HERPETOLOGY
Image Value/Research Questions

Pros/Cons for each type of image:

2D

- Easy accuracy of measurements (what you can per view at least)
- Cheaper, faster
- Uses: IDs of unknowns, some morphometrics, taxonomy, comparative IDs
- Maybe more important to have photos in life for vouchered specimens (provides color) - requires better curation - habitat photos too?

X-rays

- Cheap, easy
- Provides detailed characters

3D

- Much more utility for full sets of morphometric characters
- Cheaper and faster than CT scans

CT Scans

- Compare morphology/whole specimens to fossils - helpful for phylogenies and paleontologists
- Easier to compare across specimens/species
- Fix orientation problems
- Expensive - how to get around this?

Maybe a combo effort

- 2D of LOTS (how many?!), CT scan of representative samples

How to choose what to image?

- Maybe pick specimens that already have tissue samples (or other ancillary data), to balance that side of the science
- Representative of every family and genus?
- ALL type specimens? - not possible! - most won't have tissues, ancillary data, etc.
- Those that are present in GOOD phylogenies (and easily accessible to US museums)

Use of morphological characters (traits, features, etc)

- Time consuming
- "dying out" - how to reinvigorate?
- New species descriptions - increase speed of new pubs/discoveries
- If more characters were provided (via images) then they would get used more
- Need to add into more phylogenies (rather than just genetics) or map characters onto existing phylogenies
- Trait evolution
- Ontogeny
- Look for hidden trait diversity/radiation - good hook, but you don't know what you'll find

Other uses of images

- Assist paleontological and zooarcheological researchers - would require CT scans
- Making more data layers
- Photos in life:
    - Color images of types
    - Color photos of genetic vouchers (or call data) - send with the loan

How to make this much more useful for biological community? (not just the couple hundred herp systematists)

MAJOR QUESTIONS FROM HERP GROUP (as of 9:30am)

1. Resolving phylogenies that include fossils (so the fossil species can be better placed)
2. Trait evolution

WHAT WE NEED TO HAVE TO ANSWER THE QUESTIONS:

1. Digitizing photos in life, curate them well, and share them better
2. When choosing specimens to CT scan, pick those that are in well-resolved phylogenies AND have good ancillary data, like calls, sequences, tissues, etc. (types preferred, if possible) ---> “super specimen”
3. Of course, we will also take 2D photos of everything we CT scan

VALUE ADDED/BROADER IMPACTS:

1. Helps paleontological and zooarchaeological communities
2. Use scans for 3D printing, education, etc.