



# Invertebrate Zoology

Workflow and Digitization with  
marine invertebrates





# So what is in the Invertebrate Zoology collection?

- Primarily marine
- But... no fish or marine mammals or molluscs... so what is left?
- 18 major groups of animals (phyla)



# How do you handle a multi-phyla marine collection?

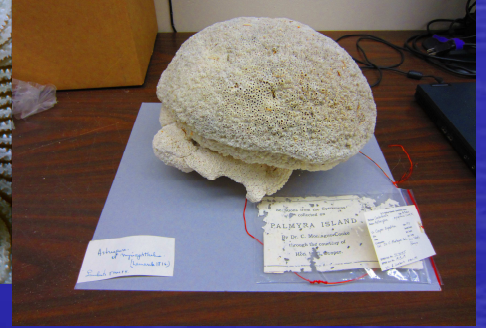
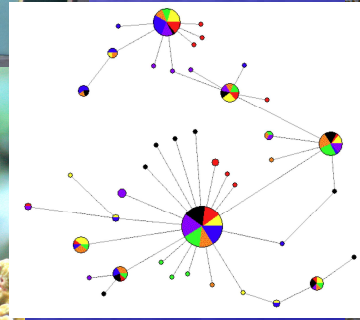
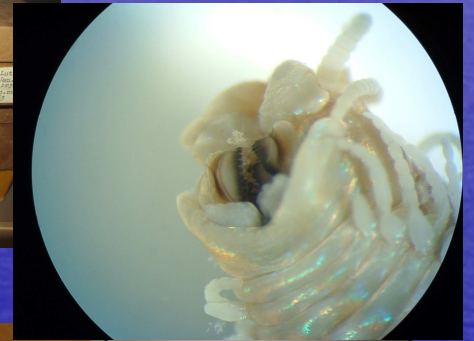
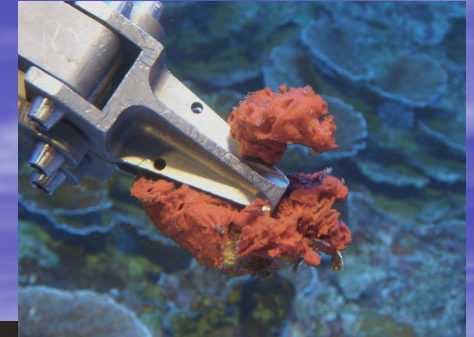
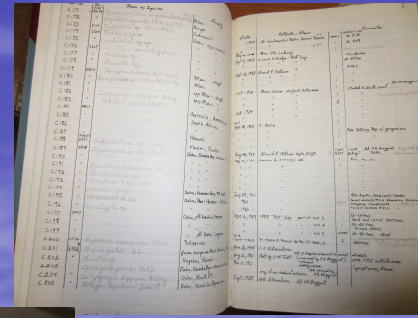
## Physical Specimens

- Wet 3D specimens (EtOH)
- Dry 3D specimens
- Parasites
- Tissue Samples
- Microscope Slides
  
- Single vs. Lots
- Very large and very small
- Multi-phyla (different preservation techniques)
- “Many to many” relationships

## Data and Media

- Field Notes, Photos, and Videos
- Database Info (Event Data)
- Lab Notes, Photos, and Videos
- SEMs, DNA, other specimen analyses
- Reports and Technical papers
- Correspondence
- Historical documents





A little overwhelming?



# Basic workflow for a collection (in a perfect world):

1. Collected specimens are accepted into museum or registered institution
2. Specimens are inventoried, processed, and **completely curated**
3. Physical specimens integrated into collection
4. Specimens and all associated data and media made available for scholastic and research purposes



# What does “complete curation” entail (present day)?

- The long term preservation and permanent storage of physical specimen

*AND*

- The collection and management of all data and media associated with the physical specimen- *this is the hard part, but also where **digitization** comes in!*



# Digitizing Collections

We will skip over the processing, preservation, and permanent storage of the physical specimens and elaborate on the other essential part of complete curation

## DIGITIZATION

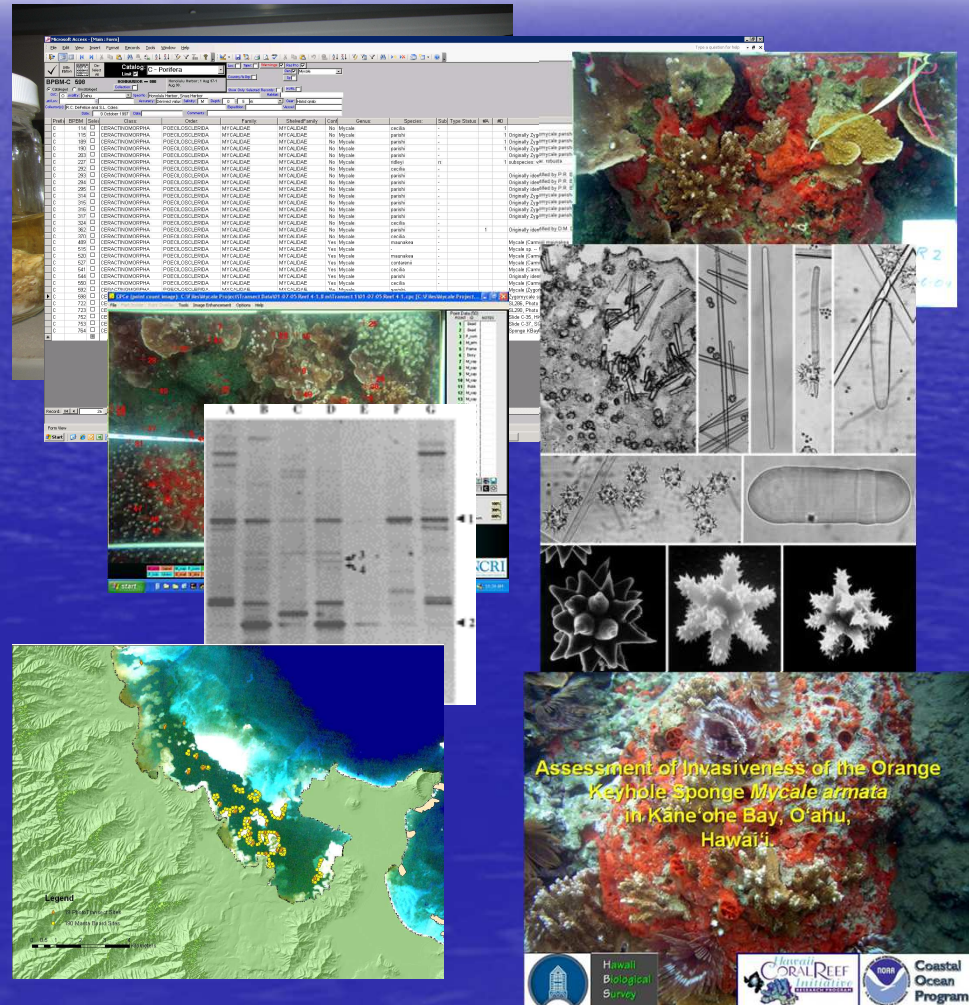
This use of the word refers to the **acquisition** and **management** of *all digital data and media* associated with a physical specimen- not just images!!!



# End result for a digitized specimen (in a perfect world)

Physical specimen (or lot) with:

- Complete event information (time/place) entered into digital database
- All digitized field photos, notes, etc
- All analyses of specimen (taxonomic ID, SEMs, DNA, chemical, etc)
- Reports, technical papers, monographs, etc
- All specimen images



# How do I get there? Where do I start?

## Must Haves:

1. At least a basic digital database for specimens (with unique identifiers)
2. Server or other digital storage space adequate for your digitization requirements
3. Basic methods and workflows for organizing multiple media types
4. Basic digitization and imaging equipment

## My Wish List:

- Complex uber-database (e.g. Explorer's Log) that can quickly and easily link multiple media types with specimens
- Large server space- the more the better with pictures and videos and scans
- More efficient methods for organizing and managing multiple media types
- High capacity equipment for efficient digitization of physical media such as documents, slides, and film photos
- Advanced imaging equipment setups to produce high-resolution digital images/videos of physical specimens more efficiently



# How do I get there? Where do I start?

## To Do List (Must dos):

1. Set up, populate, and manage specimen database
2. Follow (or create if necessary) protocols to store and organize digital media so that it can be easily linked to specimen database
3. Follow (or create if necessary) protocols for digitizing physical media and imaging physical specimens
4. Digitize and image as much as possible- But choose projects that are doable!

## My To Do Wish List (if I had more time or staff):

- Enter **every** specimen in the IZ collection correctly and completely into the specimen database
- Have **all** digital media organized and linked to appropriate specimen database records
- Have **all** physical media digitized and organized
- Have **all** specimens in collection imaged

# How digitized is the Invertebrate Zoology collection?

## The bad news ☹️

- Half of specimens databased only (~33000 cataloged lots)
- Less than 10% of databased specimens imaged
- Less than 5% of photographic specimen slide collection digitized
- No historical labels digitized... yet
- No links between media and specimen database... yet
- Departmental Staff of 1 (for now)

## The good news 😊

- Have equipment for digitization and imaging (slide scanner, document scanner, basic specimen imaging set up, photo montage set up)
- Have various types of media to link with specimen database- organized at basic level
- More efficient protocols and workflows for imaging and digitization (image libraries, media labeling protocol, photomontage workflows)
- New uber-database is being built (near completion) that will accommodate multiple digital media and will link to our specimen database
- New staff and excellent volunteers to help with the workload



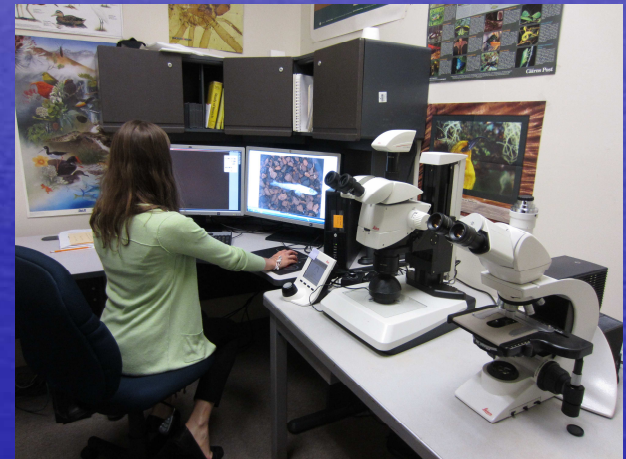
# Imaging Marine Invertebrate Specimens- why less than 10%?

Specimens not dry and flat (like pressed plant sheets), so no standardized setup for imaging

- Wet (sea water, formalin, EtOH)
- 3D- all shapes, sizes, textures
- Only thing in common- no vertebrae
  - Soft jellyfish
  - Spiky sea urchins
  - Tiny amphipods and giant spider crabs
  - Delicate sea fans and gold corals

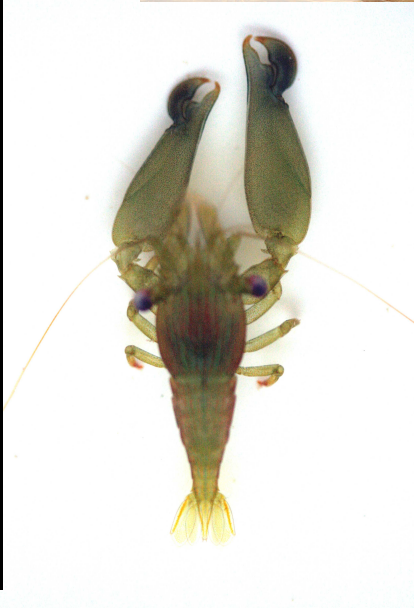
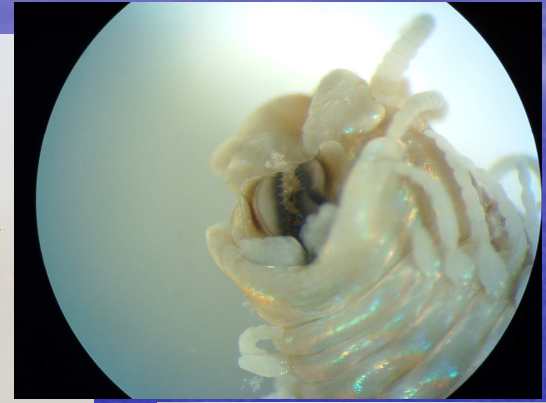
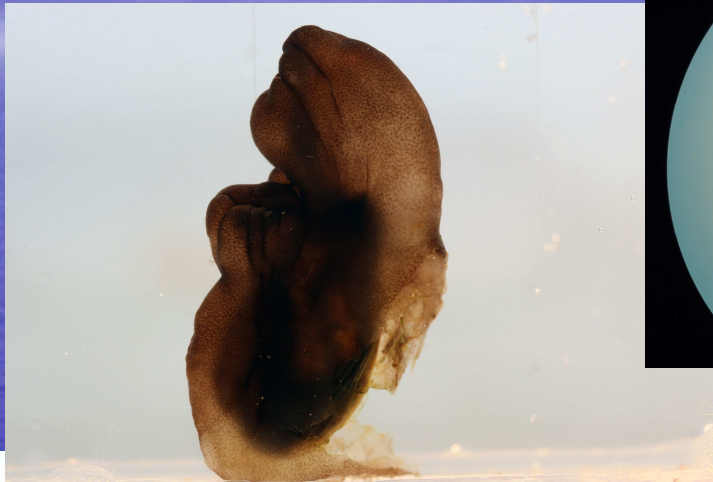
# Imaging Solutions

- Photo montage equipment for high-resolution images of small objects
- Microscope eye piece attachments for images of very small objects and microscope slides
- Digital camera setups for producing images of larger items (wet and dry setups)
- Slide scanner for 35mm photographic slides
- Special glass cuvetts and aquaria to take specimen photos in liquid (live or preserved)





# Imaging Examples



# Final thoughts: Things to keep in mind when getting started...

(since we don't live in a perfect world)

- Every collection is unique- create a digitization workflow that will work for your specific collection
- Know your limitations (work load v. staff/volunteer hours)- make digitization projects feasible
- Get to know your digitization equipment and software to maximize efficiency
- Check and understand digital storage space at your institution
- Make use of forums, workshops, and other collaborative resources for information- you don't have to reinvent the wheel



Good luck and happy digitization!

Questions? Comments?

