NOTES:

Collection Imaging Techniques at the Florida Museum of Natural History

Wednesday, November 9, 2016 (1-5 pm)
McGuire Center for Lepidoptera and Biodiversity Conference Room

Speakers: John Slapcinsky, Gustav Paulay, Stacey Huber, Geena Hill, Zach Randall, Verity Mathis, Jon Bremer, Sean Moran, Ronny Leder, Jeff Gage, Kristen Grace, Ed Stanley, Warren Brown, Kevin Love, Alex Thompson

Participants: Akito Kawahara, Jaret Daniels, Donna L. Ruhl, Elise LeCompte, Alexis Rojas, Larry Page, Cathy Bester, Hongshan Wang, Tom Kyne, Nameiko Hall, Shelley James, Terry Lott, Cat Chapman, Denise Tan, Rebecca Koll, Chris Hamilton, Samm Epstein, Han Meng, Debbie Matthews, Hannah Owens, Maria Fernanda Checa, Jim Schlachta, Irv Quitmyer, Rachel E. Narducci, Mingwan Li, Dave Hackett, Vijay Barve, Adania Flemming, Jackie Miller, Amanda Bemis, Jon Bloch, Charlie Covell, Brian Stucky, Oliver Keller, Joe Martinez, Susan Sorrell

John Slapcinsky
Invertebrate photography
- 600,000 georeferenced lots from Specify
- Invertebrate photo library:
    - 300,000 photographs
    - Most are not in situ
- Use field numbers for photographing (specimen specific)
    - Helps to track during the process
    - Also use station numbers (station specific)
    - Two copies: one for specimen, other for DNA subsample
- Preserved specimens: color and form often lost
- Live animal photography in lab
    - Need flashes because animal moves around
    - Small aperture
    - First photograph includes field number and scale
- Photos:
    - Uniform background (black or white)
    - Elevated wet tank about black velvet (wet)
        - Wet velvet to reduce glare from bottom of tank and texture
    - Flashes on either side of tank on gorilla pods
    - Diffuser paper around specimen for even lighting
    - Sylgard for pinning out dissections for photos

Gustav Paulay
Workflow for imaging invertebrates in lab and field

- Every species gets a voucher, tissue sample, and photo if things go well
- Large scale sampling of biodiversity
    - Triage at all levels
    - High throughput including photography
- Photo triage
    - Impacted by collection → in situ
- Photography is a great way to record diversity on species if you can't collect
    - No voucher
    - Could take tissue sample
- Lose information when collected
- Dive with the camera
- Habitat shots are important
- Lose a lot of information when you bring certain specimens back to the lab
- Voice notes are important
- Associate photo and specimen in database quickly
- Dedicated photographer in the lab
    - High throughput
    - Specimen label doubles as scale and colors scale
    - Dark background doesn't work great for transparent
- Photomicrography
- Photo tracking
    - Rename image files with unique identifier
    - Associate photo number and specimen number in data sheet
- Photo relabeling

Stacey & Geena:
- Whole drawer photo prior to removing specimens
- Image each specimen with labels
- Take dorsal/ventral photo (2 photos per specimen)
- Raw + JPG
- Storage: 1 TB on P Drive
- Specify and Symbiota databases
- Several Digitization set-ups at the McGuire Center
    - Wing Venation: Involving pinning specimen to opaque acrylic sheet and positioning external flashguns in front of and behind the sheet. Results in a complete white background and can be overexposed to bring out the veins in the wings.
    - Light Box set-up aka Digitization Set-up
- Digitization Set-up is worked by 2 people and it consists of 2 stations:
    1. Specimen Prep Station: unit tray, scissors, modified flat forceps, barcode labels, and 2 gray platforms
    2. Imaging Station: Canon 7D with 60mm macro lens, copy stand kit, camera tethered to PC, light box, glass, gray foam liner, scale, color card, unit tray, forceps, putty

- 2 specimens are being prepped and image simultaneously; a rotation of Removing, Placing, Imaging, and Replacing
- Labels are imaged along side of specimen
  - Labels are removed in order and placed in order upon raised gray platform with the addition of the barcode label which is placed last
- File naming consists of collection code MGCL; catalog number, seven digits; gender ID, M or F; and Dorsal or Ventral side.
  - Example: MGCL_1004913_F_V
- Workflow:
  -Taking images that incorporate specimen with labels; allows having labels transcribed from the photo.
  -Utilize Notes from Nature, WeDigBio events, and of course our amazing volunteer team to transcribe.
  -Notes from Nature will be exported into Specify and into SCAN/Symbiota.
  -After it will be published onto iDigBio and GBIF

Zach Randall:
- Vertebrate imaging techniques
- Photo e-box: good for 2-D dry specimens
- Copy stand vs. light box
- Squeeze tank: glass/plexiglass tank with silicone and moveable glass plate to "squeeze" specimen in place
  - Distilled water
  - Dorsal, lateral, and ventral views easily obtainable
  - Helps to prevent specimen from drying out
  - Can photograph anything in ethanol with this setup
  - Flash and natural lighting
  - RAW + JPG
  - Automatic white balance
  - Storage (external hard drives and Project Drive)
- Color choice for background is extremely important
  - Got to stick with the same color background
- Add _USE at end of image file for database

Verity Mathis
- Cam lift on steroids in back of mammal range
- Full automated
- Canon 5d ii for macro (good for larger specimens)
  - 35mm lens
  - 50mm lens
  - 100mm lens
- Microscope attachments
- CamLift v2.7
- Adobe Lightroom 5 - viewing images

- Helicon Focus 5.3
- Camera range is open to anyone at FLMNH
  - Google calendar for reservations
  - Email Verity for access

Jon Bremer
- Focus Stacking
- Equipment: Computer, Software: USO utility (live view shoot), camera, light source
- First step: Specimen preparation
- Clean specimens; with paint brushes, tweezers, cleaning solutions
- Second step: Positioning
- Clamp hands, foam blocks,
- Third step: Lighting
- Lights and diffusers. Diffusers decrease the glare and create even light.
- Fourth step: Take photos
- Automatic mode or Manual for taking stack photos
- Take as many slice photos as possible, the more steps (photos) the better
- The camera and computer will automatically create the photo
- Choose render method and it will stack to create final image: A or B
- Errors to avoid: too few slice photos, blurry edges, dirty sensors/lens, reflective pins

Sean Moran
- Choosing where to start; specimen selection
  - Funding
  - Overarching Goals
  - Complete Specimens
  - Representatives of the whole collection
- Equipment:
  - Copy Stand
  - Camera; 105mm to 60mm lenses utilized. The 60mm is used for 60% of the specimens.
  - Lights from Top Left and Bottom right; standardizes highlight and low-light, which helps with morphological features
  - Camera Control Pro-software; camera is tethered to computer
  - Sand box, sandbag, clay; for positioning
  - Light and dark felt background
- Process of taking Photos
  - Specimen Staging; important views (avg. 4 views per specimen)
    - Scale bar
    - Clean felt overlying sandbox
  - F18 to F21; Shutter speeds changes
  - 3 images taken; different shadows for each
- Post Imaging

-1 of 3 converted from .nef to .jpeg
-Post-processing using Photoshop is done to clean background
- Data storage stored on project drive; all 3 Raw images are stored
- High and low resolution images--- database and print
  - Warren: low-res jpegs for Specify
- Databasing: Used Excel, but now access to excel sheet that links to the Specify database
- Specify database went live a few months ago
  - Viewable on FLMNH site

Ronny Leder
- Create a database with a digital image
- Pre-digitization curation
  - Specimen curation starts in the field; take notes and pictures
  - Make sketches; include scales and benchmark
  - Geolocate; use cell phone
- Back home
  - Clean and prepare specimen; also repair
  - Type all data into database
  - Label- double check database
- Imaging; find setup
  - Good stable tripod; avoid camera shake OR
  - Selfie stick; box and sandbag to hold the stick in place
  - Use Cell phone camera
    - Different apps enhance quality
    - Attachable lenses; snaps on phone
  - Pop-up mesh light box OR
  - Plastic tupperware box; lights on the side create a lightbox
  - Lighting, have stronger lighting from upper left and low lighting from lower right
- Play around with camera's shutter speed, aperture, and ISO.
- Post-processing programs for images: GIMP, Paint, Pixlr, PS Express, Photoshop, etc.
  - Magic wand = your favorite tool
  www.myfossil.org

Jeff Gage
- Make your own copy stand; glass, boxes, paint cups, background paper or fabric, helping hands, etc.
- Play around with copy stand
- Key is to raise specimen from background
- Camera type: Nikon
- Use color card
  - Color check in Lightroom to remove light poisoning

- Images go to Lightroom
    - Light room shoot and catalog simultaneously

Kristen Grace
    - Metadata- applying to images to preserve data content, id, fact checking, etc. as well as tracking
    - Consistent metadata
        - How to be consistent: Time/Date stamp on camera
    - Lightroom-photo editing software; it also catalogs images in various ways; adds metadata, captions and keyword to images
        - It is a virtual space; light room is pulling a virtual copy
            - The raw file remains <u>unedited</u>
                - Always want to preserve original RAW file
    - When using Lightroom you want to create a plan: An action plan, consistency with workflow
        - Filename-ing: Rename upon import
            Example: 1608120001, when it was taken
        - Folder filing: All shoots are filed in separate folders
            Example: parent folder
            2016
            8-12_Nature_Photography_Camp
    - Keyword hierarchy: create a plan; a standard;
        - You can create a keyword list
    - Keywords - cluster images taken
    - Create a Metadata preset: for each photographer- this will live with any image
        - You can go directly to that person with questions
    - Lightroom lets you add as much metadata as you want
        - Example: Email address
    - When editing photos in Lightroom, it is good to remember that it does not work in layers
        - You can take the image to photoshop and then photoshop back to Lightroom

Ed Stanley
    - CT Scanning = We all have access
        - Machine: GE V|tome|xm240 CT Scanner
    - X-ray files: Slicing through the specimen
        - It is an x-ray machine, but the difference is x-ray is 2 dimensions, while the CT is multiple 2 dimensions
        - Non-destructive way of scanning all different parts of the specimen
            - Digitally dissects the specimen
    - Numerous types of analysis
        - Novel measurements, quantitative analysis, fast and accurate results, Easy to disseminate, 3D printing; use for teaching purposes
    - Cost = Not free for internal users ($30/hr.)

     -Huge data sets
     -Need very expensive computers
  -Request to use CT
   -Nano-CT and 3D printer: https://rsc.aux.eng.ufl.edu/
      User panel → Equipment → request service quote (can see if available)
      Also can contact: Gary Scheifele 352-281-8262 (personal cell!)
      -Contact Elise LeCompte- for badge information; for scanning
      -Planning the scan
        -What measurements
        -What questions are you asking
        -How many specimens need scanning
        -Optimization: resolution, spatial resel, contrast, noise, speed
   -Data Handling; an issue
    -Lots of Files
    -Lots of Memory
    -EX FAT format is the best
      www.Morphosource.org → disseminating photos, track usage of data

Warren Brown
Specify and Images

How to get images into specify
- Can import inside of collection objects
- Shouldn't be large quality images
- Not meant for archiving images
    - Takes too long to render
    - Stored on remote server, not on your disk
- Quick and easy reference to collection objects
- Can attach images to locality
- Jpg or png best for preview
- "Attachments" - can view all images on web portal
    - Choose attachment destination
    - By field number, catalog number, filed number, guid, taxon name (can attach to taxon node)
- Mapping file - catalog number to point to other objects
- Help cast series on Specify website
- Schema exports for IPT for DarwinCore mapping
- Data exporter tool
    - Takes data out of specify and transforms it to darwincore
    - Can automate it
    - OMT needs to manually create the build for images
- Specify web portal
    - Will publish images
    - Downside: publishes all images on one page
    - Can't search exif metadata

- Can build awesome queries
- No download
- Can't send images from Specify to iDigBio
    - Image ingestion through iDigBio
- Publish AudubonCore (Specify doesn't make this right now)
- Image attribute table: can create new fields in schema
    - This is where to find metadata
- Priority for OMT to finish migrating all of FLMNH collections

Kevin Love / Alex Thompson:
- Don't actually give data to iDigBio, you publish data - then tell aggregators that you've done that to smash it all together to present it as one large dataset
    - You are the publisher / journal - you maintain that dataset longterm
- What is required metadata when you share with an aggregator?
    - ID: coreid of the specimen it links to
    - Identifier (GUID) - globally unique ID
        - Most people don't use GUID to search for data; search by metadata
        - Catalog number is not your identifier, it's something you search by
        - Prefer UUIDs with a prefix (extremely long name)
    - Format (image/jpg)
    - Access URI (public path to your best quality jpg) - where its located online
        - Doesn't have to be anything within FLMNH, can be in something like MorphoSource
        - STL files: binary representation of 3D file that you can manipulate
- Ways to get media to iDigBio:
    - Symbiota
    - AudubonCore
    - Media appliance
- IDigBio is not the repository, but they do store a copy of your RAW files
- Prefer that there is metadata associated with specimens

Tagging information in Lightroom is very useful
- Morphbank - image databasing and research project out of FSU
- Would like to get this information out and to the public

DISCUSSION:
- Division codes: OMT already uses this
    - Ask Warren for collection code if you don't know
- Naming conventions:
    - Warren: standard naming convention needs respective catalog naming
    - There are individual collections within divisions
    - Include division and collection code in name
    - There are ranges that have more than one collection database

- UF_Herps_CollectionCode
- Alex: don't put any of this information in your file names!
  - The least information that allows you to still use the files, the better off you are
  - Don't put genus and species in the file name, or anything else that is subject to change
- Image gallery issue: photographer copyright

Questions:
***What about consistent file naming for FLMNH?
Color checking in photos