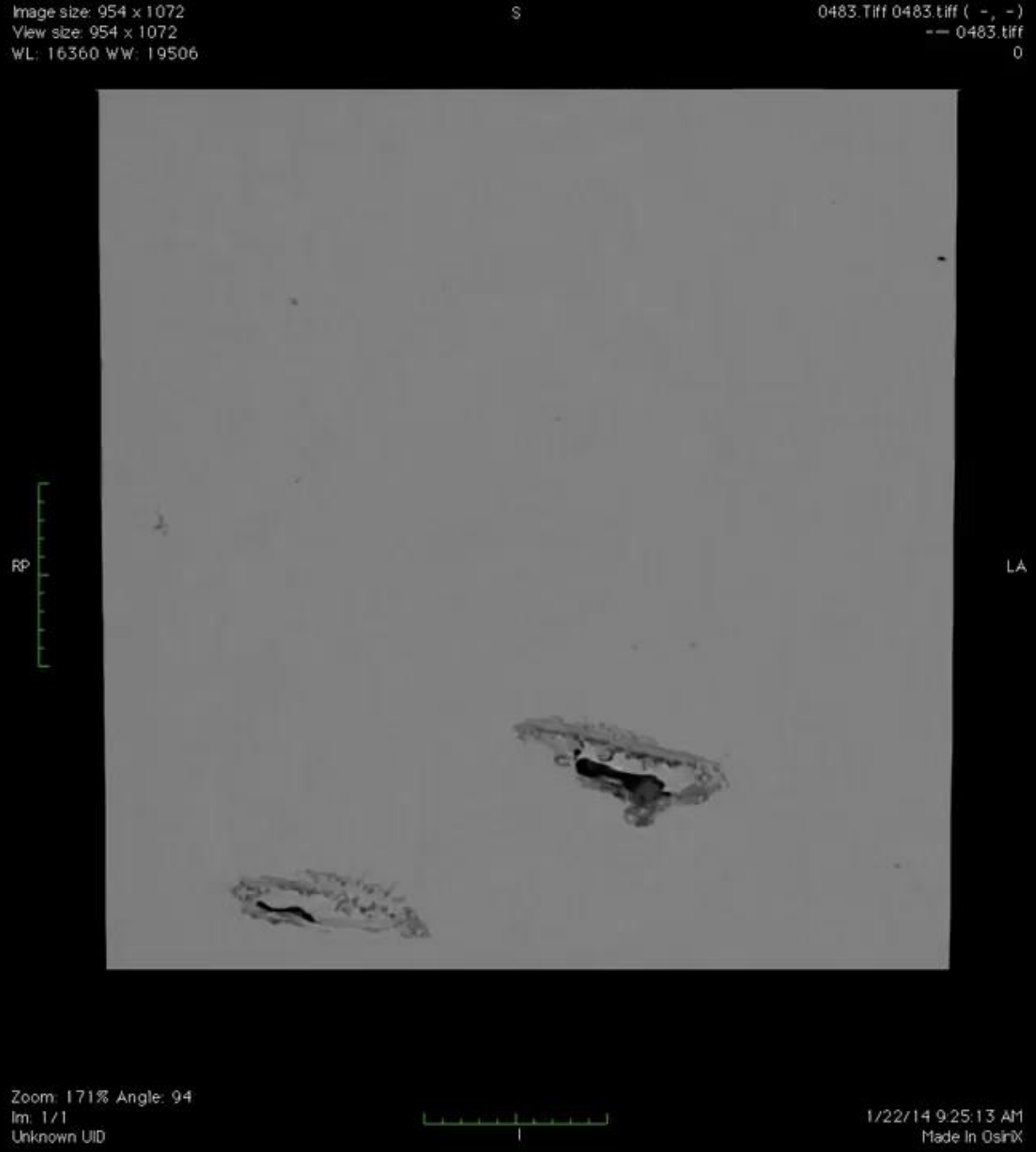
Haidomyrmex scimitarus from~99 million year old Burmese amber (Barden, Towbin, & Alaric in prep)



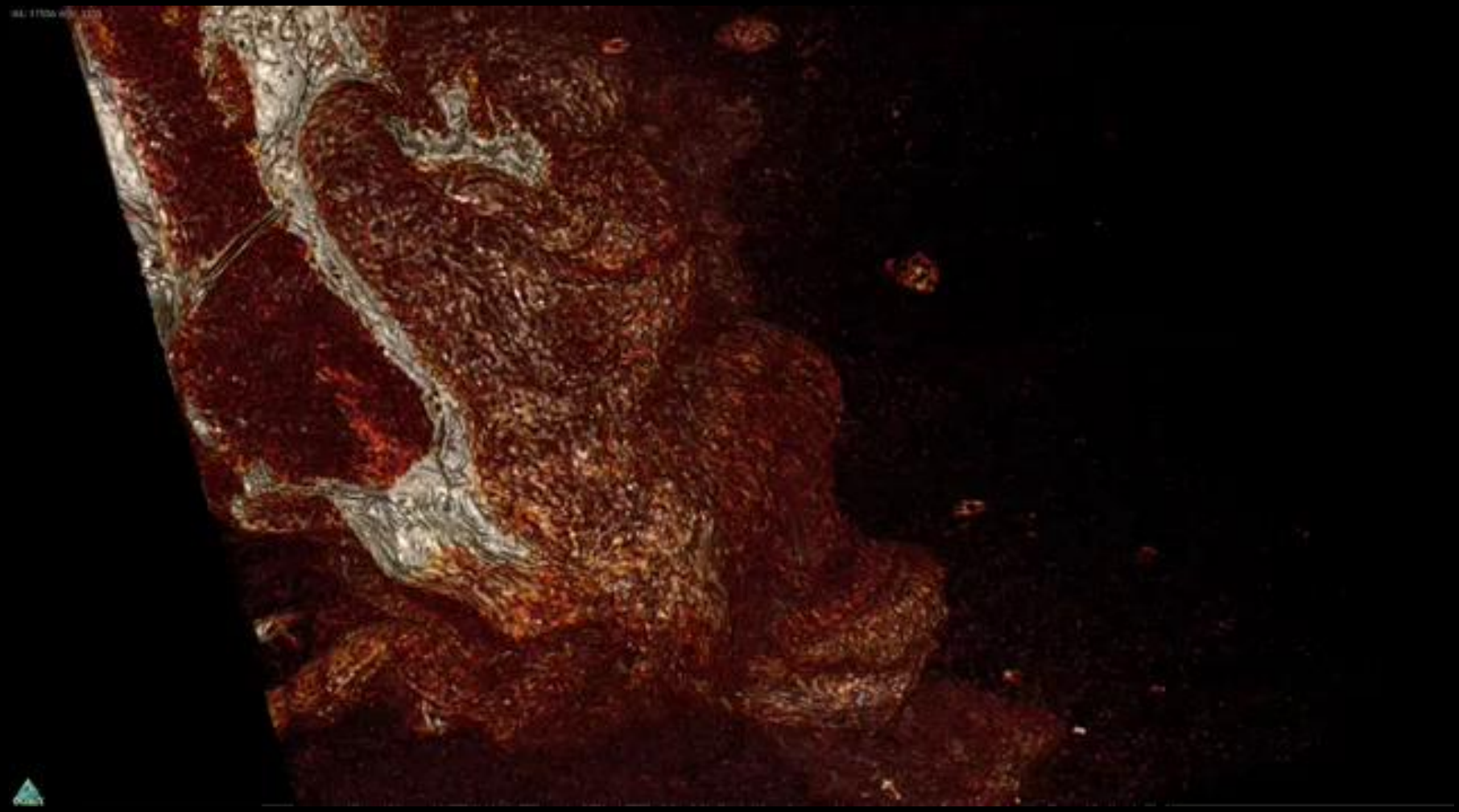




Zigrasimecia tonsora from~99 million year old Burmese amber (Barden & Grimaldi 2013)



Zigrasimecia tonsora from~99 million year old Burmese amber (Barden & Grimaldi unpublished)



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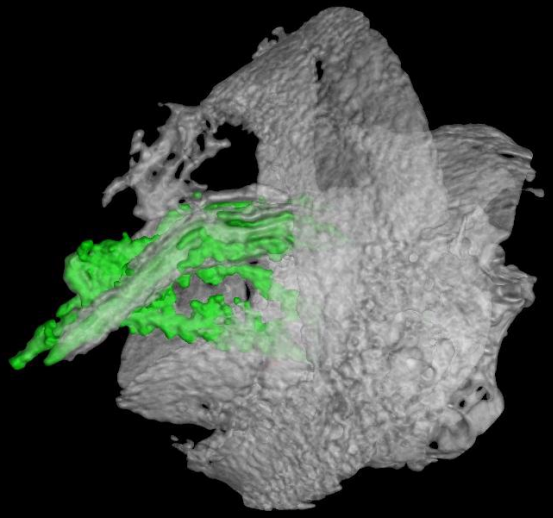

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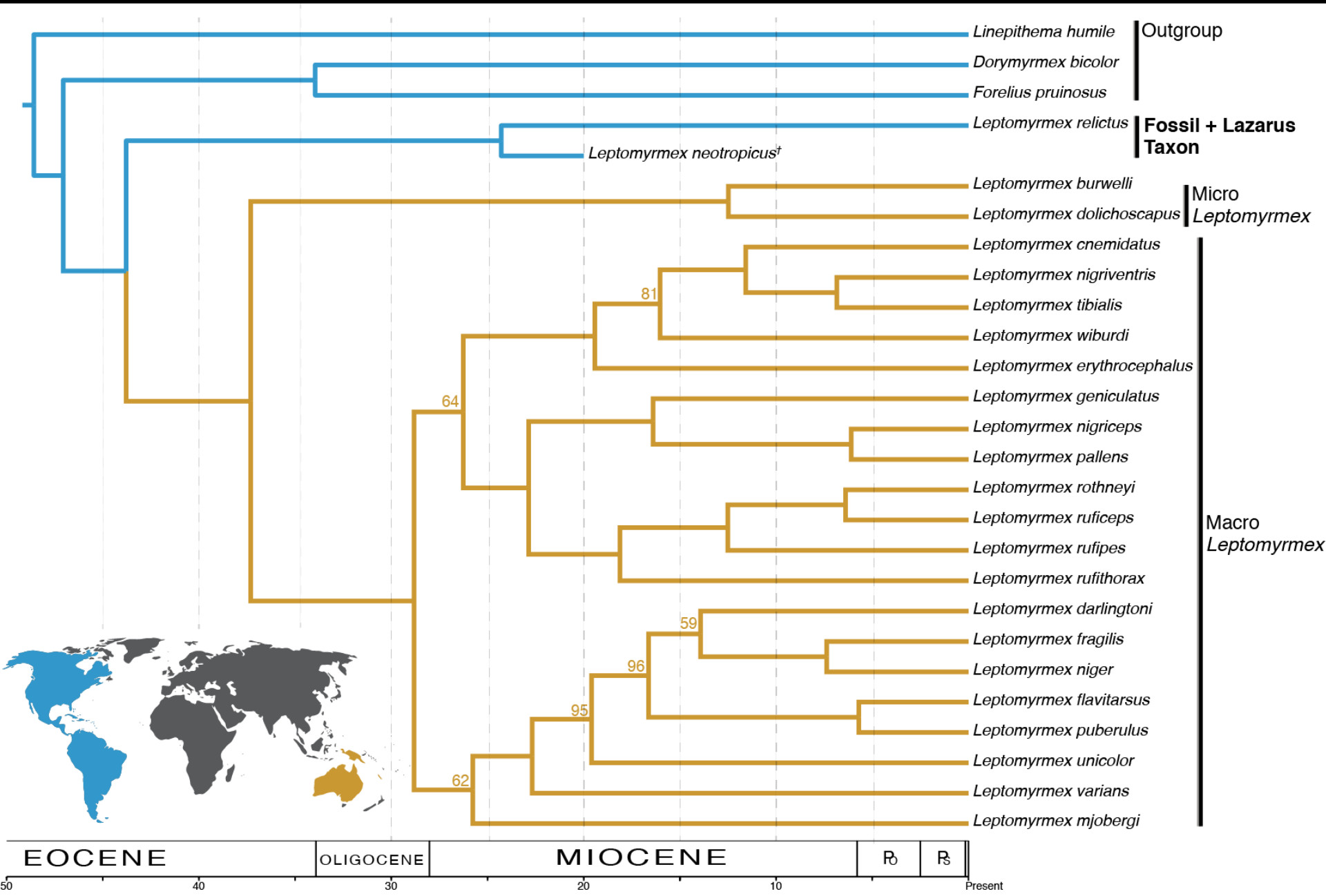

Leptomyrmex neotropicus from ~20 million year old Dominican amber (Barden, Boudinot, & Lucky In Press)

(Barden & Grimaldi 2016)

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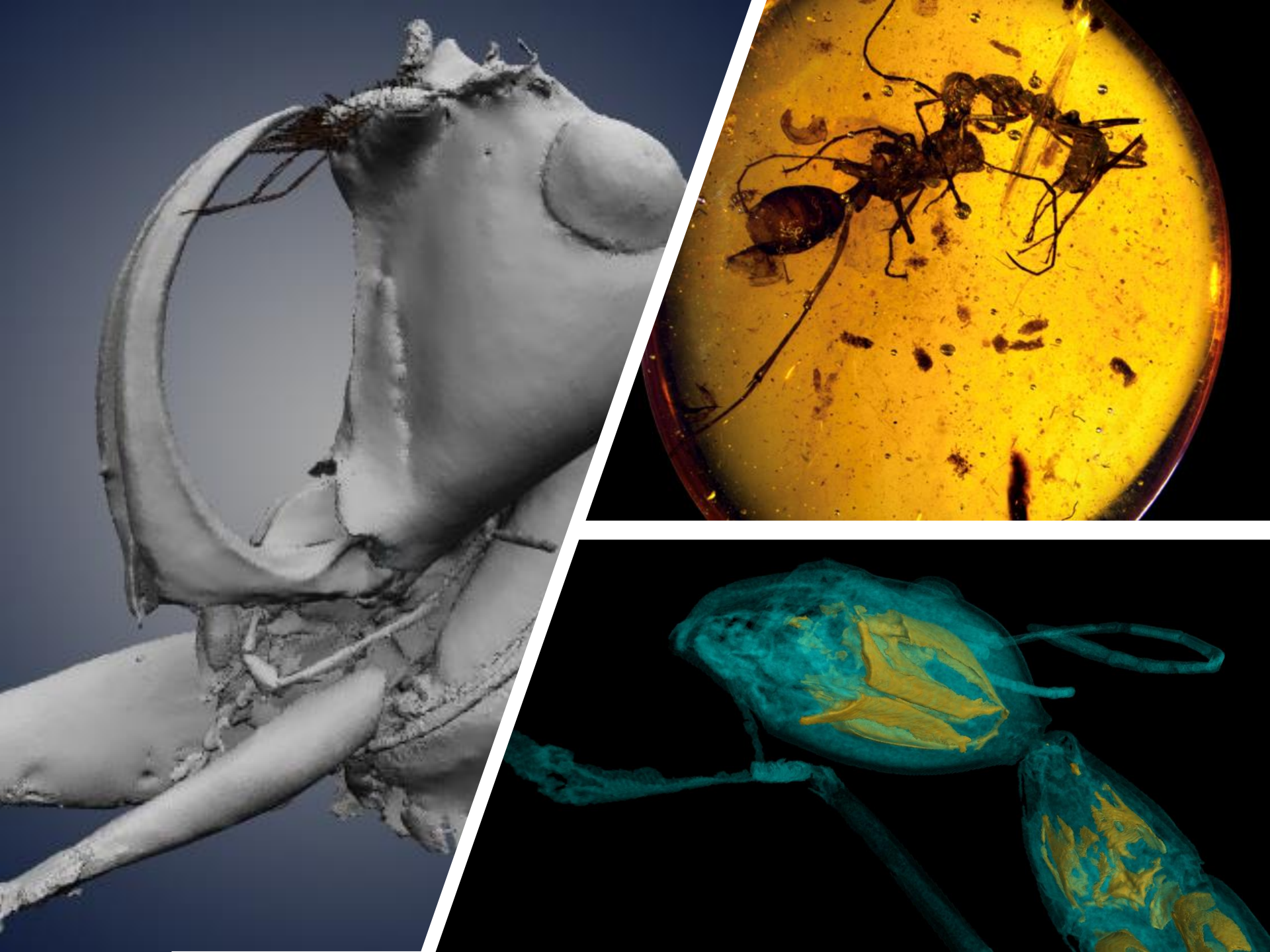
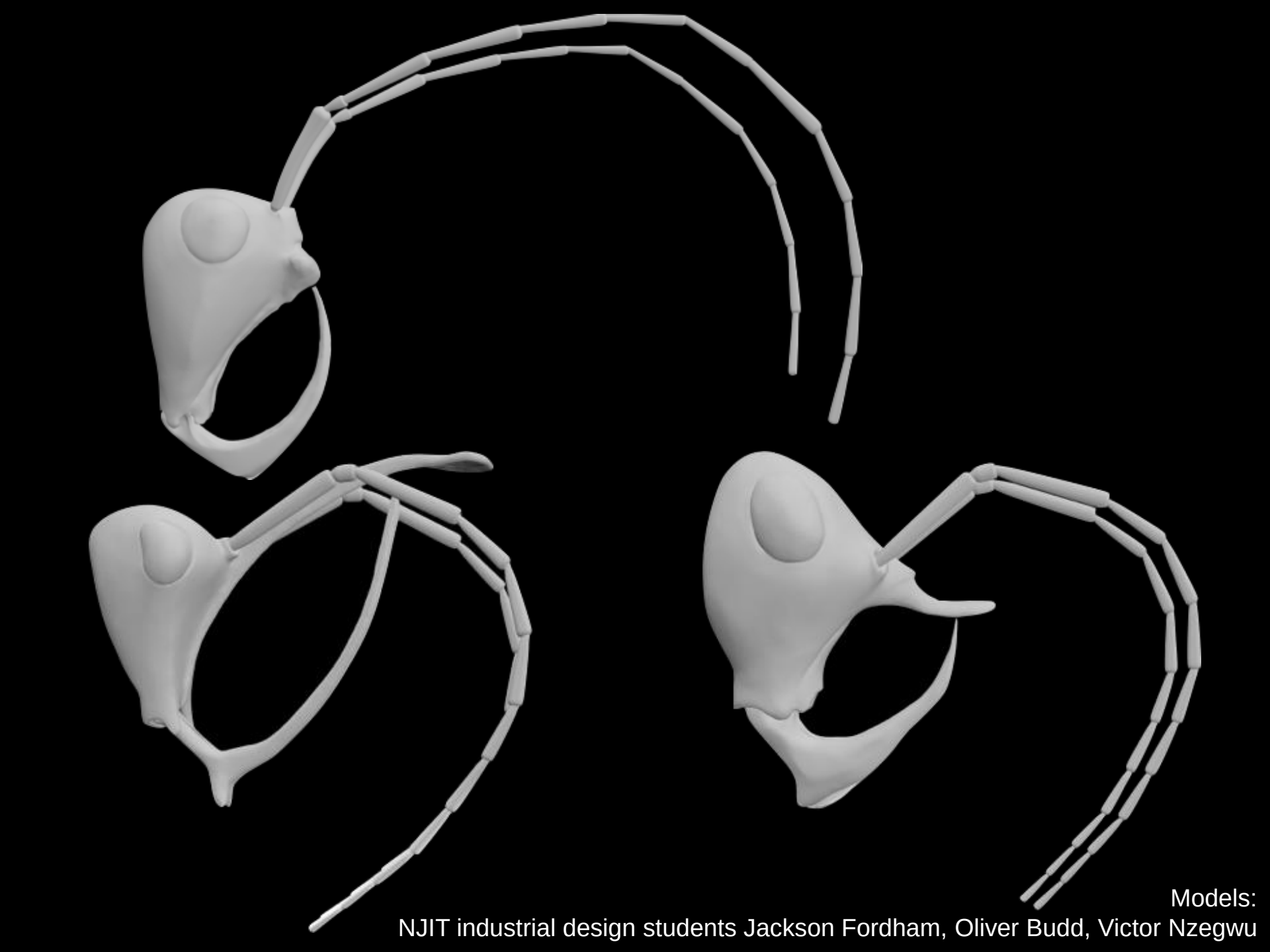
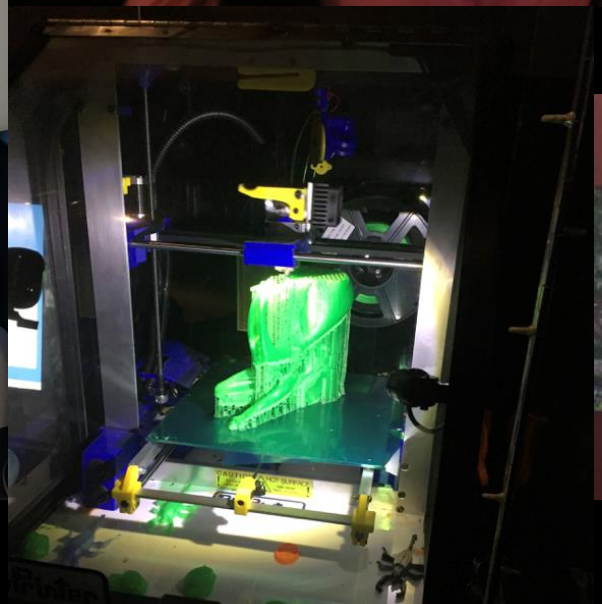


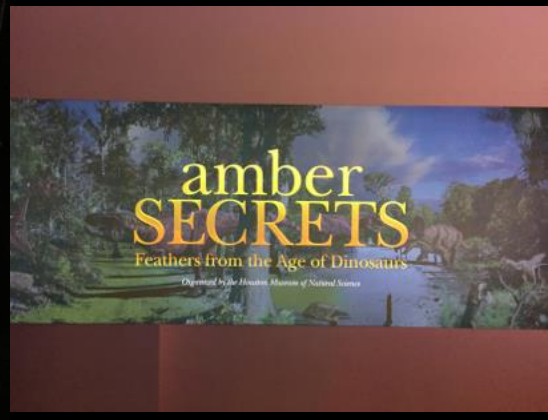


Models:
NJIT industrial design students Jackson Fordham, Oliver Budd, Victor Nzegwu

Models
NJIT industrial design students Jackson Fordham, Oliver Budd, Victor Nzegw


20-Million-year-old Dominican amber
Enlarged head model of the ancient ant
Ceratomyrmex




amber
SECRETS
Feathers from the Age of Dinosaurs

There are over 730 described fossil ant species

Photos: AntWeb, Archibald, et al. 2011

Sketchfab EXPLORE BUY 3D MODELS FOR BUSINESS Search 3D models LOGIN SIGN UP UPLOAD

Economolab PRO

Okinawa, Japan

3D virtual ant collection of the Economolab at OIST - http://arilab.unit.oist.jp/

FOLLOW CONTACT 1173 Followers 27 Followings

SUMMARY 142 MODELS COLLECTIONS 27 LIKES

POPULAR MODELS View all (142)

Pheidole lucida queen 417 1 18

Melissotarsus sp. 461 0 16

Nesomyrmex cataula... 256 0 15

Pheidole viserion ma... 219 0 14

Meranoplus magrettii 221 4 13

Sphinctomyrmex stali 112 1 12

Red Imported Fire An... 224 0 12

Australian Bulldog A... 252 1 11

Acanthomyrmex fero... 153 1 11

ABOUT

In the Economolab at the Okinawa Institute of Science and Technology in Japan we focus on biodiversity research. Our 3D model collection at sketchfab is part of our research and coordinated by Francisco Hita Garcia and Georg Fischer.

CATEGORY

Organization / Scientific Organization

WEBSITE

http://arilab.unit.oist.jp/

MEMBER SINCE

August 7th 2017

STATS

12.8k views

615 likes

634.1M triangles

322.1M vertices

Many thanks to

barden@njit.edu
BardenLab.org
@haidomyrmex

Andrea Lucky / University of Florida
Bo Wang / Chinese Academy of Sciences
Brendon Boudinot / University of California: Davis
Christine Sosiak / New Jersey Institute of Technology
David Grimaldi / American Museum of Natural History
Henry Towbin / Columbia University
Hukam Singh / Birbal Sahni Institute of Palaeobotany
James Carpenter / American Museum of Natural History
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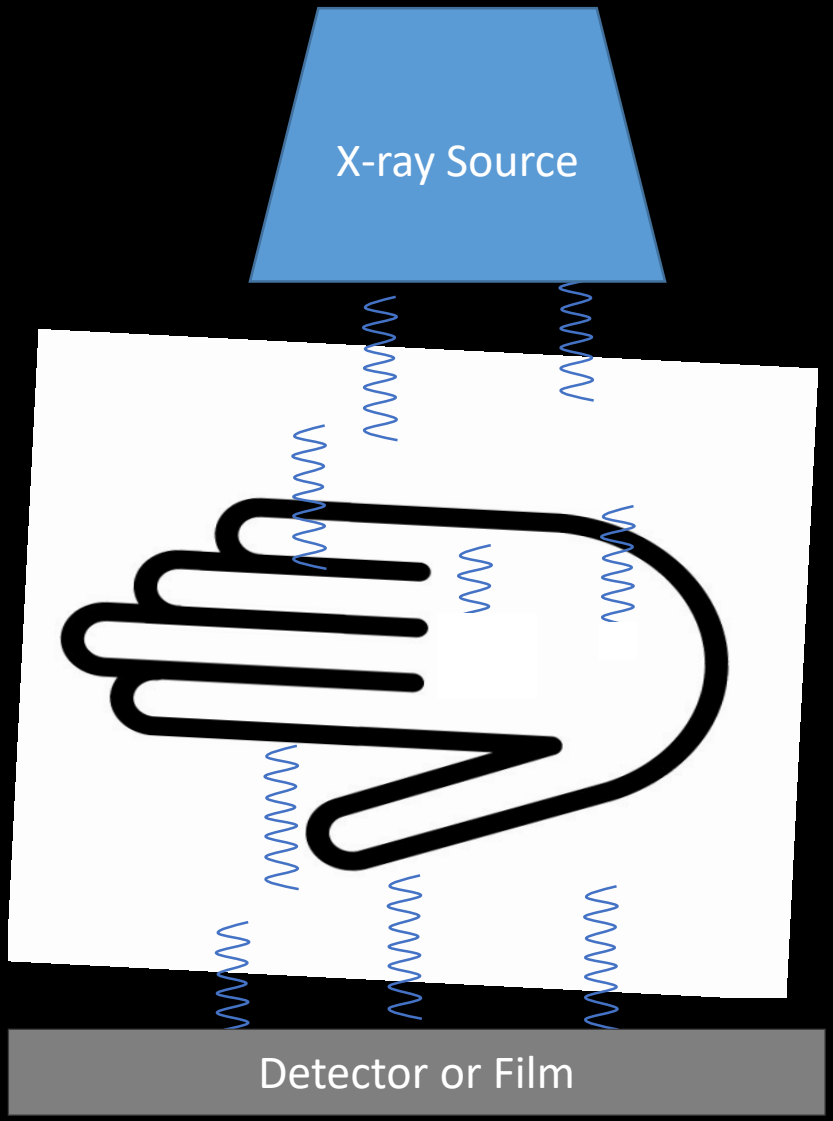
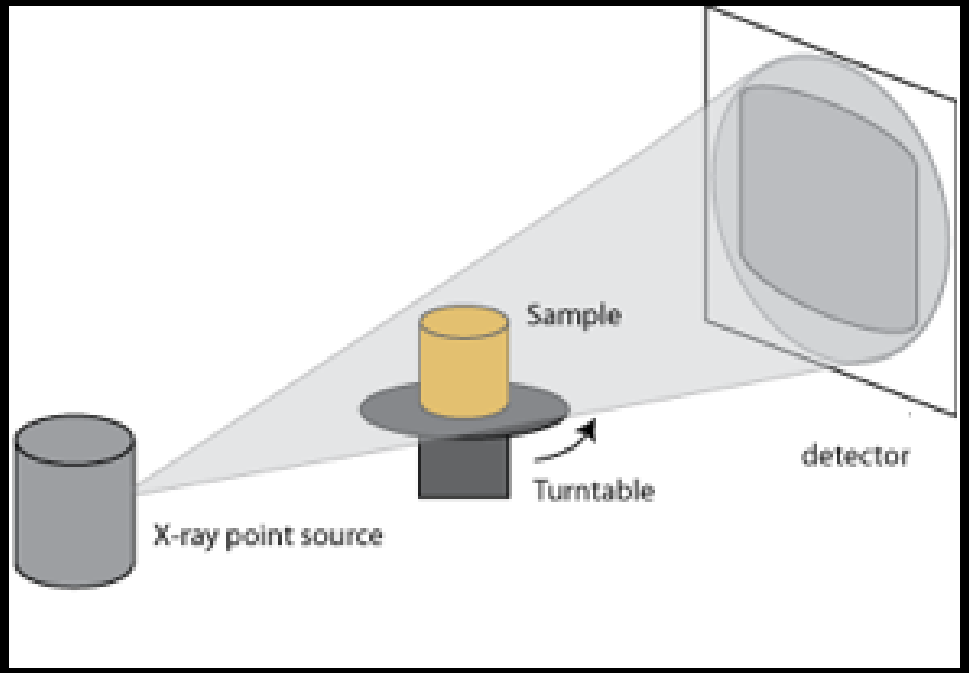
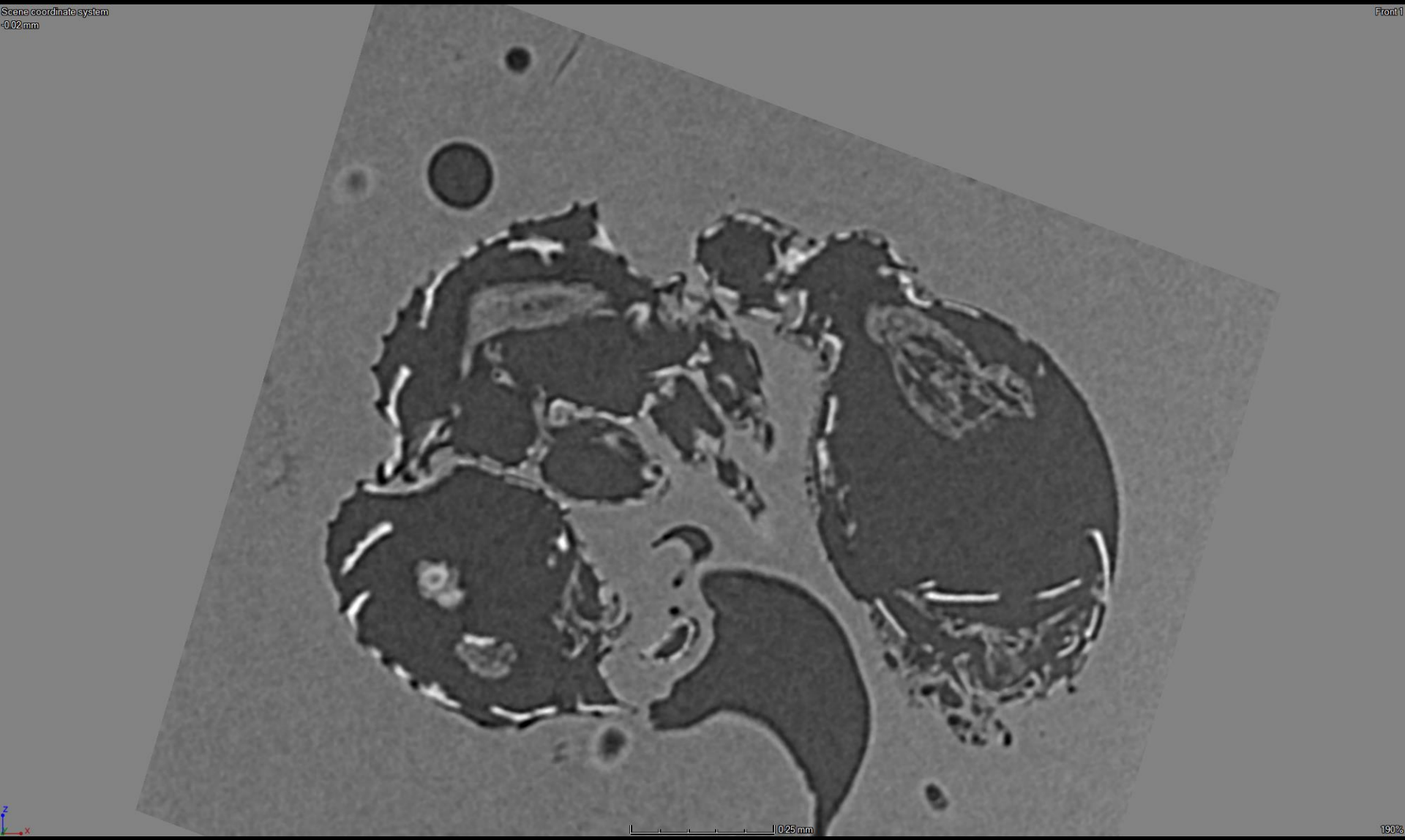
Michael Engel / University of Kansas
Susan Perkins / American Museum of Natural History
Vincent Perrichot / Université de Rennes

Imaging, Animation
Martina Decker / New Jersey Institute of Technology
Jackson Fordham, Oliver Budd, Victor Nzegwu / New Jersey Institute of Technology
Alaric Heiss / American Museum of Natural History
Hollister Herhold / American Museum of Natural History
James Thostenson / Duke University
Morgan Hill / American Museum of Natural History
Steve Thurston / American Museum of Natural History

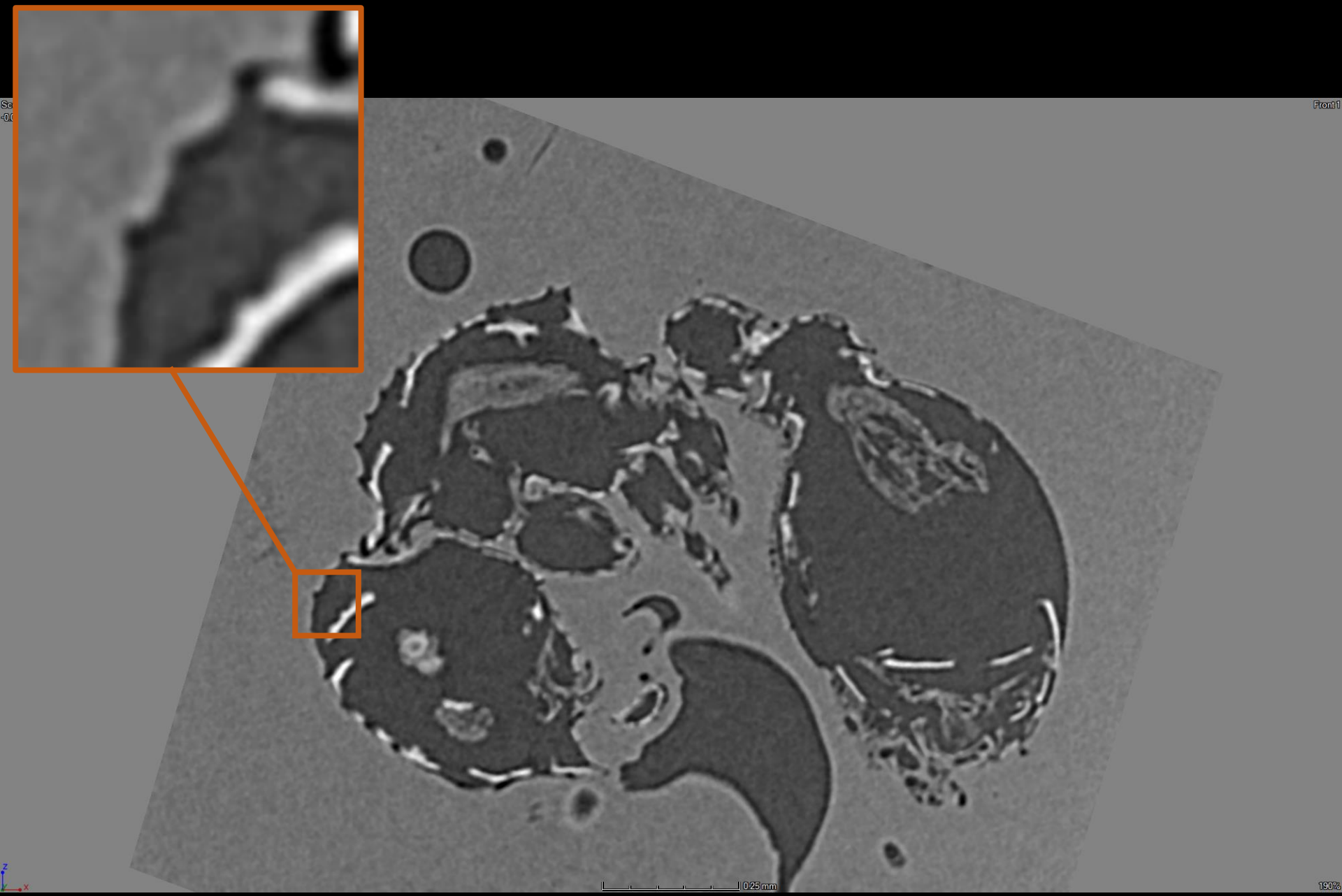
How are X-rays used in imaging?







Worker in ~52 million year old Cambay amber (Barden & Grimaldi unpublished)



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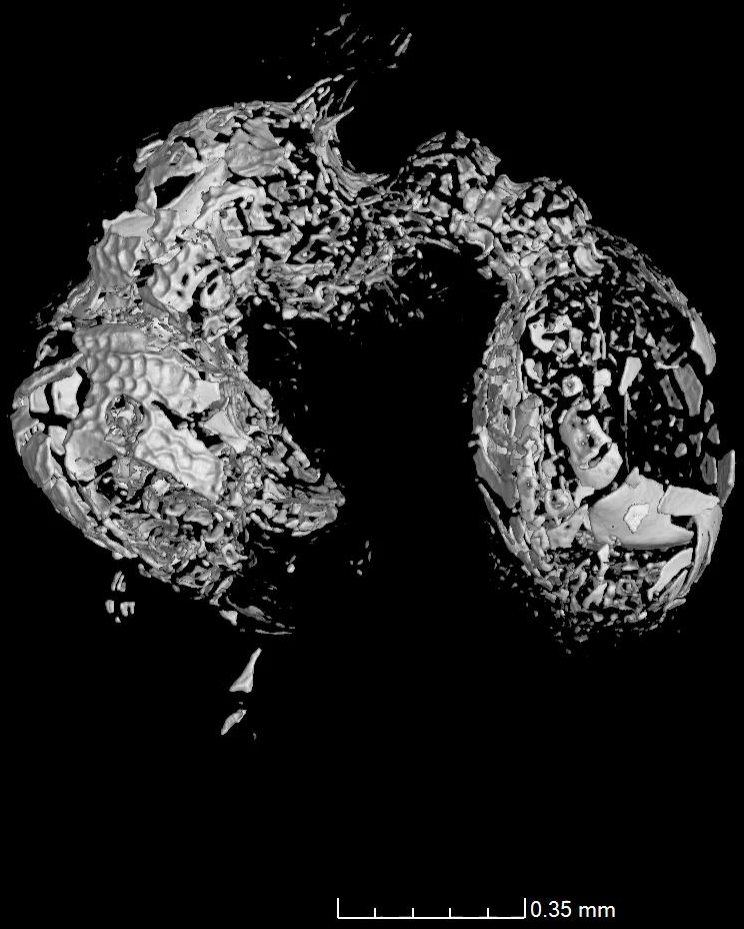

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