Wet Specimen Imaging at CAS

Going with the flow into the 21st Century

Vic Smith

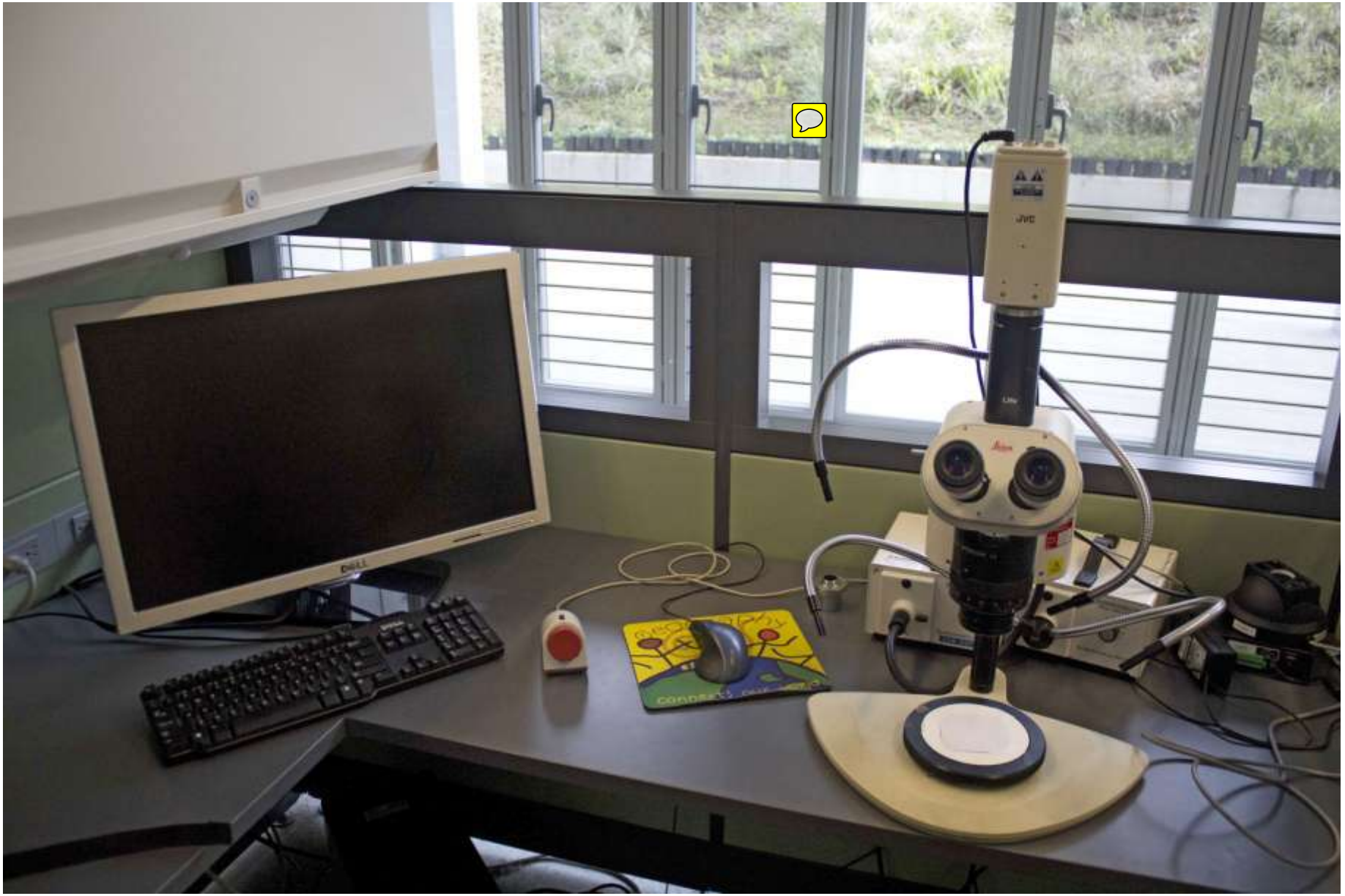
Imaging Specialist and Curatorial Assistant, Department of Entomology

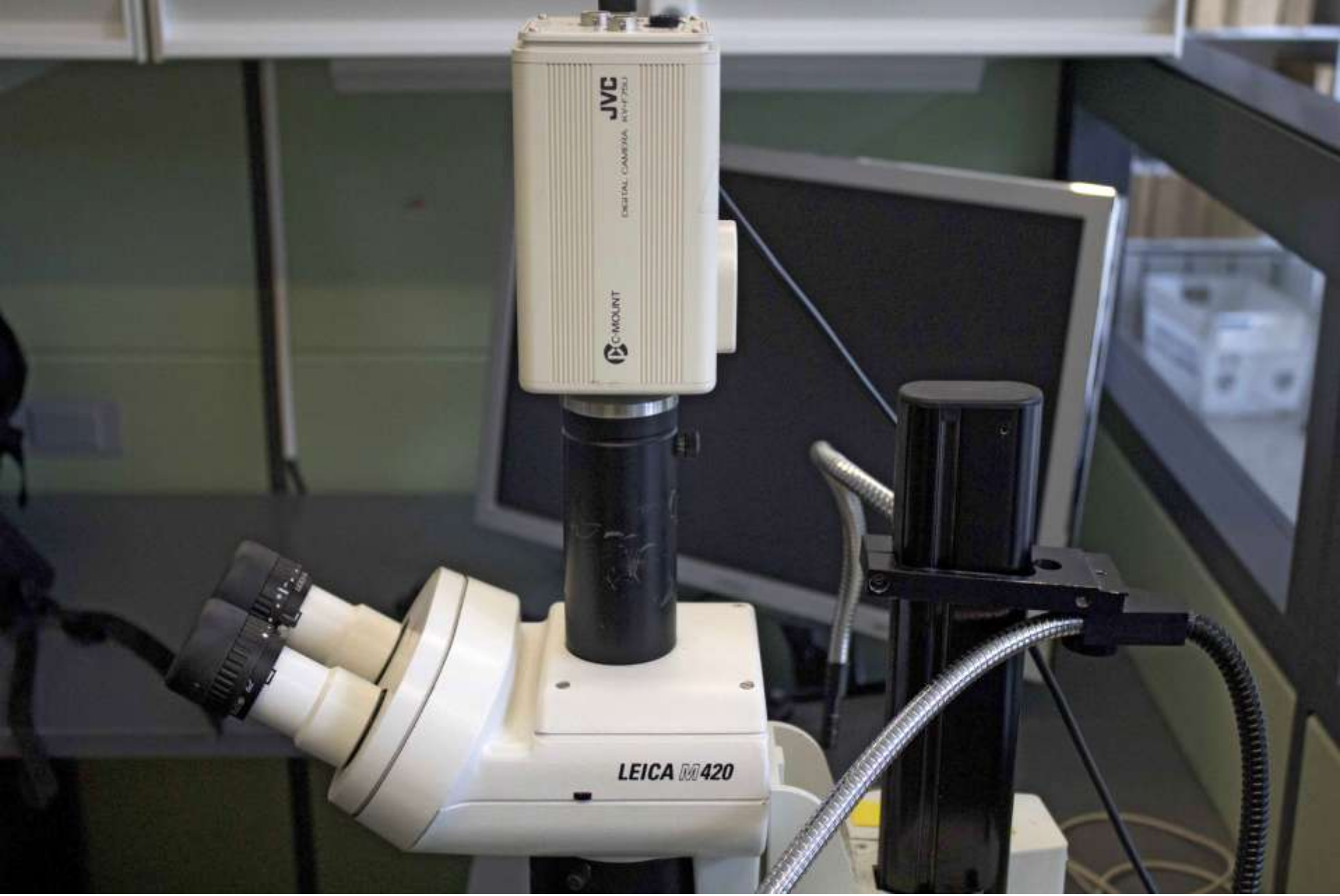
CALIFORNIA ACADEMY OF SCIENCES

Evolution of Imaging at CAS

A LITTLE HISTORY

- CAS 2002: Brian Fisher initiates imaging project
- Helps develop and refine hardware/software for AntWeb
- Spider lab invests in imaging
- Project Lab 2008


JVC


JVC
C-MOUNT
LEICA M420

Syncroscopy/Automontage

IMAGE CAPTURE AND PROCESSING

PRO'S

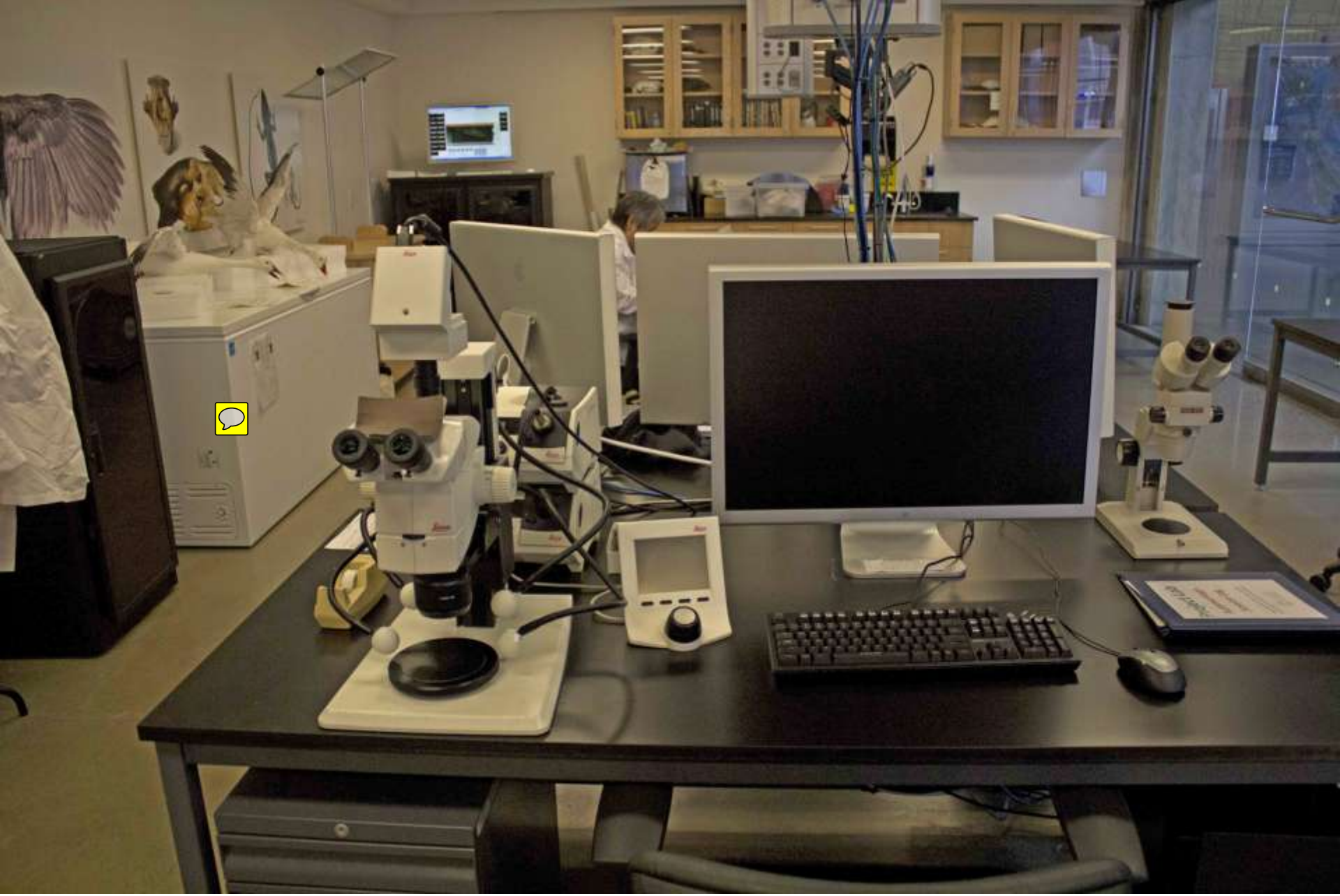
- Quick image capture
- Good editing capabilities
- Small file size

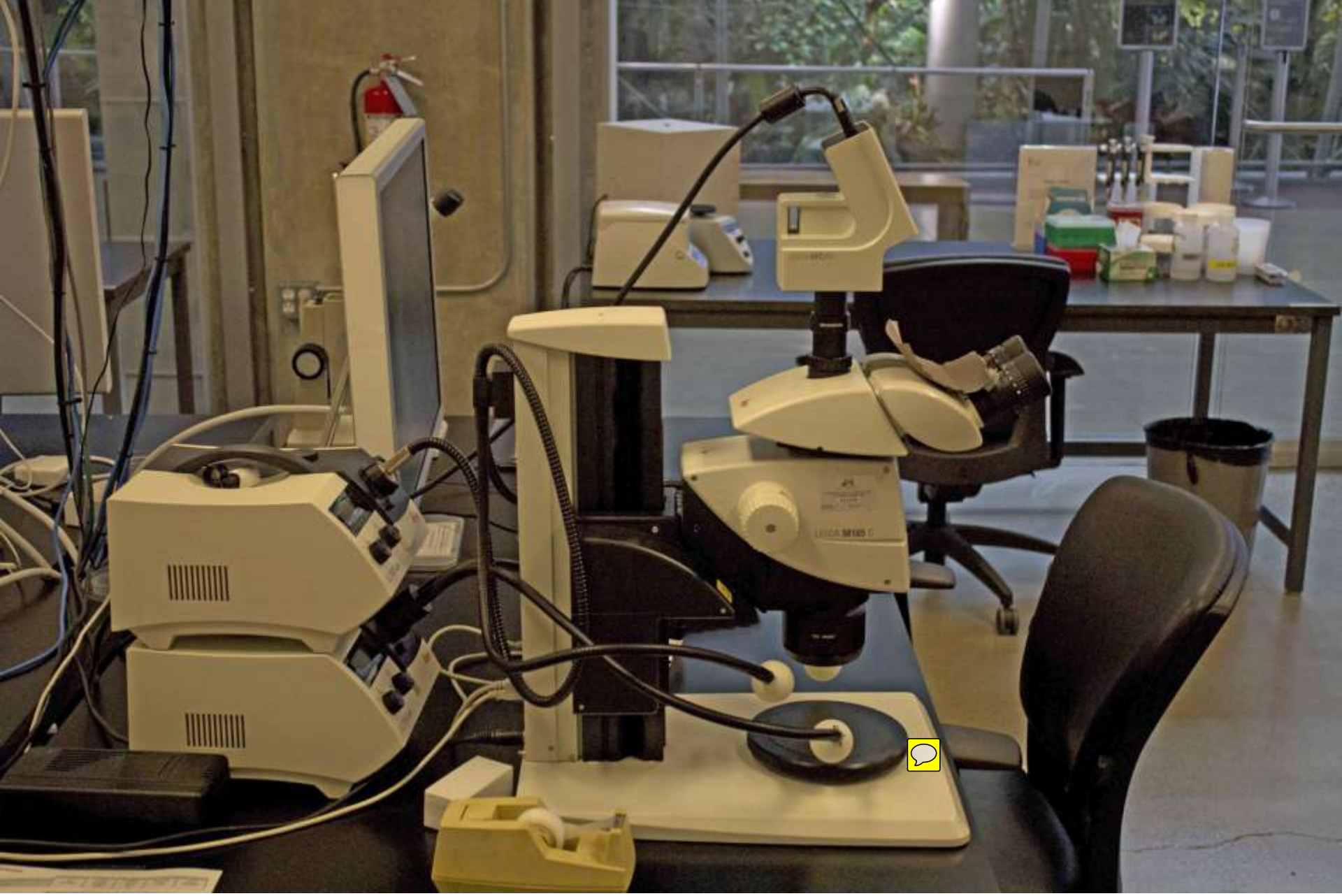
CON'S

- Expensive
- Most images need editing
- Small file size

LEICA/LAS

IMAGE CAPTURE AND PROCESSING





LEICA/LAS

IMAGE CAPTURE AND PROCESSING

PRO'S

- Better image quality than Automontage
- Moderate file size
- Variable resolutions

CON'S

- Expensive
- Difficult and confusing software
- Poor editing capabilities
- Moderate file size
- High resolution imaging slow

HELICON FOCUS

STACKING SOFTWARE ONLY

PRO'S

- Cleaner stacking than Automontage/LAS
- Fast
- Newest version Features Added
  - Direct export from Lightroom
  - New stacking algorithm (similar to Zerene Stacker)
- Economical
- Good editing capabilities

CON'S

- Trouble with very large stacks
- A little 'buggy' on my system

ZERENE STACKER

STACKING SOFTWARE ONLY

PRO'S

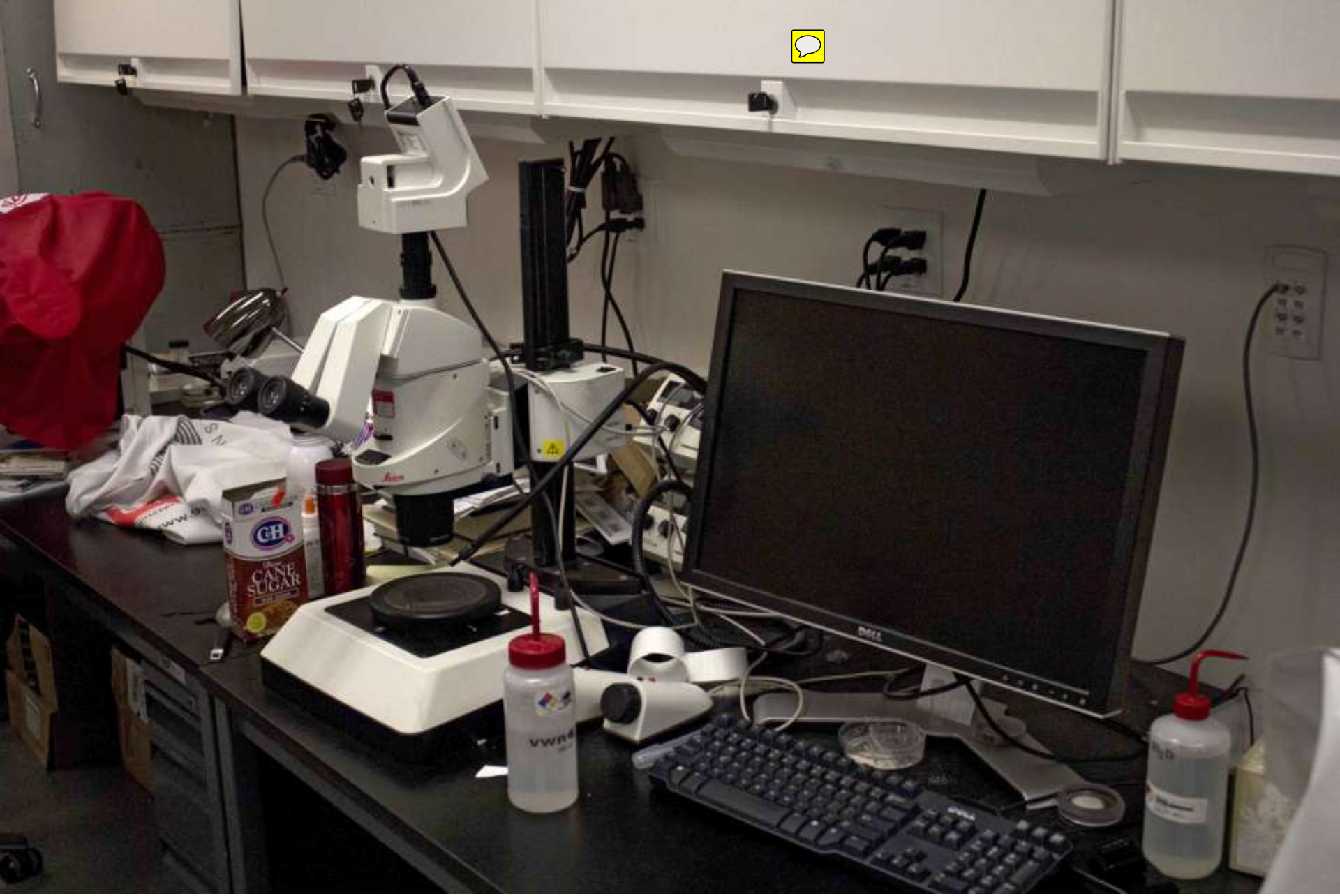
- Inexpensive
- Easy to use
- Good quality stacks
- Works on very large stacks

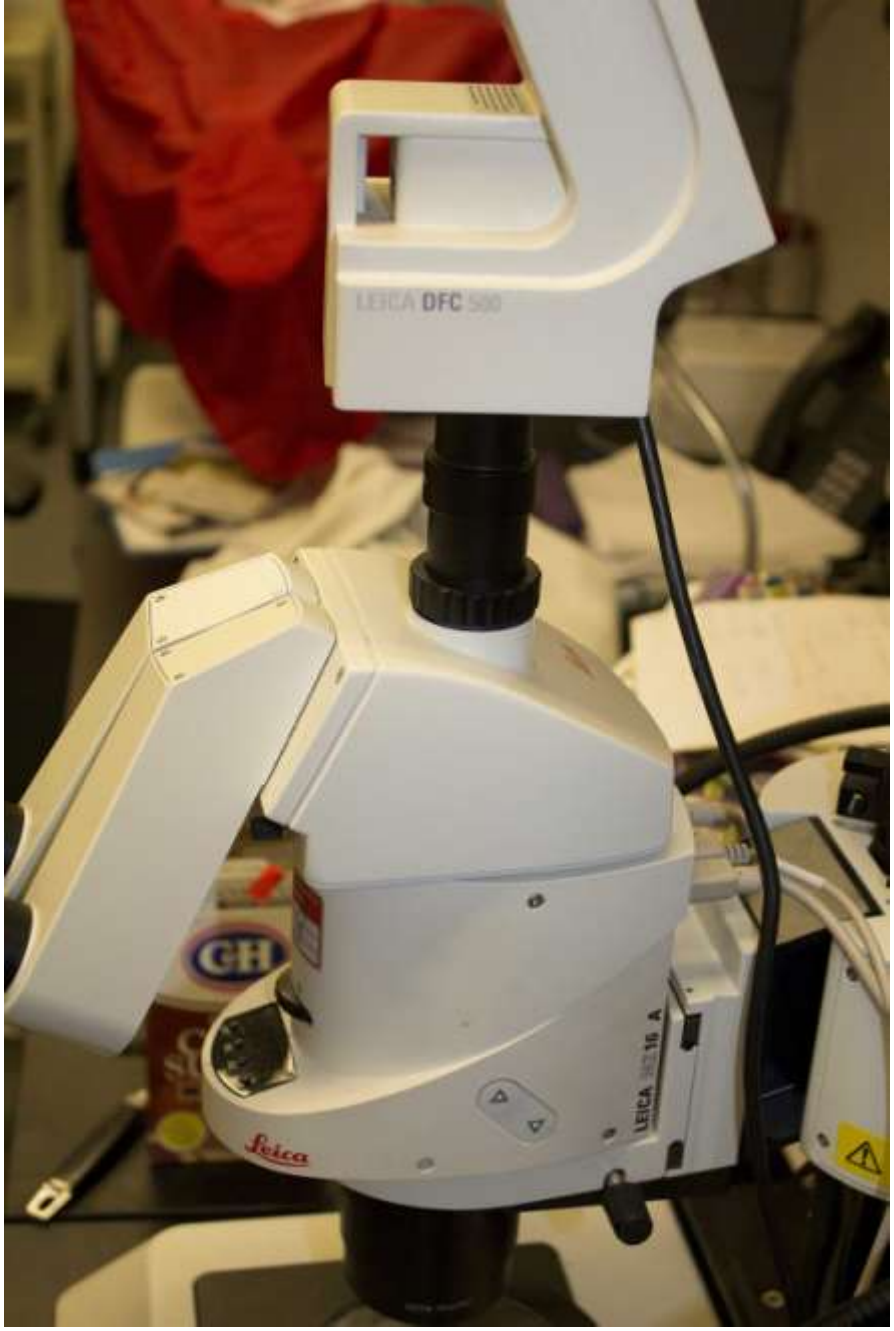
CON'S

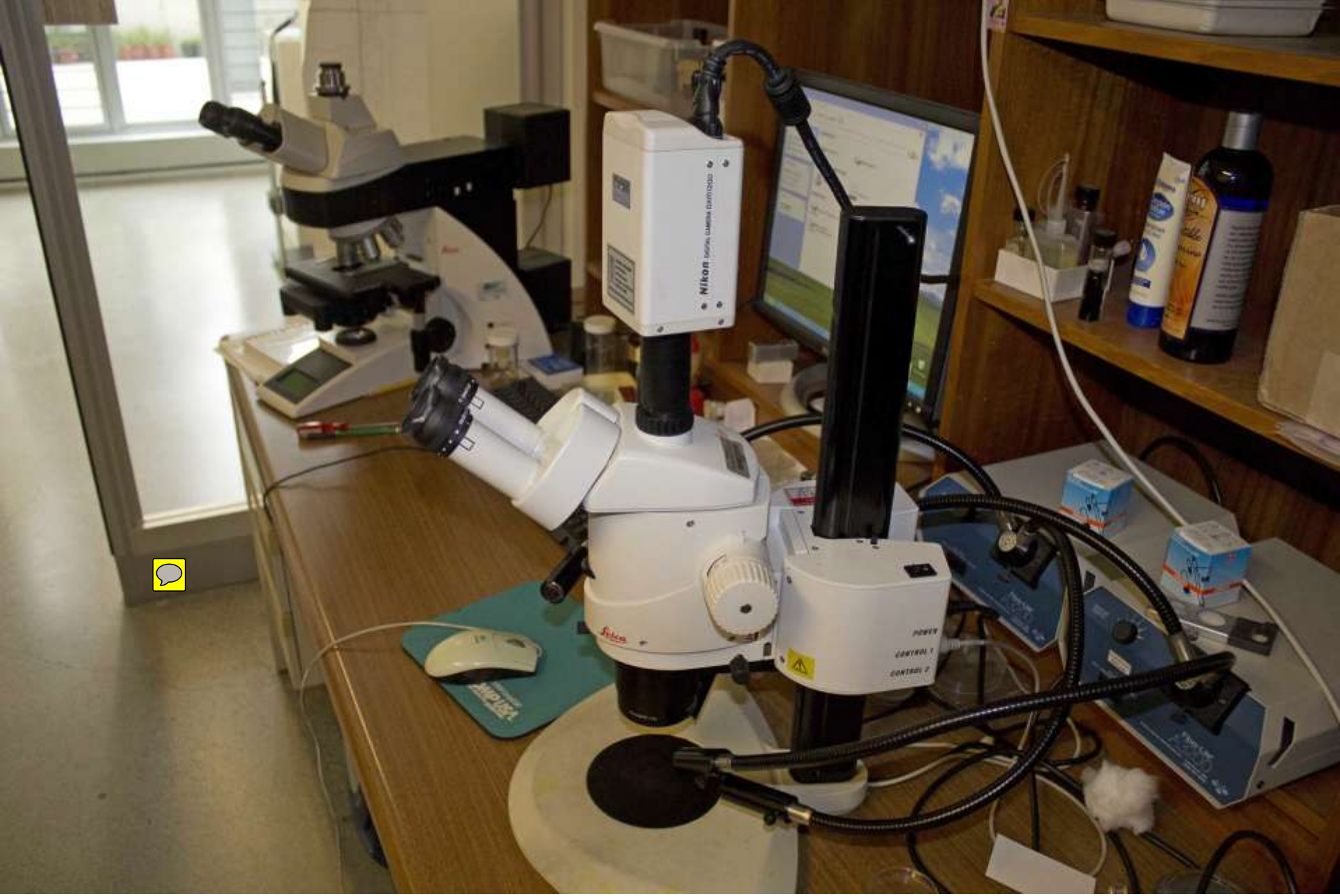
- No direct export
- Sharp image, grainy background
- Does not maintain metadata on stacked image

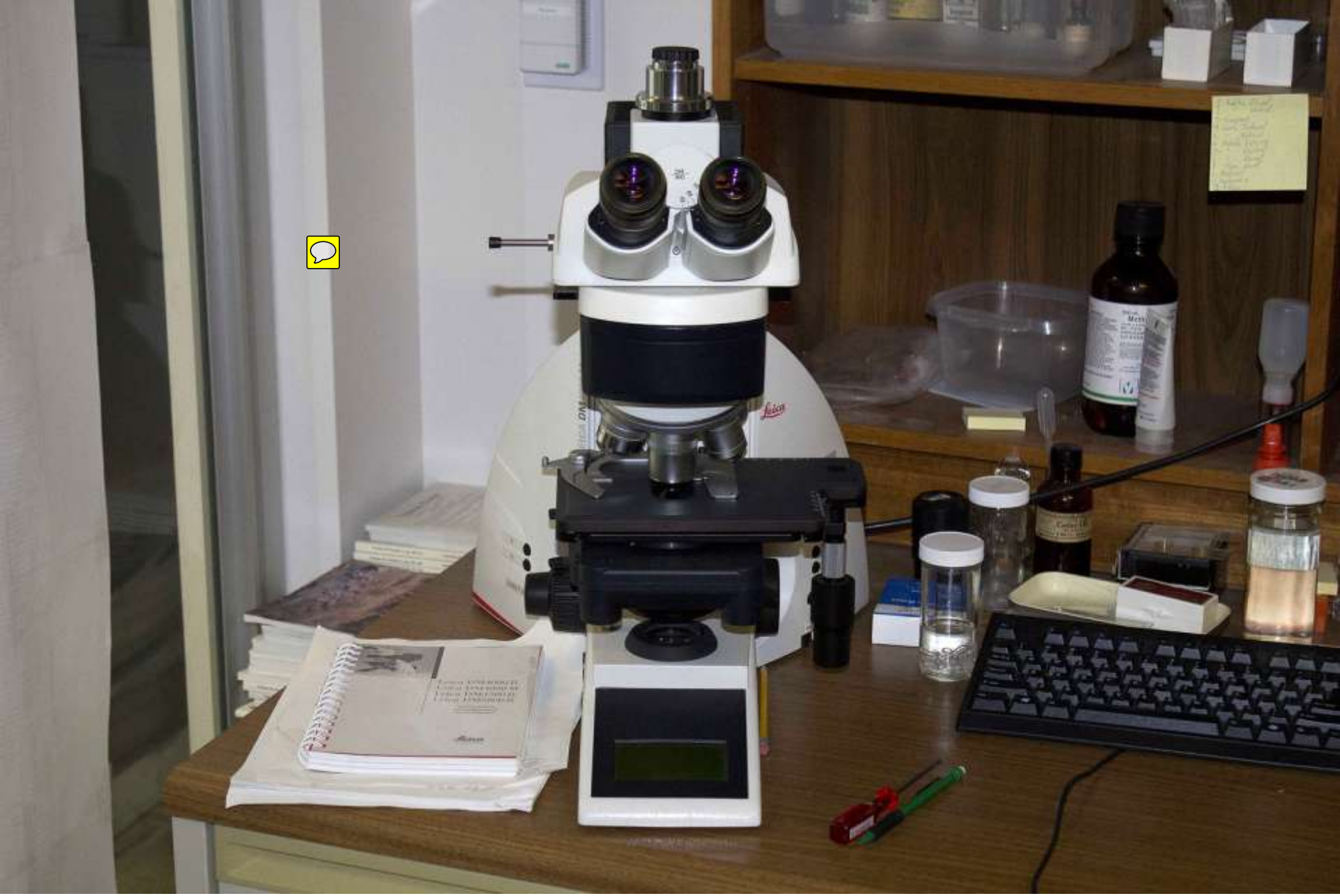
Other imaging systems used at Academy

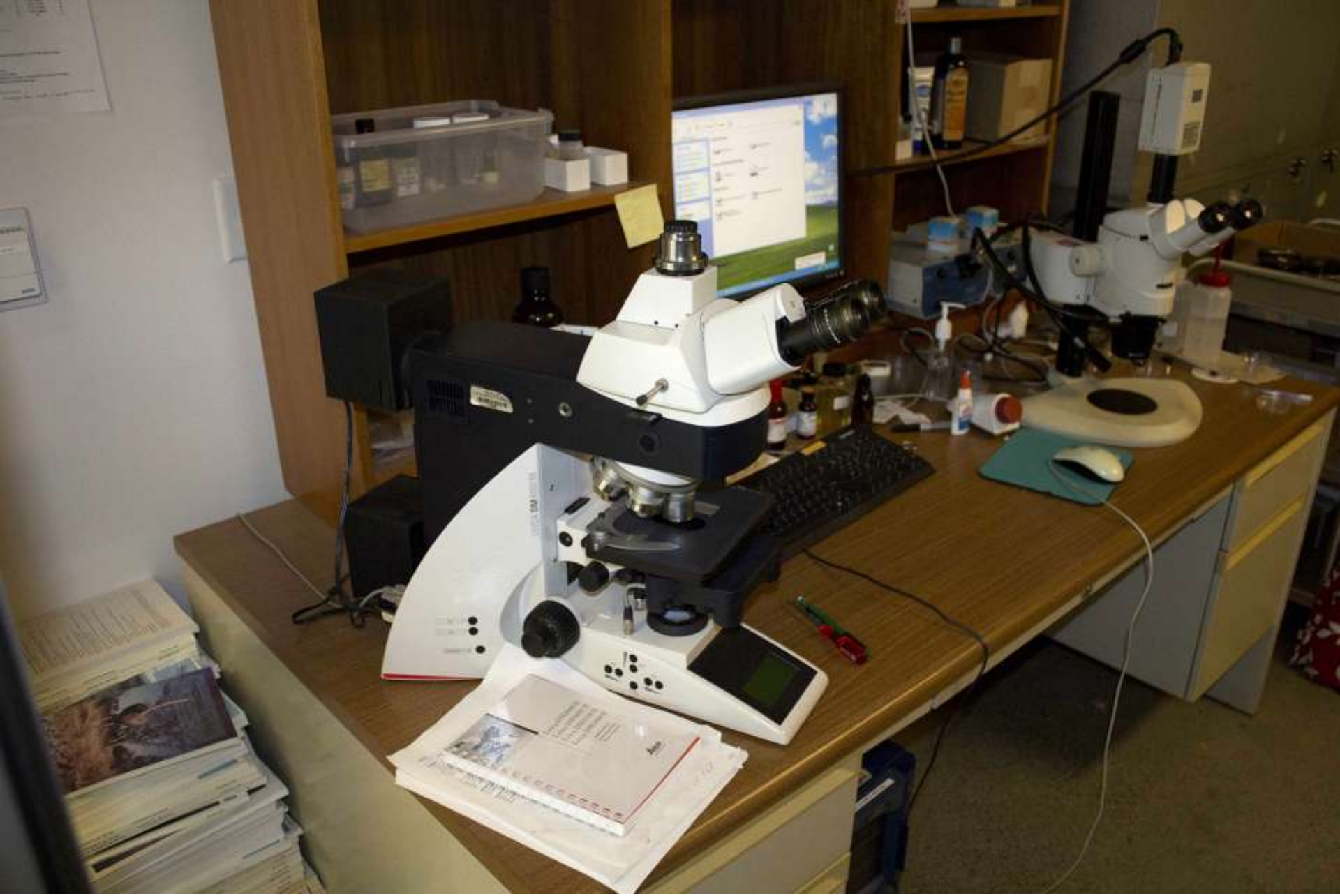
- Ant Lab
- Spider Lab
- Project Lab
- CalBug Project


CANE SUGAR


LEICA DFC 500
GH
Leica
LEICA

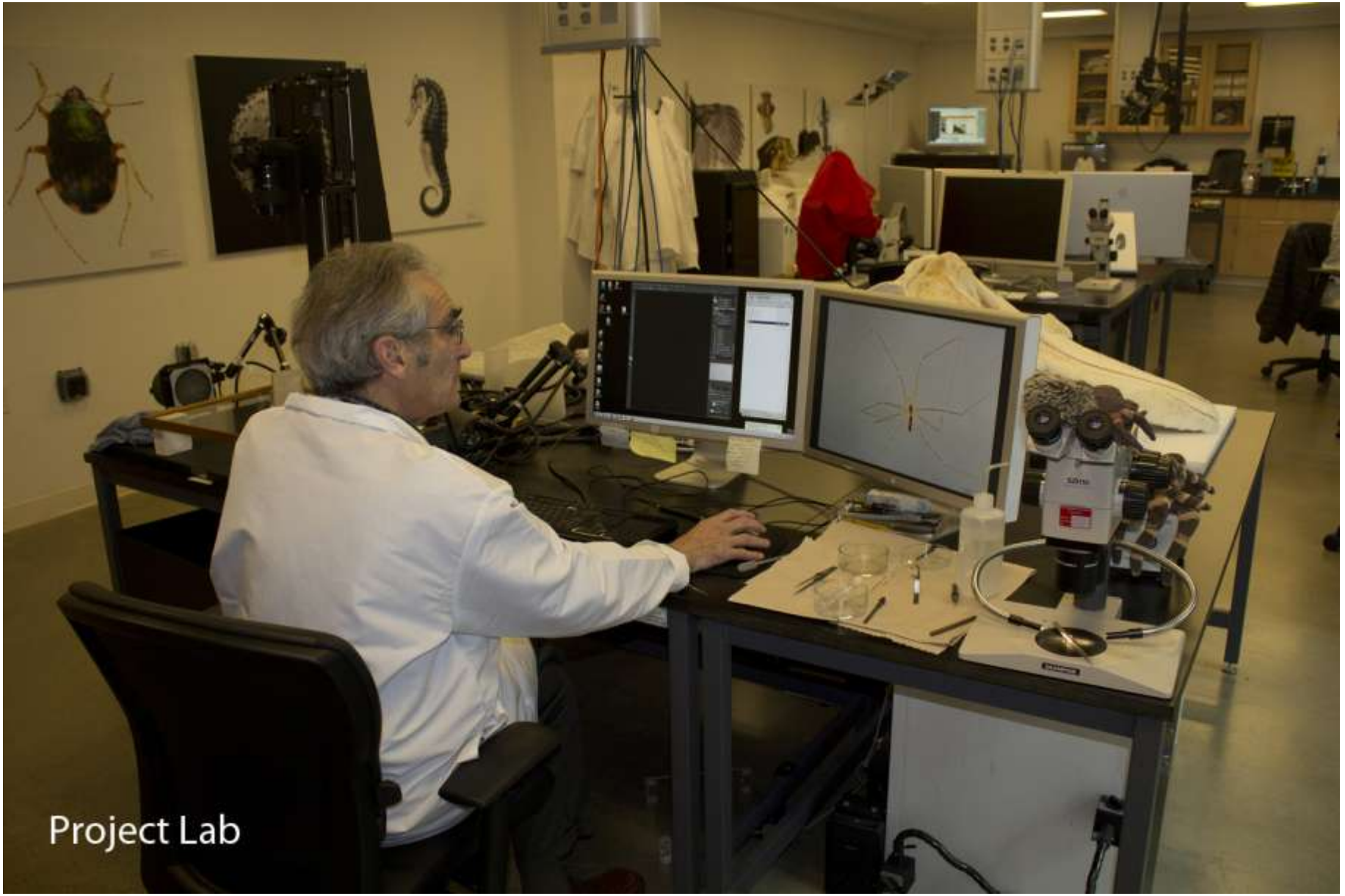

Nikon
Leica
POWER
CONTROL 1
CONTROL 2

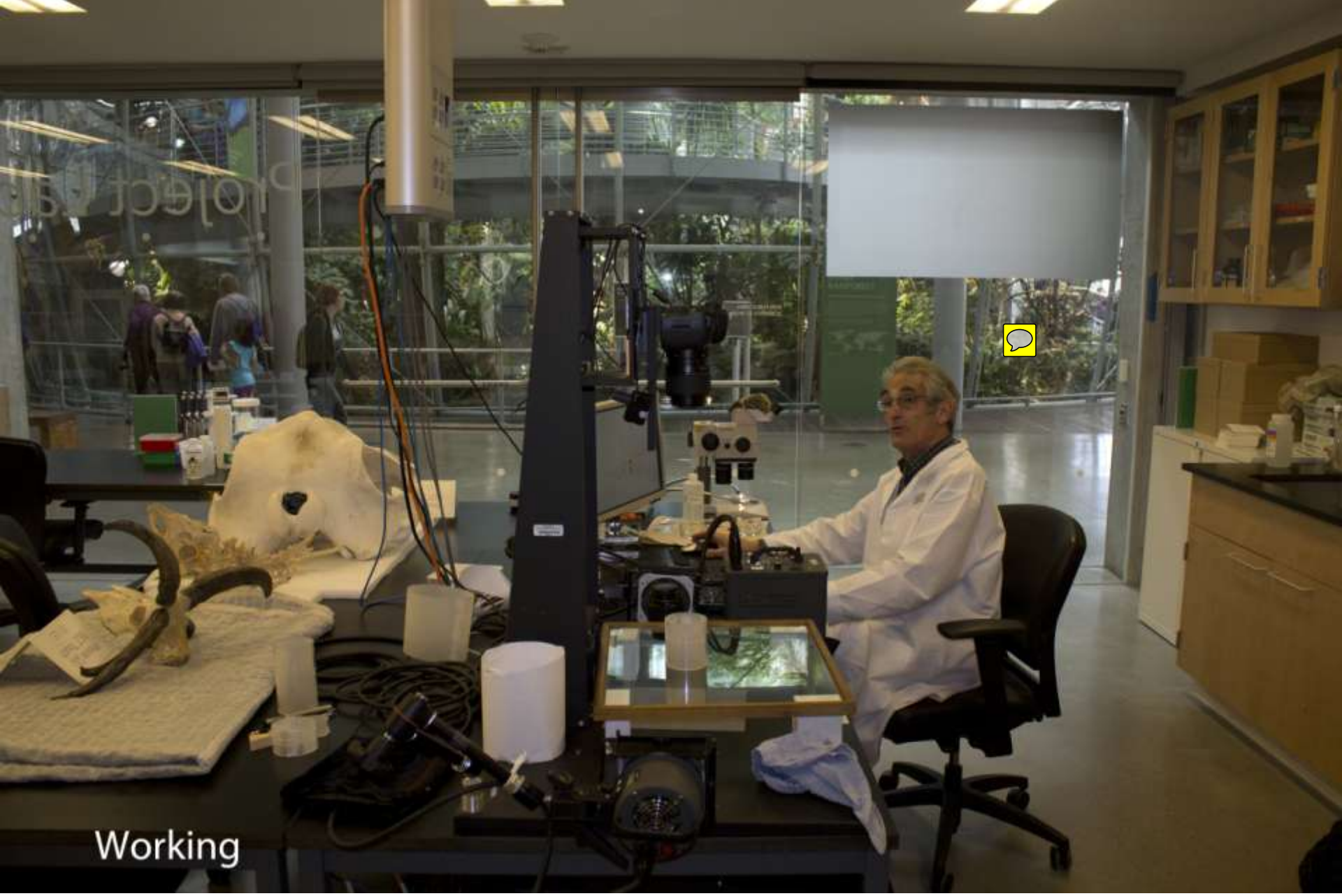




The Big Kahuna

Visionary Digital Imaging System


Project Lab


Working

The Big Kahuna

Visionary Digital Imaging System

- Uses high quality digital camera for image capture
  - Large 22 mp image, very high resolution
  - Wide selection of lenses
- Versatile and powerful lighting systems
  - Studio flash
  - FX2 fiber-optic lighting
  - Photo umbrellas and diffusing devices
- Powerful computer with lots of software
  - Lightroom and Photoshop
  - Helicon Focus and Zerene Stacker
  - Camlift

Wet Collections

Special considerations/problems

- Alcohol is flammable and waste is hazardous
- Wet collections organization
    - More difficult to survey
- Cleaning of specimens, fluid
- Subjects need to be positioned and immobilized

Wet Collections

CONTAINMENT, IMMOBILIZATION AND POSITIONING

- Disposable plastic containers or glass?
- Immobilization/positioning techniques:
    - Vaseline (Yuck!)
    - Sand or glass bead dishes

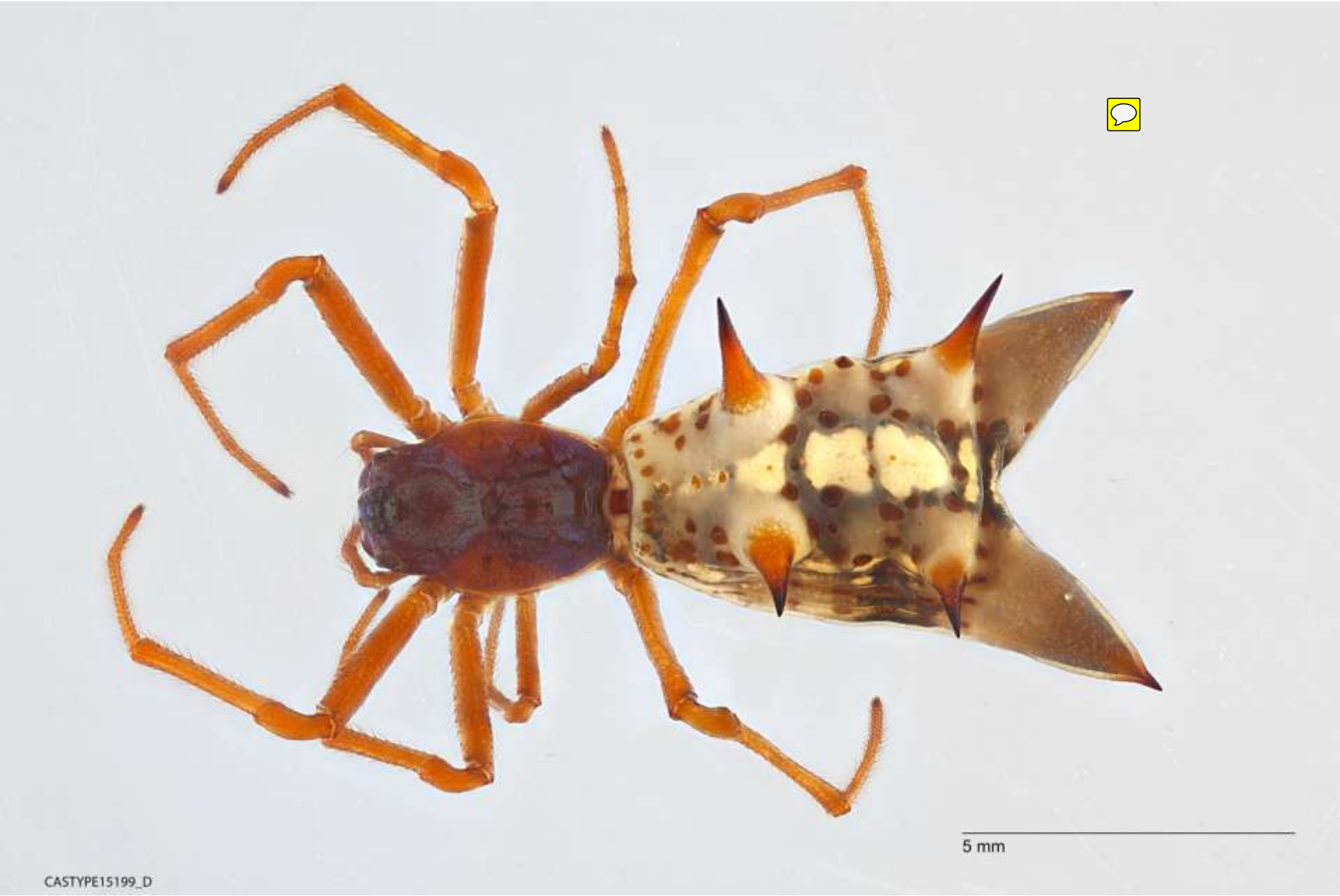

0.5 mm
CASENT9045681_MM_Palp


1 mm
CASENT9043617_MM_Hab_V

Wet Collections

CONTAINMENT, IMMOBILIZATION AND POSITIONING

- Disposable plastic containers or glass?
- Immobilization/positioning techniques:
    - Vaseline (Yuck!)
    - Sand or glass bead dishes
    - K-Y Jelly
    - Glycerin
    - Hand sanitizer

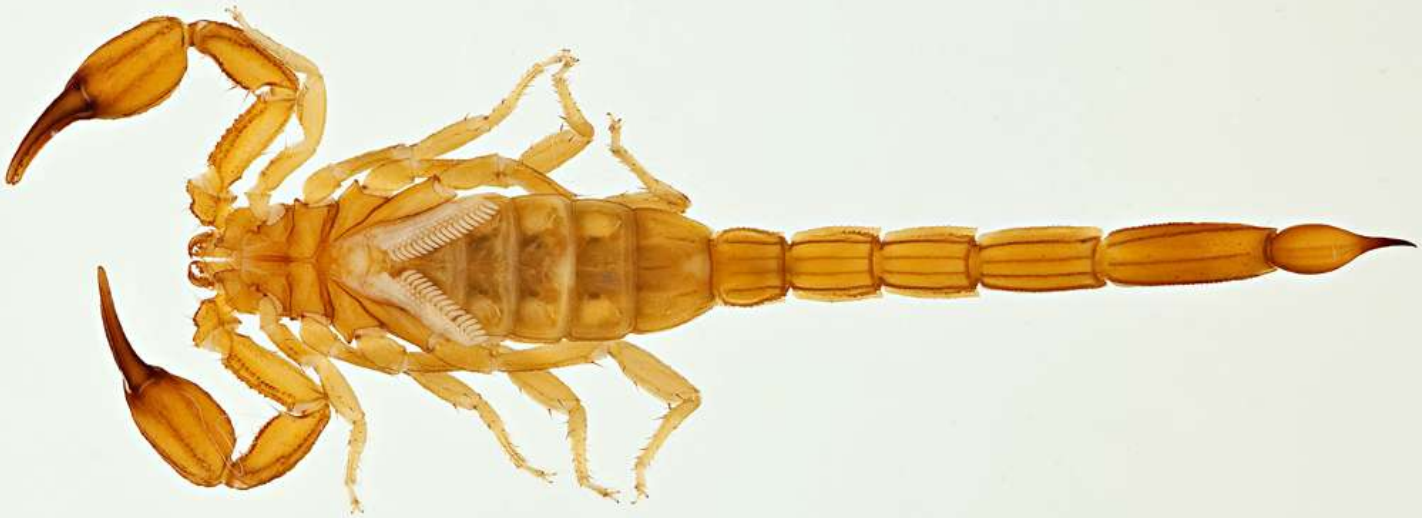

5 mm
CASTYPE15199_D


CASENT9042085_MM_Palp
0.5 mm

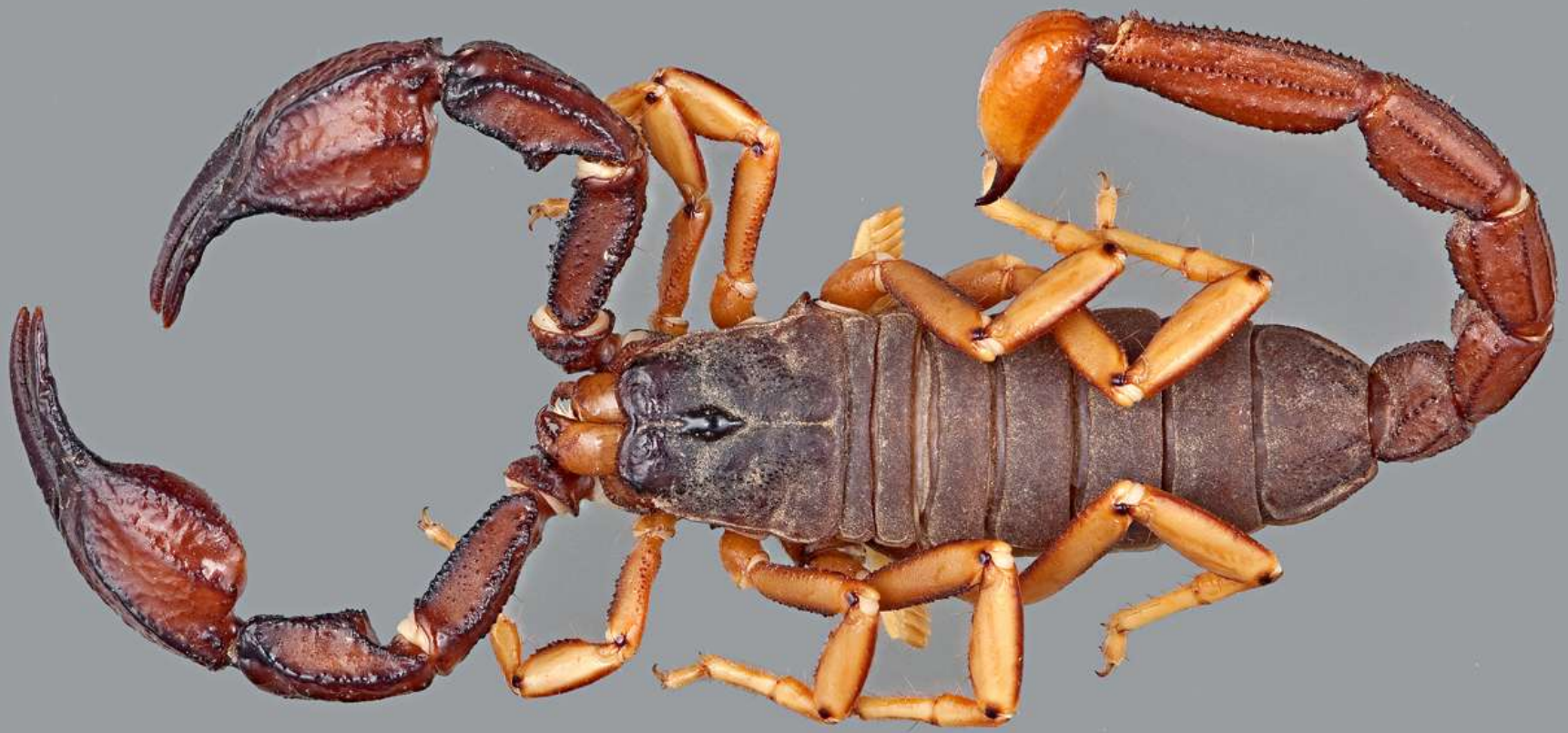
Wet Collections

CONTAINMENT, IMMOBILIZATION AND POSITIONING

- Disposable plastic containers or glass?
- Immobilization/positioning techniques:
    - Vaseline (Yuck!)
    - Sand or glass bead dishes
    - K-Y Jelly
    - Glycerin
    - Hand sanitizer
    - Trapping between 2 slides
    - Temporary removal from liquid



CASTYPE11466_V



CASTYPE3523_D_M

Working with Types

TYPE SPECIMENS HAVE SPECIAL ISSUES AND REQUIREMENTS:

- Delicate and irreplaceable
    - Extreme care in handling, positioning and cleaning
- Varying specimen quality
    - Some specimens may be damaged, degraded, or dirty.
- What to image?
    - Differing taxa have differing requirements.
    - Label photos

Imaging protocols and workflows

- Images captured in camera RAW using Lightroom
- Specimens sent to stacking program (Helicon or Zerene)
- Output saved as 16 bit Tiff, Adobe RGB
- Scale added and post-processing done using Photoshop
- Original image archived

Imaging protocols and workflows

- Labels saved as JPEGs
- Full sized JPEGs of specimen images also saved

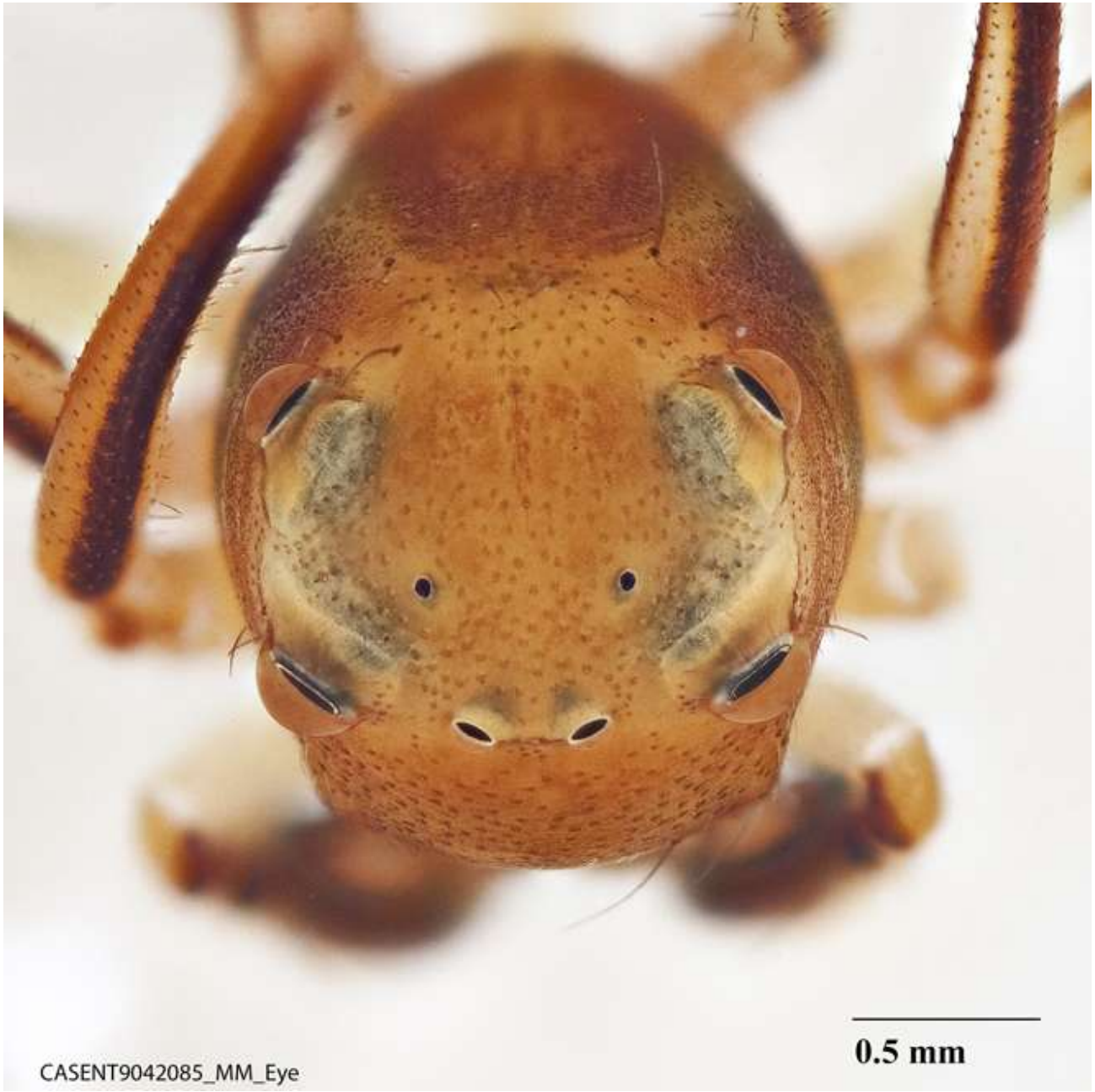
How are our images used?

Our images are used for multiple purposes:

- Type Specimens posted on web site
- Scientific publications
- Exhibits
- Social media
- Marketing
- Research

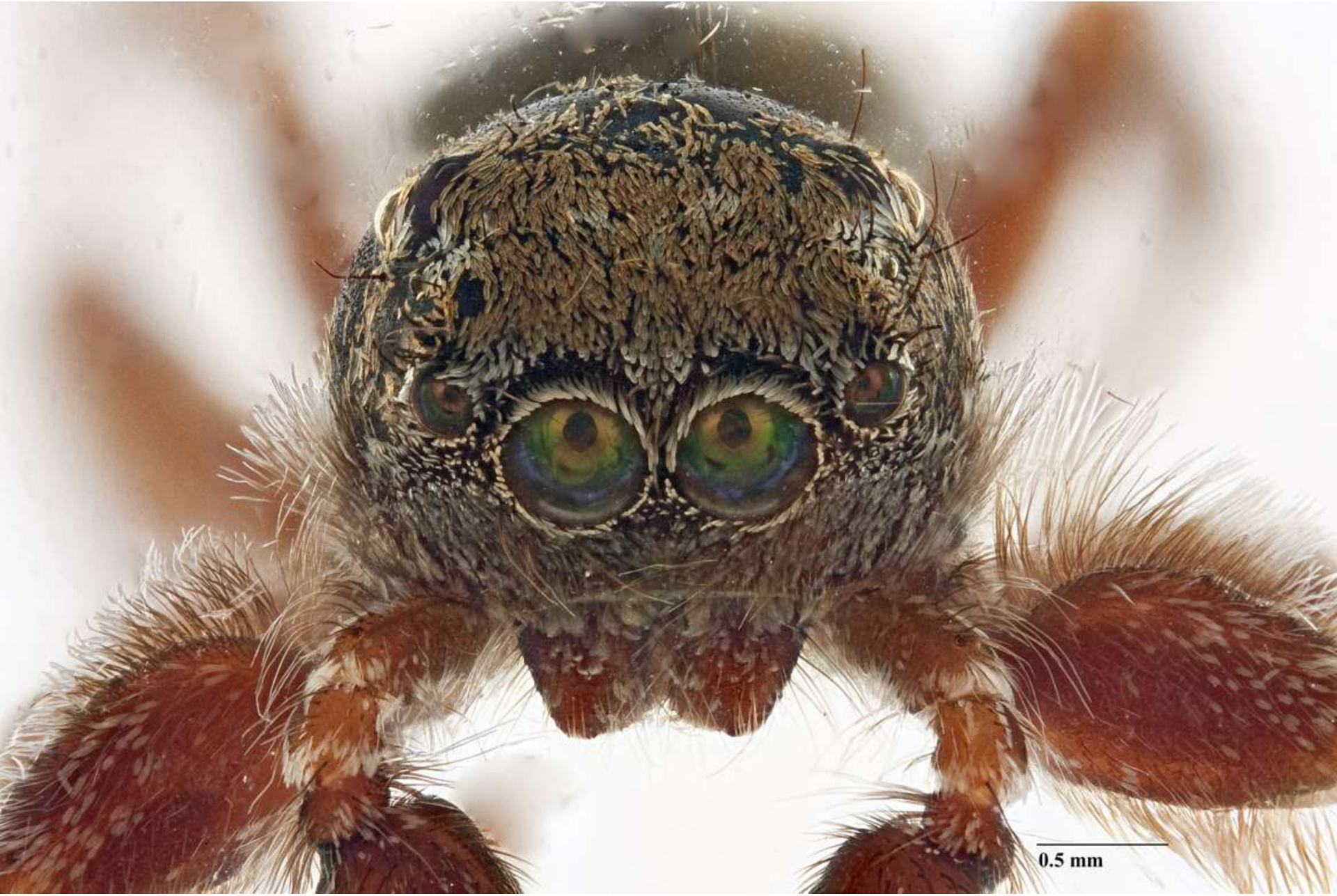
A Survey of Taxa Imaged

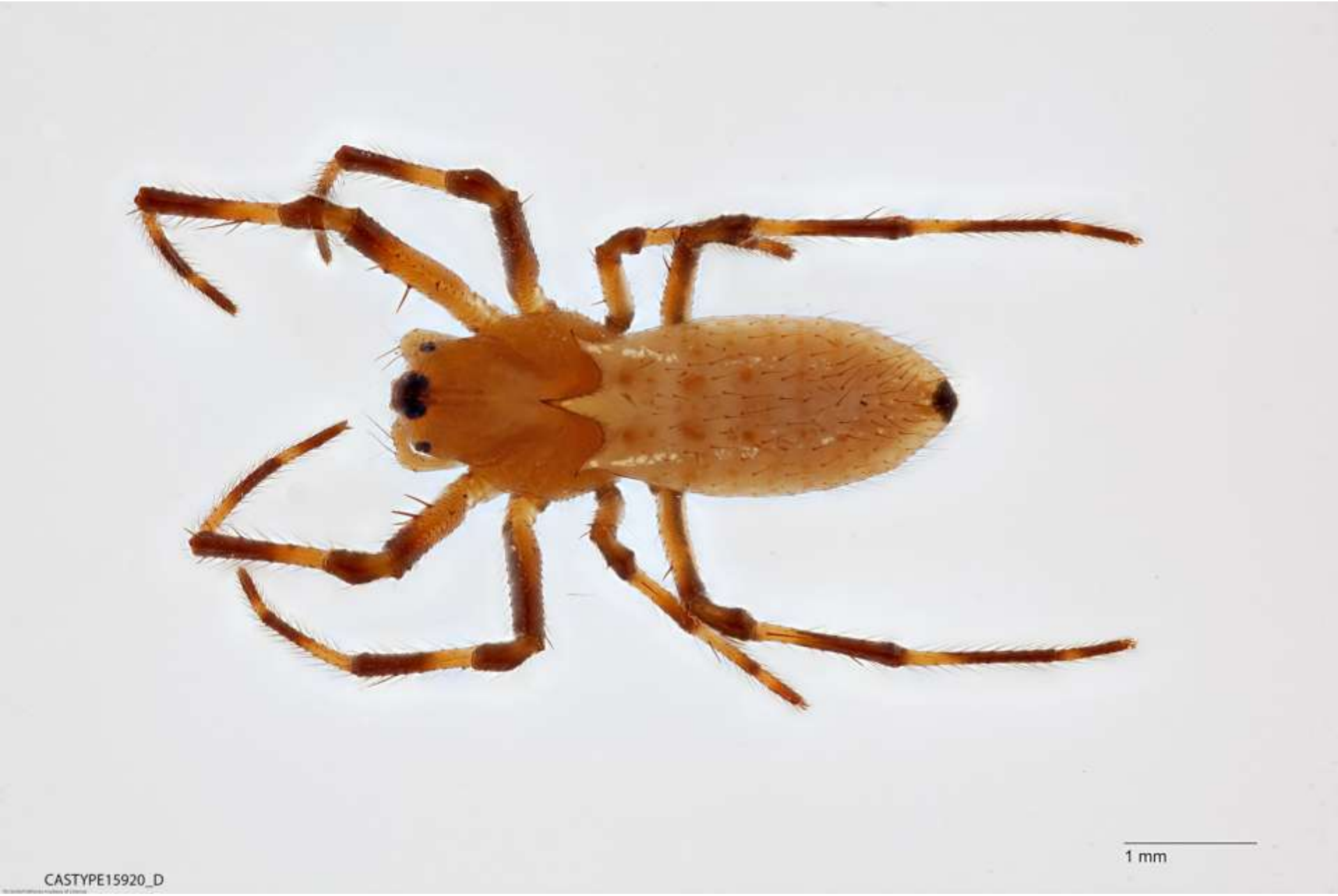
SPIDERS:


0.5 mm
CASENT9042085_MM_Eye

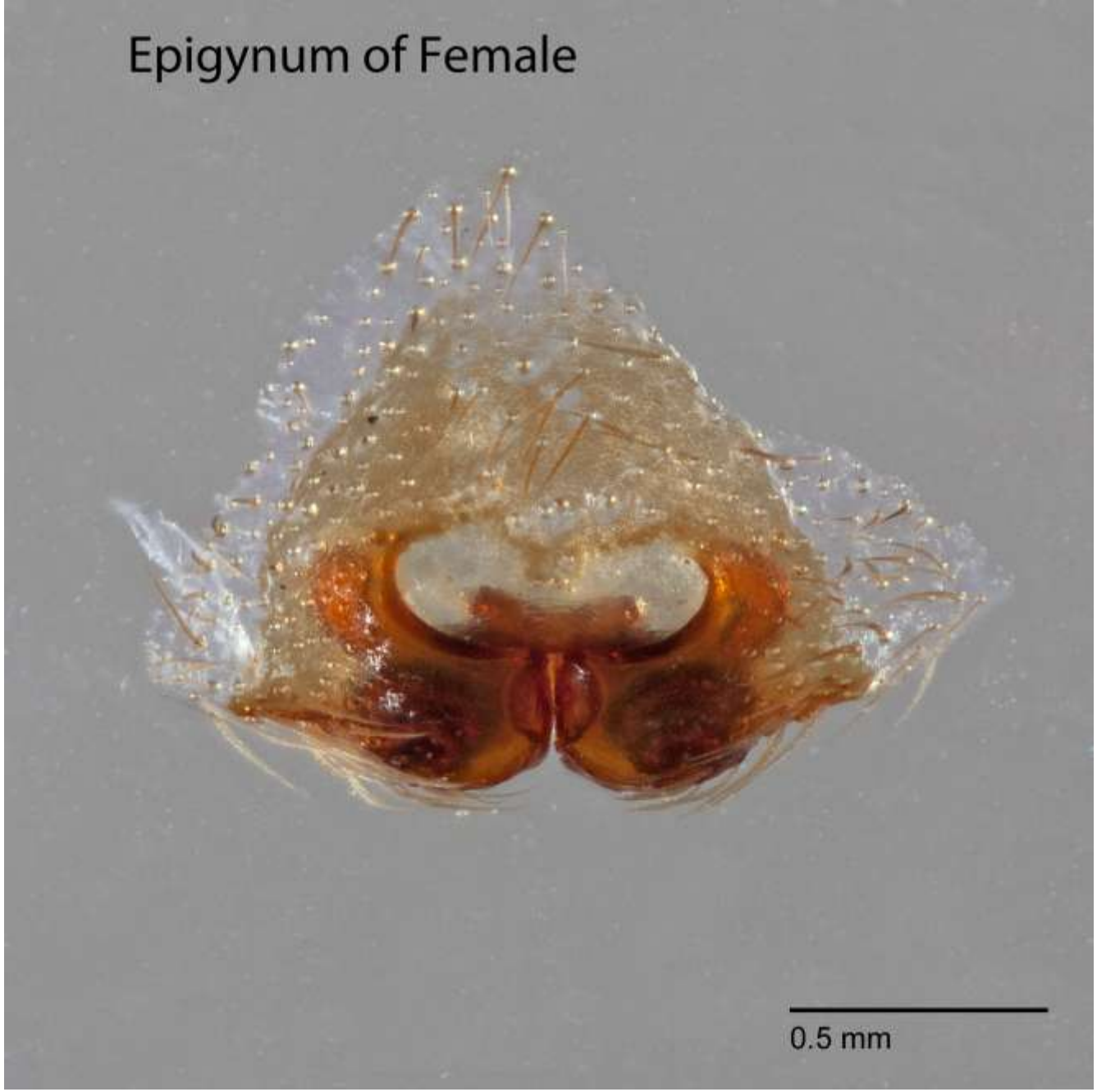

5 mm

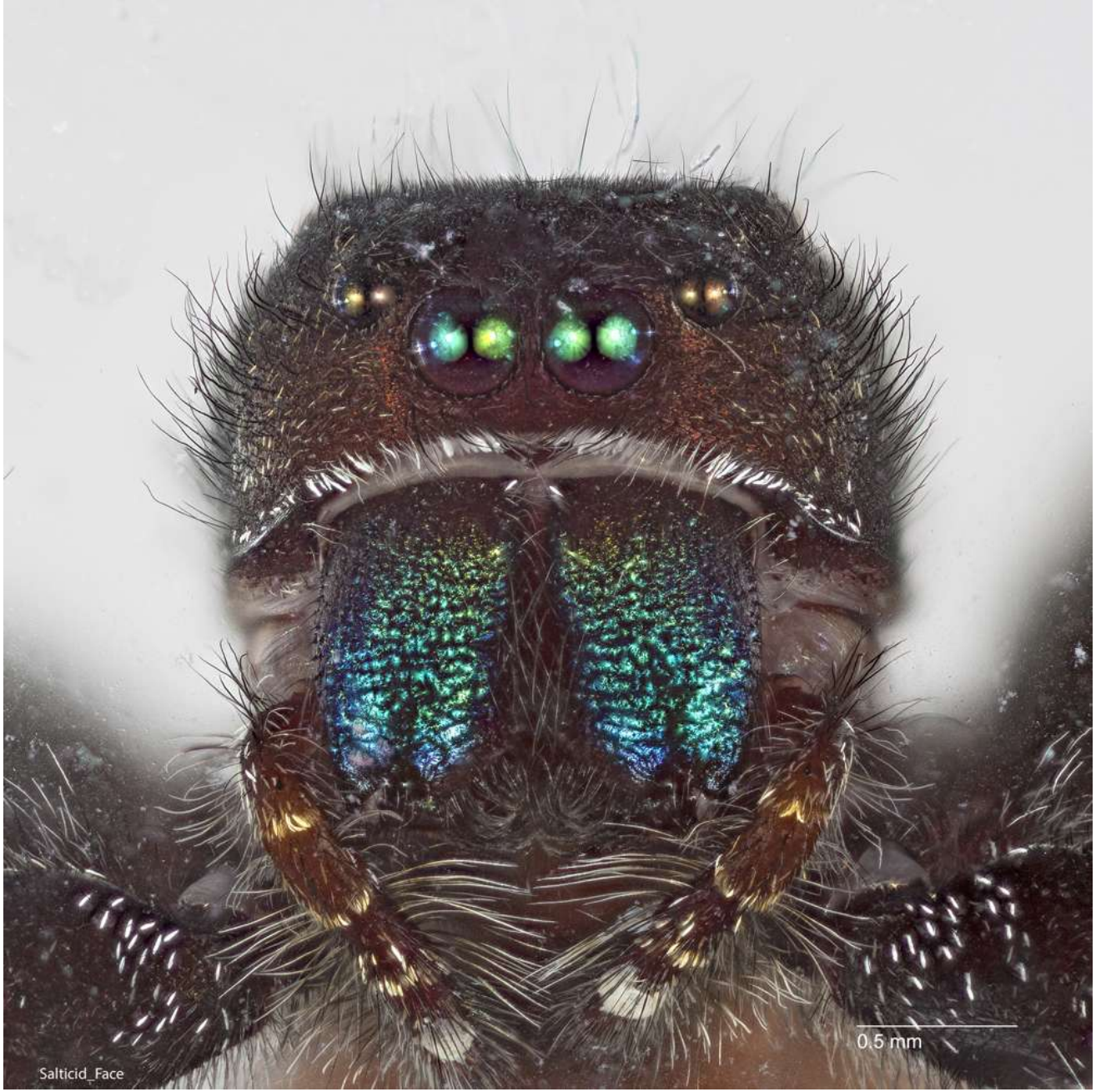

0.5 mm
CASENT9043566_MM_Eye


0.5 mm


1 mm
CASTYPE15920_D


0.5 mm
CASENT9043617_MM_Eye

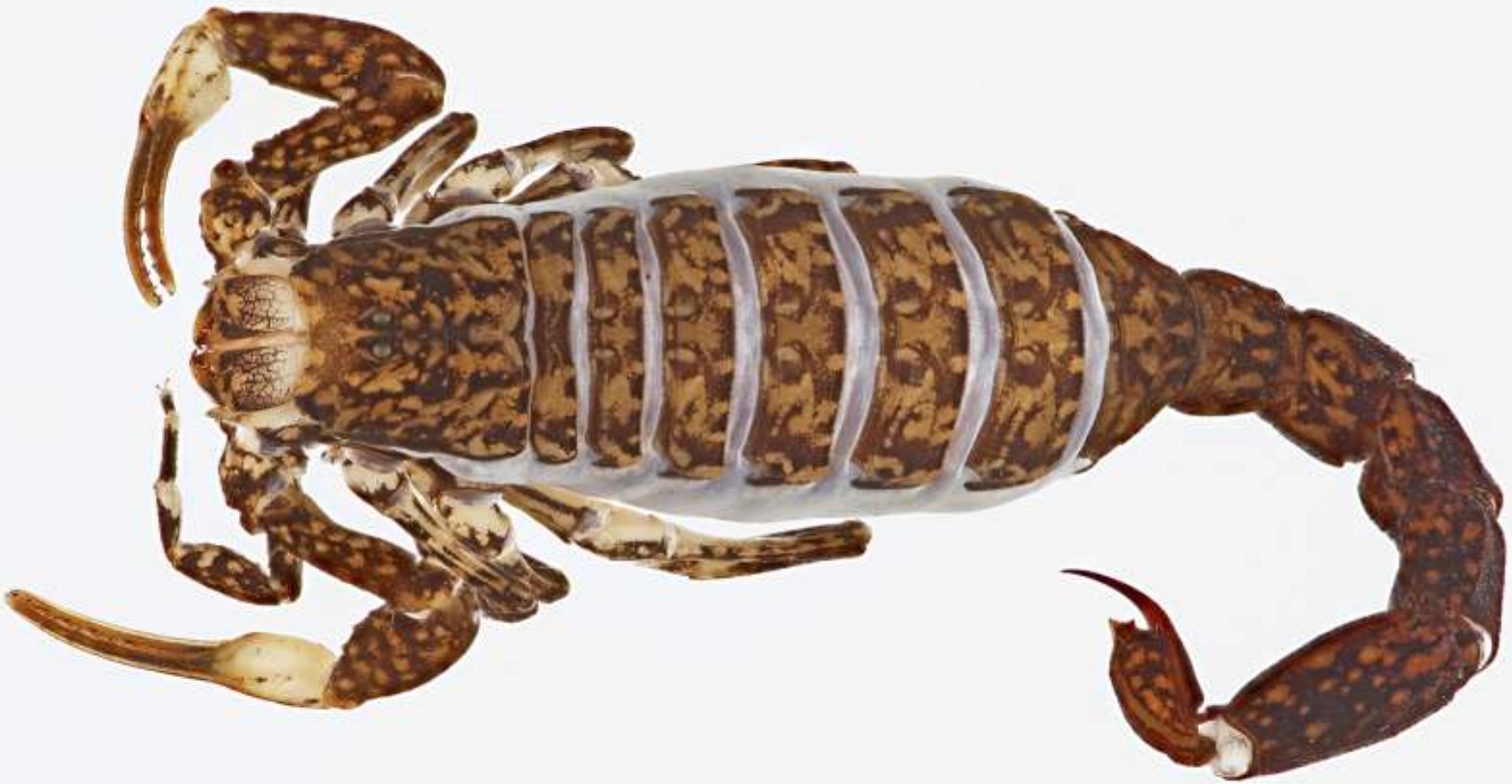



0.5 mm
Salticid_Face

A Survey of Taxa Imaged

SCORPIONS

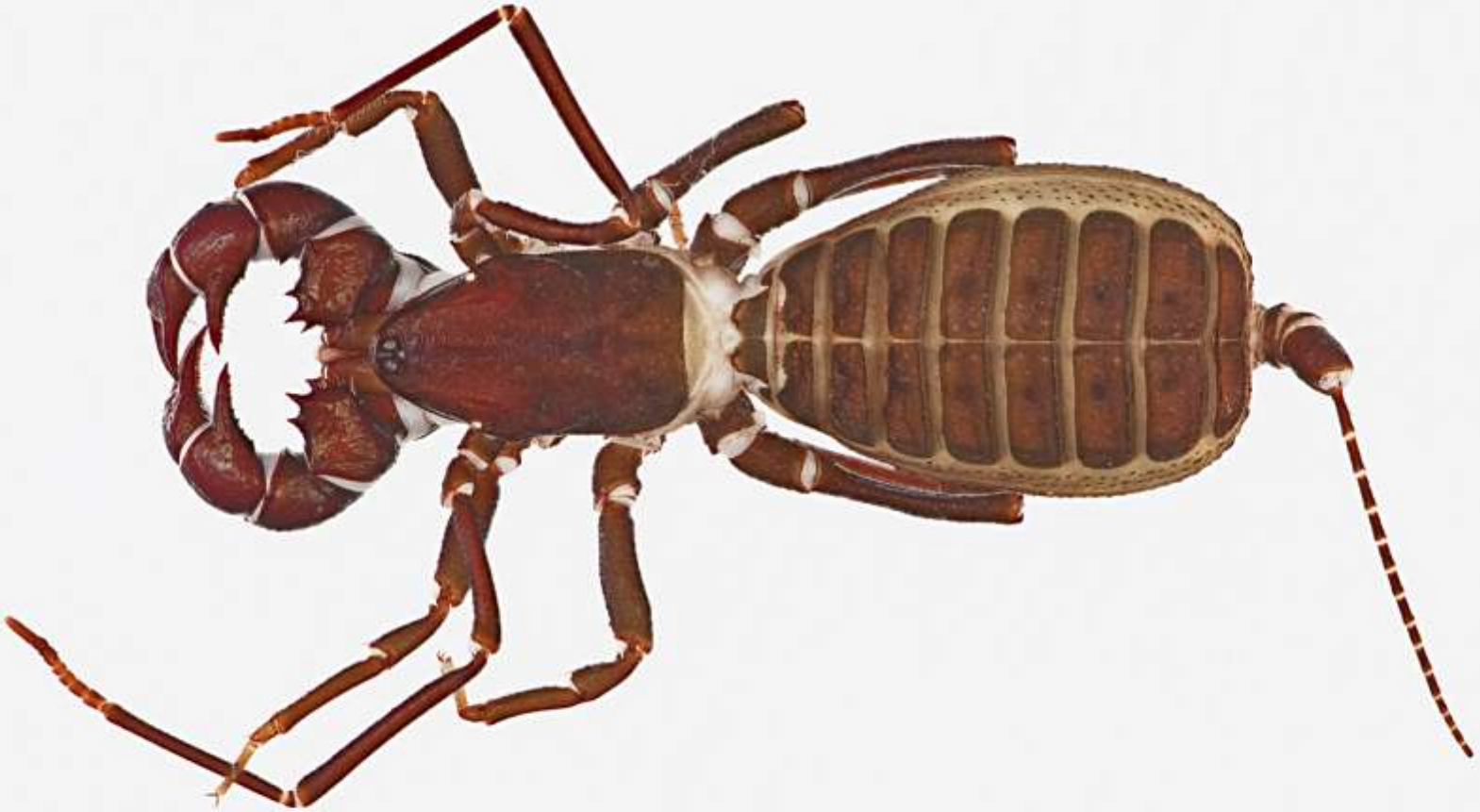
And other Arachnids



CASENT9043659_D

5 mm

CASENT9034224_D_1

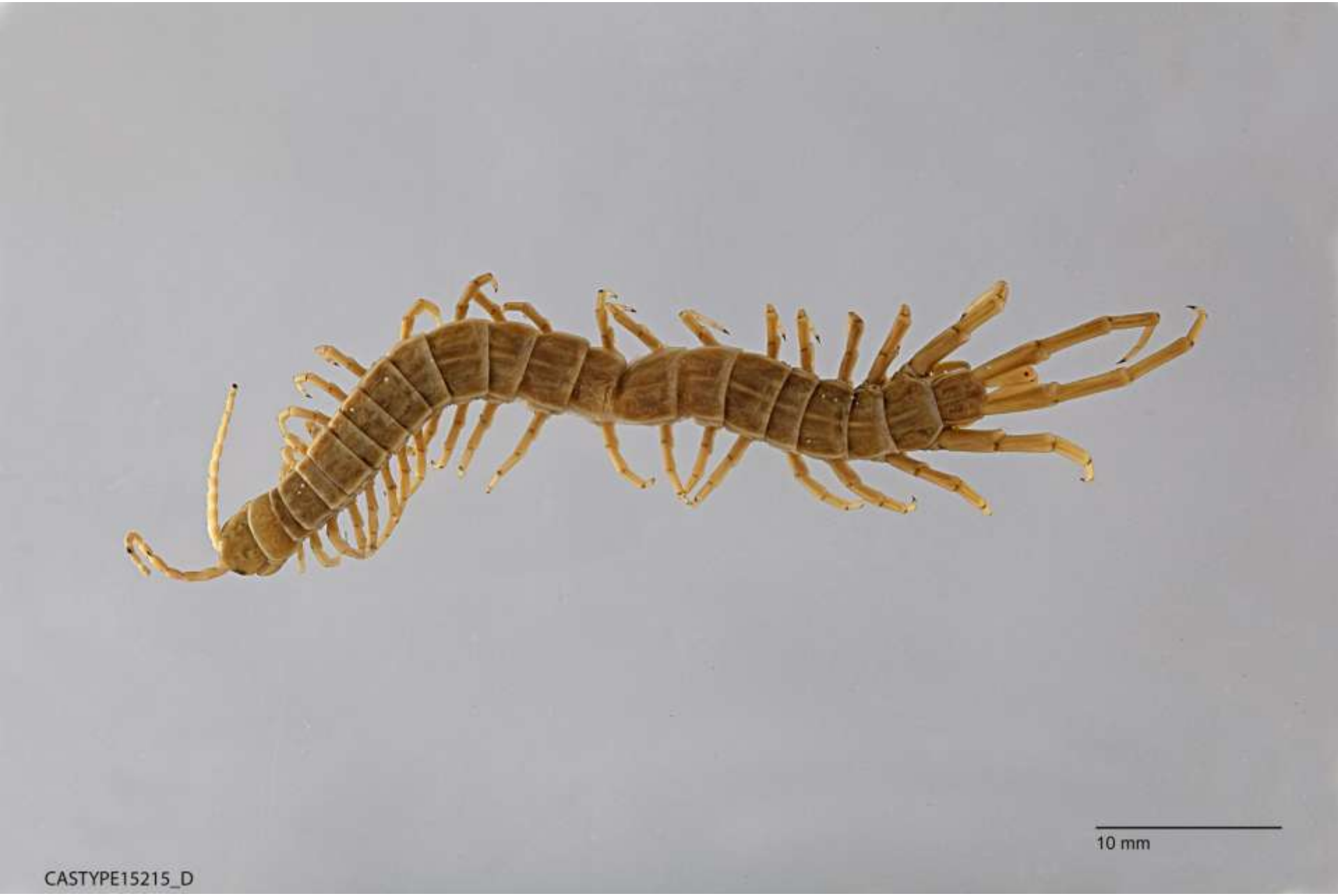


5 mm

CASENT9034224_D_2

A Survey of Taxa Imaged

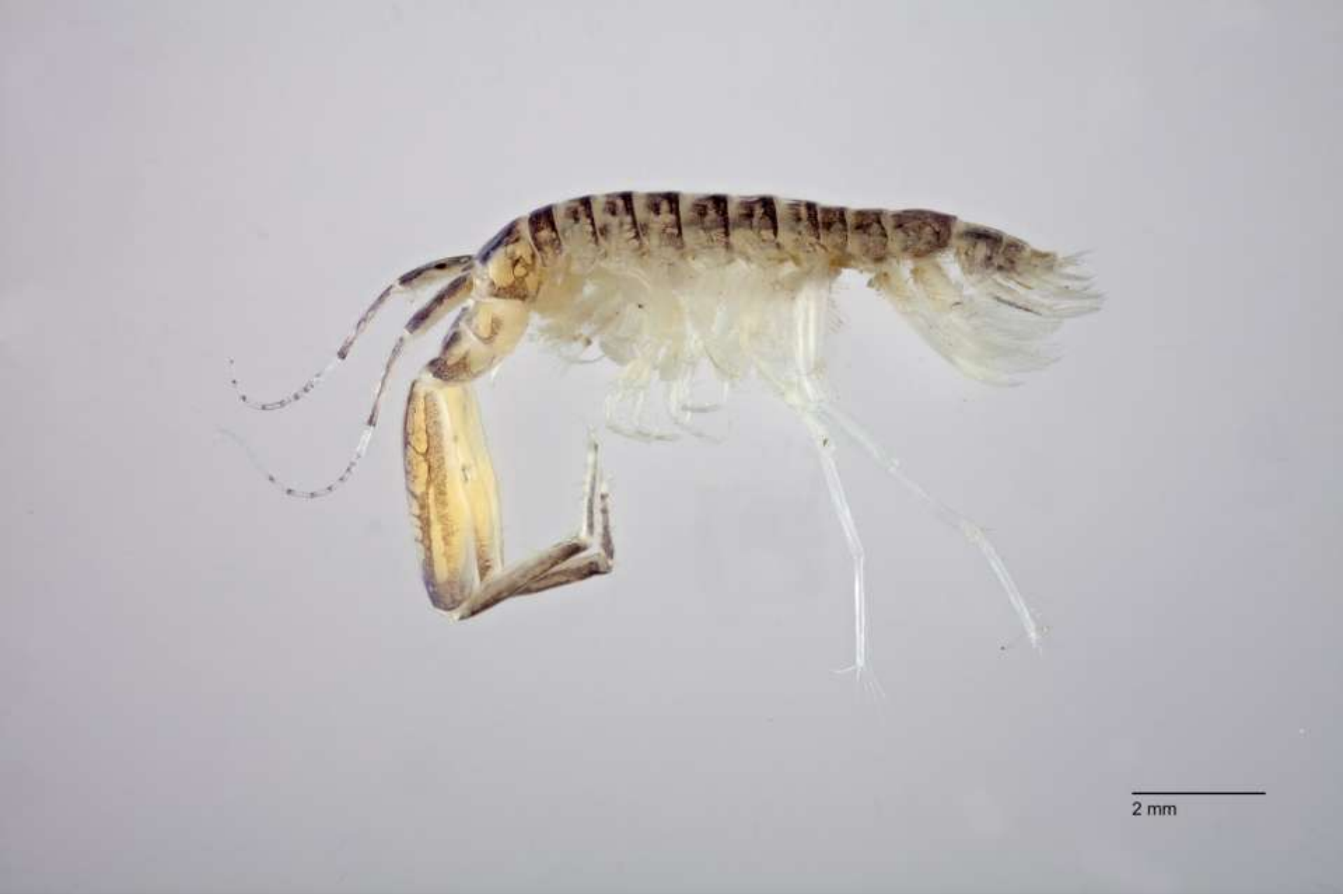
CENTIPEDES


10 mm
CASTYPE15215_D

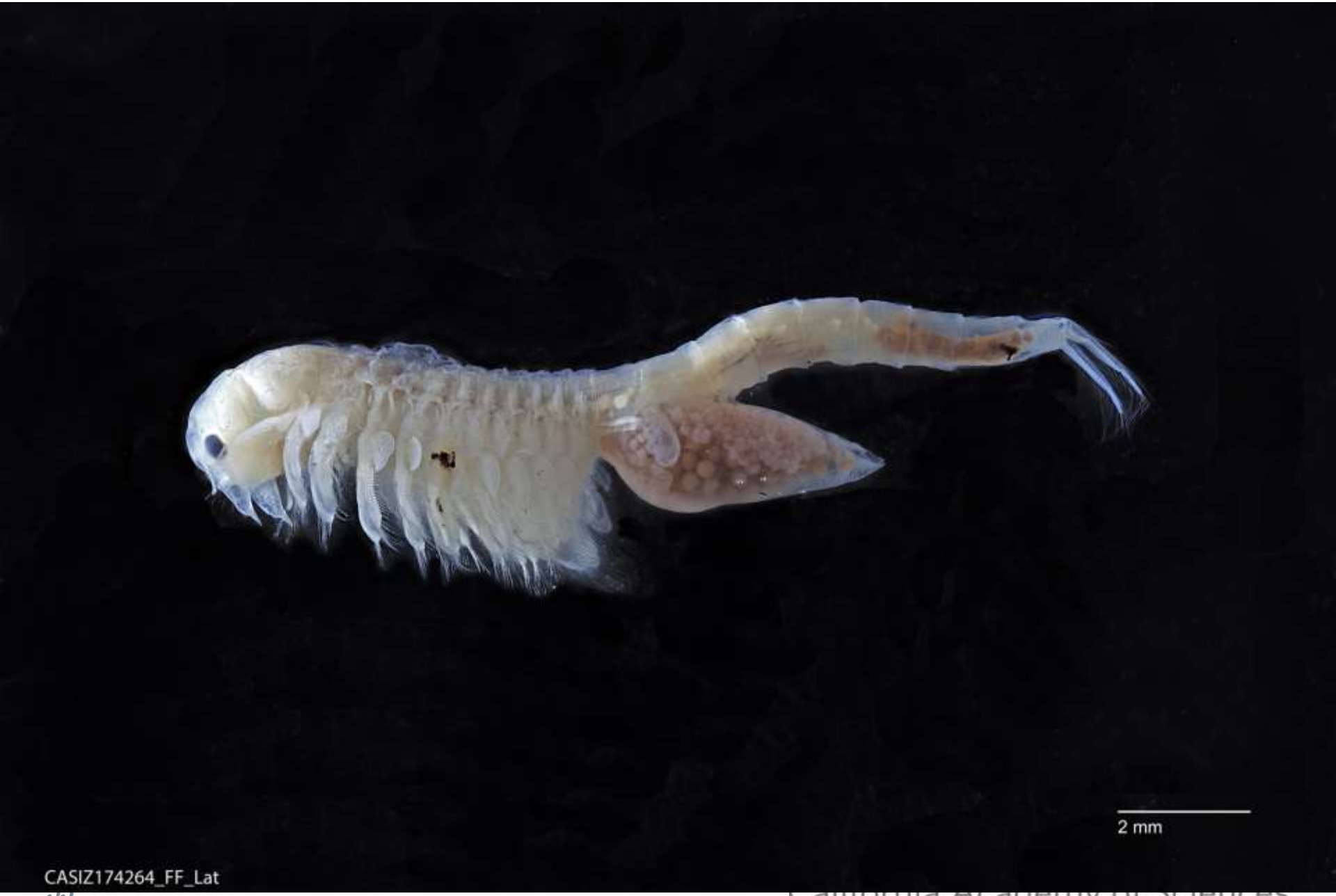
CASTYPE15215_V

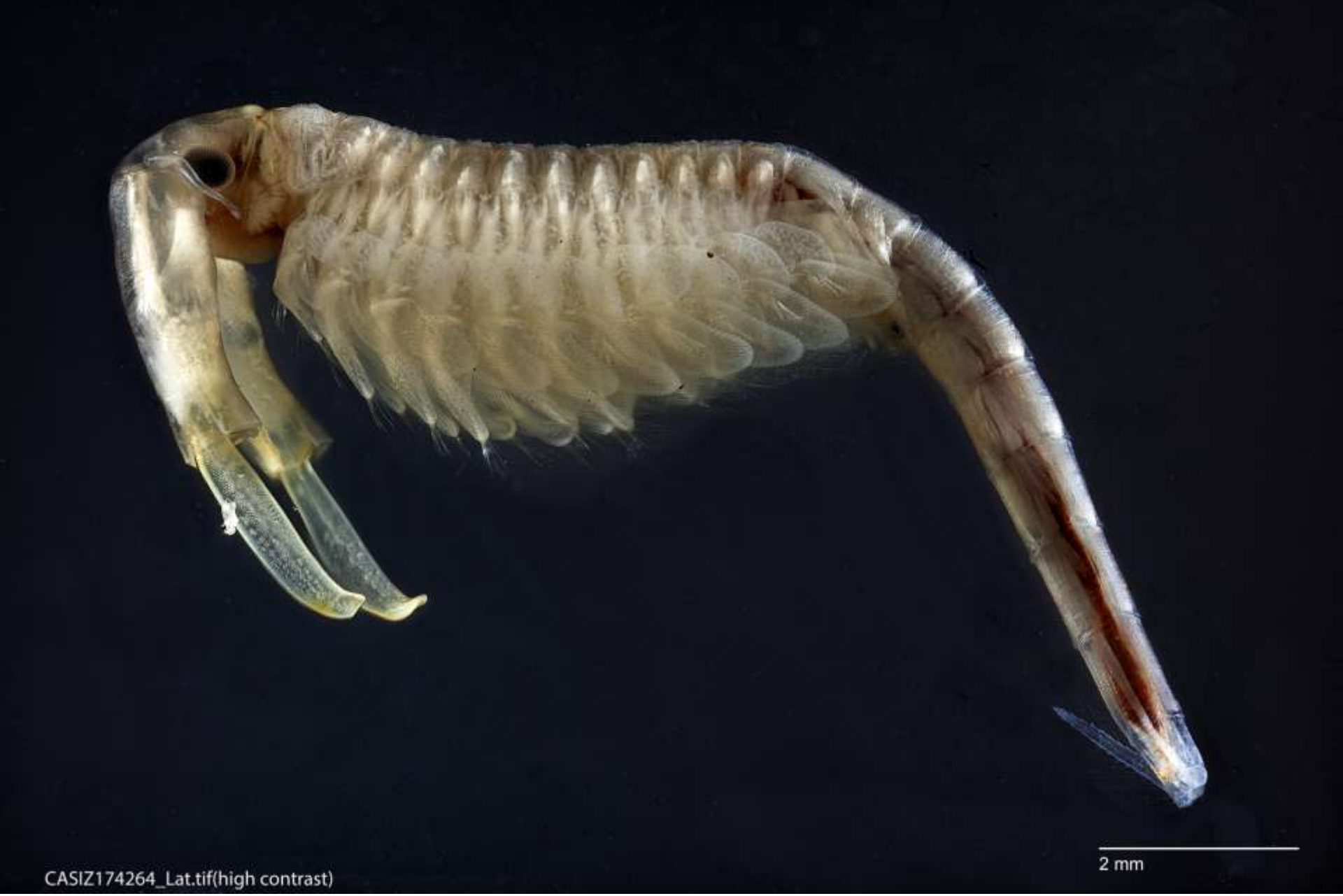
A Survey of Taxa Imaged

MARINE AND AQUATIC


2 mm


2 mm




2 mm
CASIZ174264_Lat.tif(high contrast)

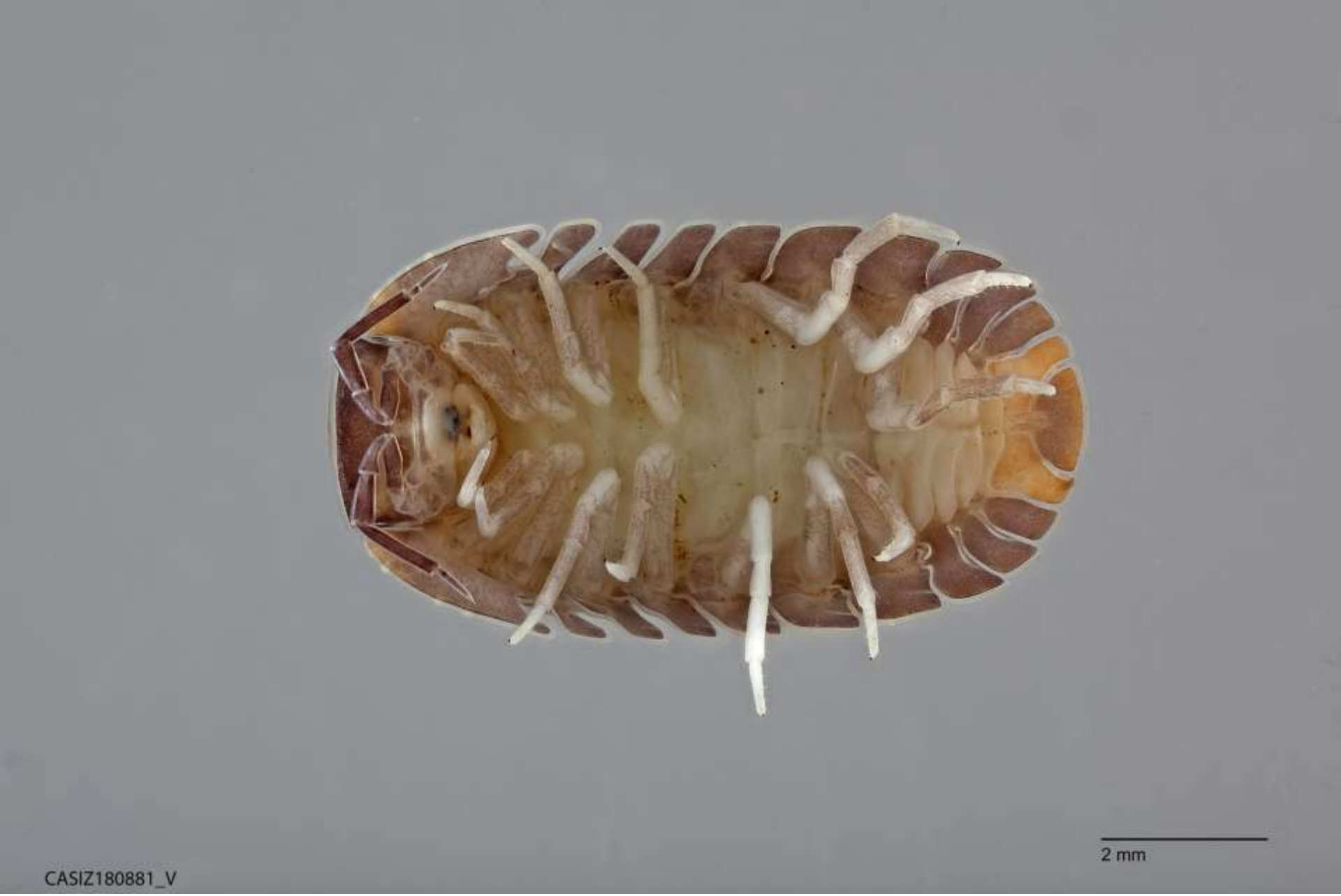
A Survey of Taxa Imaged

TERRESTRIAL

(LIQUID PRESERVED)


2 mm
CASIZ180881_D


1 mm
CASIZ180881_Face

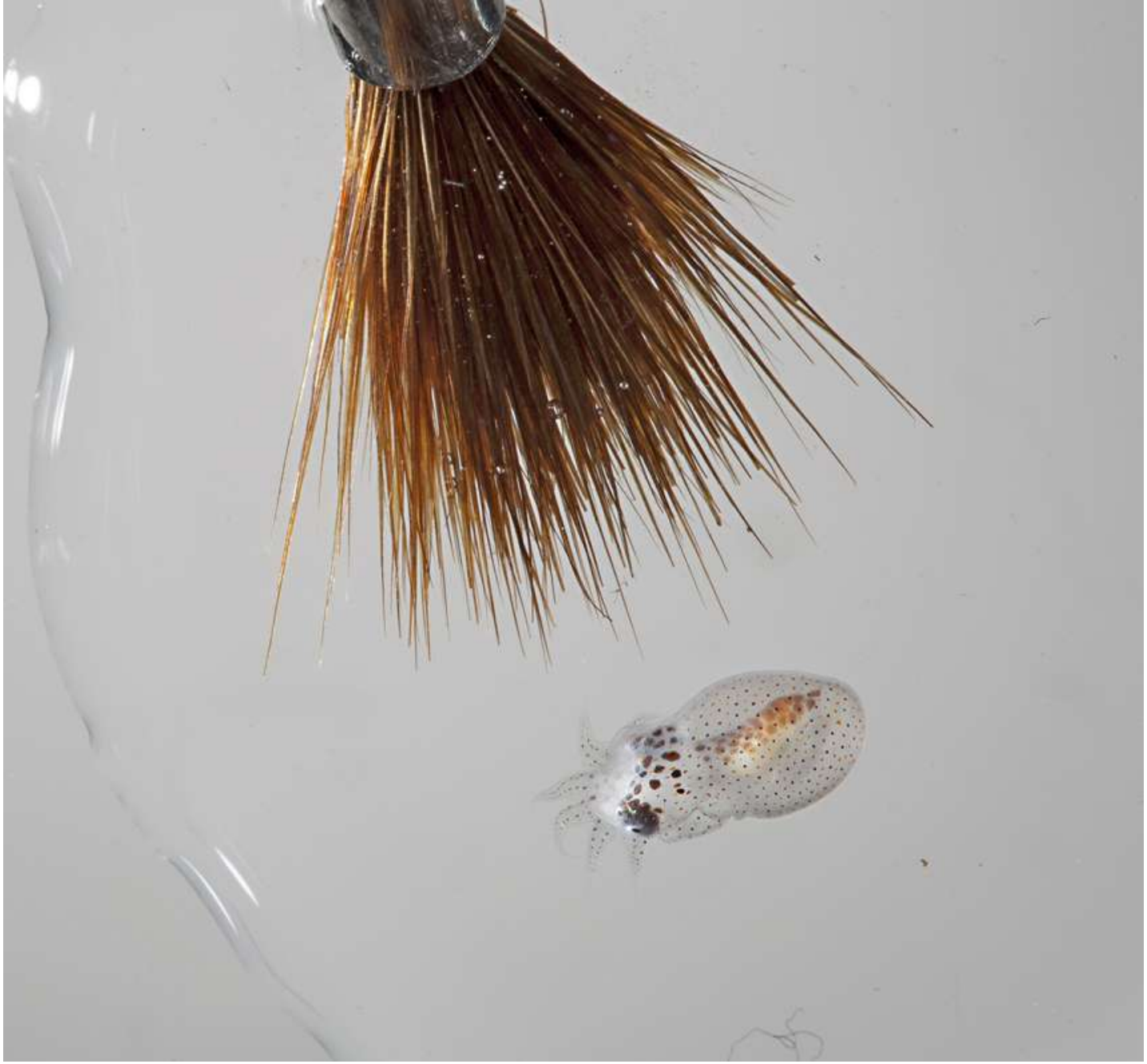

2 mm
CASIZ180881_V

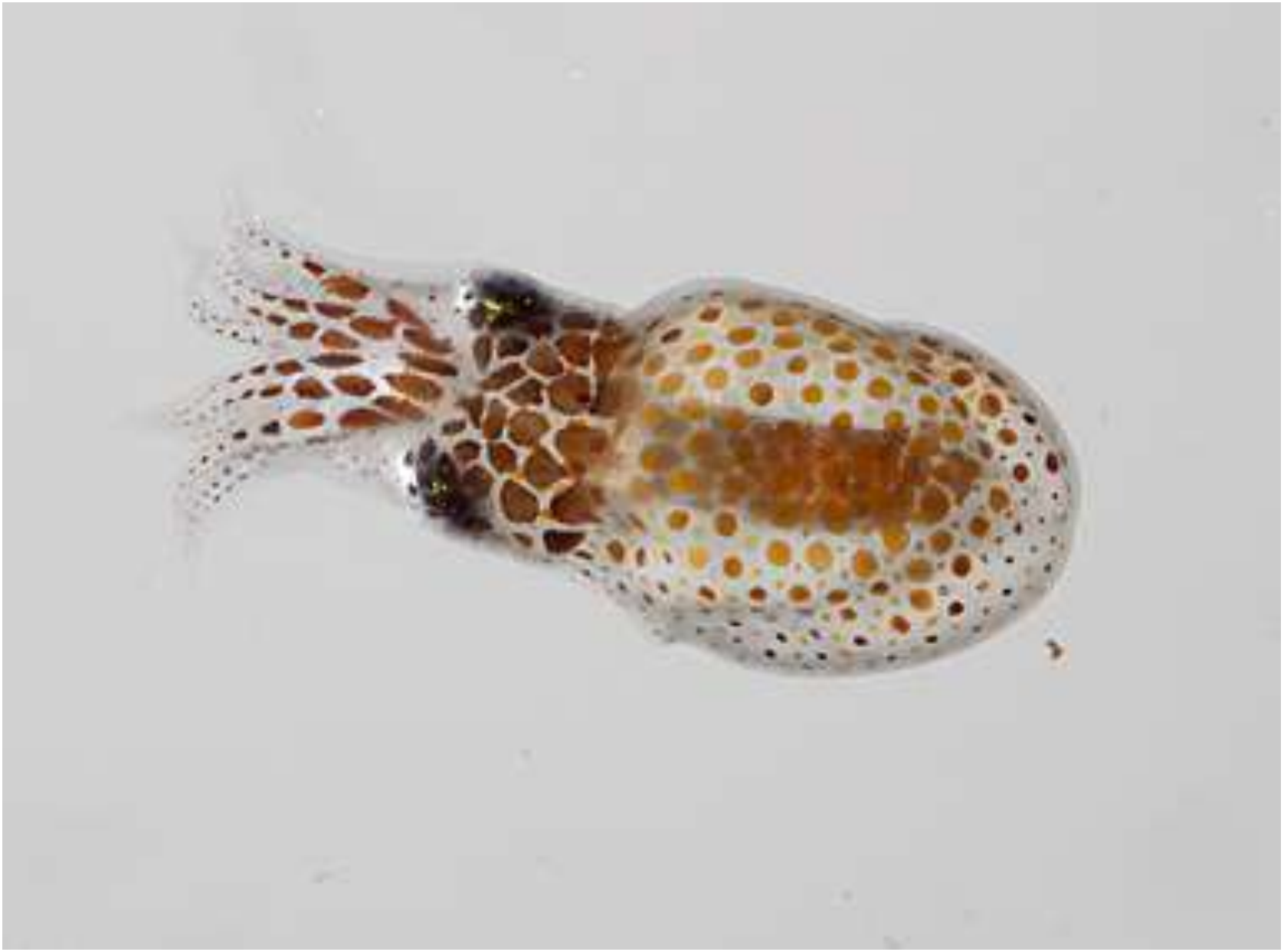
A Survey of Taxa Imaged

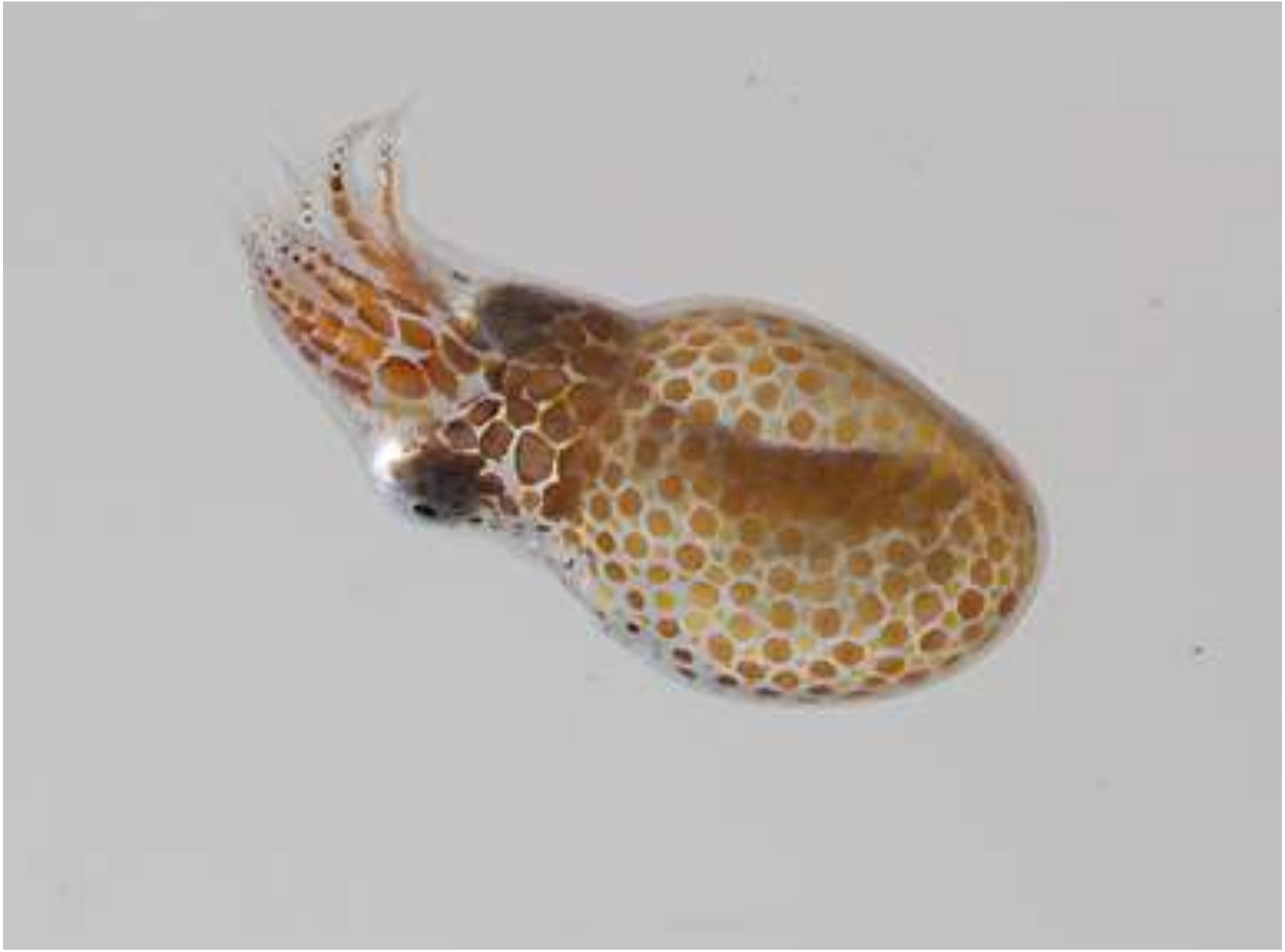
LIVE ANIMALS!

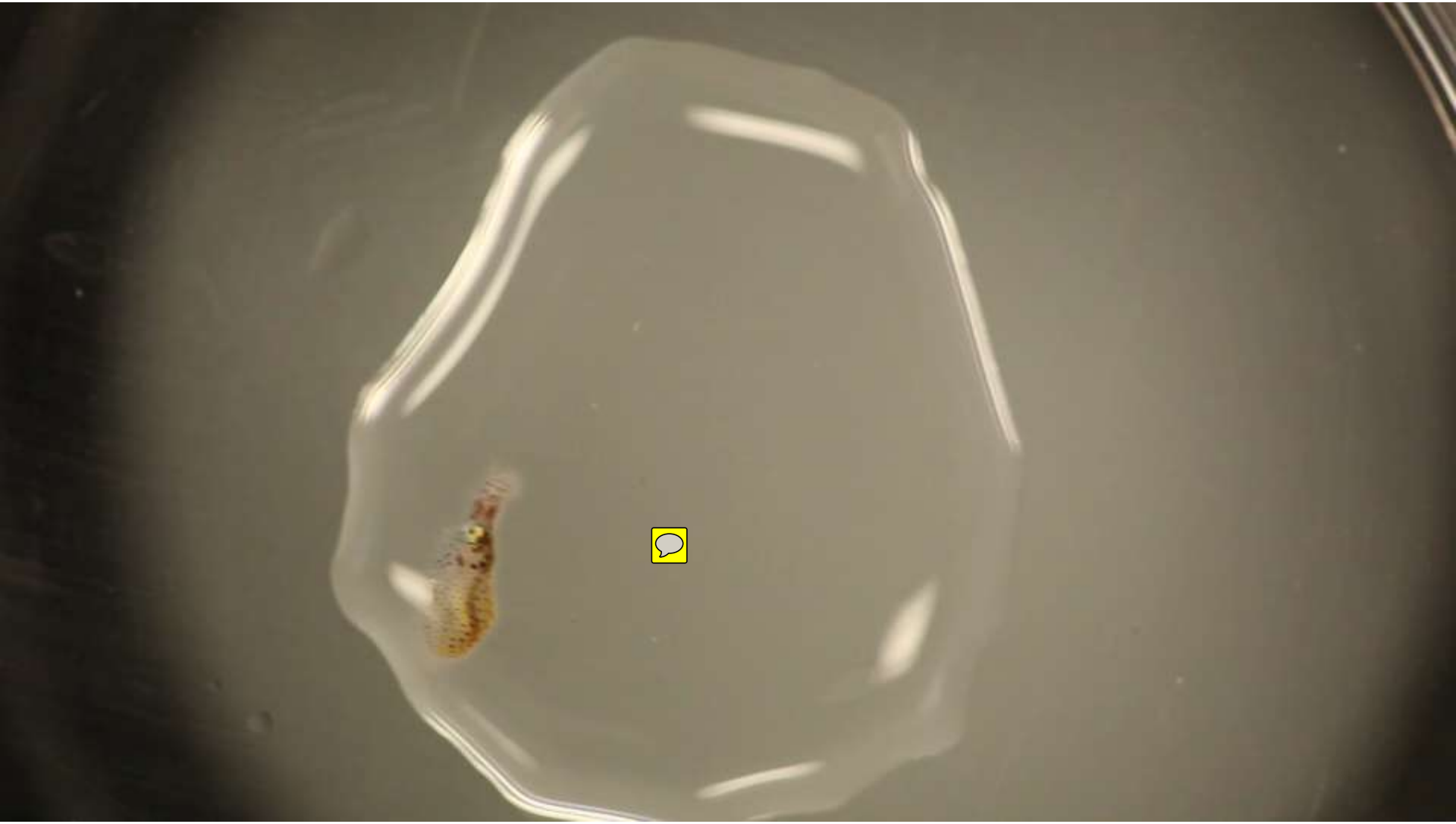
STILLS AND MOVIES

(movies won't work in PDF)









Wet Specimen Imaging at CAS

Going with the flow into the 21st Century

THANK YOU!

CALIFORNIA ACADEMY OF SCIENCES