

Supplemental Materials:

Virtual Expeditions broaden student participation in natural history research

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Post-training instructions provided as part of the Invertebrate Species ID CURE:

Some internal hyperlinks have been removed, but formatting preserved for example purposes.

You will be inputting your species identifications for each photo at this [link](#). We will be duplicating efforts on photos to start, just to make sure we are all arriving at the same conclusions. This way, you can all gain confidence from each other.

How do I identify species?

- Start with the [resources](#) provided by William Chan at the USGS. Identifying to group, class, or a higher order classification will help you get started.
- Creating your own dichotomous key from the USGS resources can be very helpful! This is where you use defining characteristics to separate organisms based on single traits. If you haven't heard of a dichotomous key before, see this [YouTube video](#).
- Recent advances in community science platforms online can be very helpful! You may search www.iNaturalist.org based on general location (probably California or West Coast, since it is unlikely to have any reported sightings at our exact field sites)
- There are a number of helpful online resources that are field guides (see [example](#)), and it can be helpful to search for databases using key terms such as “Suisun Marsh, benthic, coastal, aquatic, brackish, or macroinvertebrate”. However, some of these do not get all the way to species level.
- Here is a [field guide](#) to the invertebrates of the San Francisco Bay-Delta
- Here is an interactive [map](#) of species found in Suisun Marsh since 1979.
- For your final identification (if you haven't gotten it from a field guide), use the official WoRMS database (world register of marine species): <http://www.marinespecies.org>

What if I get stuck?

- Ask your research partners in your dyad, or in your synchronous zoom room (if we are virtual)
- Ask the research group on Slack in the “id-questions” channel
- If none of us can figure it out, we will solicit external help from other experts

Welcome to the snake behavior project! It's great to have you on board!

Here is your introductory packet of information:

1. You are my connection to the UROP administration, so please keep me informed of any assignments, deadlines, or other items I need to know.
2. Please indicate your availability for our weekly meetings on the attached WhenIsGood poll
3. Please attempt to download and install the software below before our first meeting next week. We can go through it together during the meeting if you get stuck.
4. You should be receiving an invitation to a DropBox folder soon. Please let me know if you do not receive it.

Required software includes:

1. Microsoft Excel
2. Quicktime 7 (not the current version of quicktime) or mpv.io if you have Mac Catalina or newer.
3. Dropbox Desktop Sync (desktop software to automatically download files any time your computer is on)
4. You should be receiving invitations to Slack, Dropbox, and our shared Mendeley bibliography in the next couple of days.

Here is a general procedure for how to score the videos:

Browser actions are in blue, Desktop actions in green

1. In your browser, sync **your temp folder** to your desktop. Don't sync the whole Giant Snake Project, because I can guarantee that you don't have enough space on your computer to do that.

Location: Giant Snake Project>Individual Information>Paul Temp

☆ Paul Temp is selected

Tags Email Download

Name	Updated	Size
Trial Videos	Oct 4, 2018 by Talia Yuki Moore	17 Files
Sean Temp	Oct 4, 2018 by Talia Yuki Moore	0 Files
Paul Temp	Oct 21, 2018 by Paul Gerard Ham...	2 Files
Literature	Oct 11, 2017 by Talia Yuki Moore	20 Files
Emily Temp	Oct 4, 2018 by Talia Yuki Moore	1 File
Briana Temp	Today by Talia Yuki Moore	0 Files
Ashley Temp	Oct 12, 2018 by Talia Yuki Moore	0 Files
Input sheet_MAC	Oct 4, 2018 by Talia Yuki Moore	22.2 KB

2. In your browser: "Copy" (do not "move") videos from the **Trial Videos** folder into **your temp folder**.

Location: Giant Snake Project>Individual Information>Trial Videos

3. On your desktop: Open all videos for a trial and watch them in any video player you like (Quicktime is good). Find out which one is the "best," meaning which camera can see the snake for most of the time.
4. Open the **template** and click the button to "Enable Macros." "Save as" the exact same filename as the "best" video ".xlsm" (macro-enabled workbook) into **your temp folder** on your desktop. Copy paste the filename to ensure no misspellings!
5. On your desktop: Use your video player software to watch the video and record the behaviors for each frame according to the diagrams of snake behaviors in the file you just created. You can advance or return to frames using the left and right arrow keys, by sliding the marker along the timeline bar, or by clicking the play/step forward/step backward buttons.

In the Excel spreadsheet:

1. HeadFrameIn must be greater than the previous row's HeadFrameOut.
2. Use the dropdown menus to select a value for each behavioral column.
3. When you select a value for the last column, it will copy all behavior values for the next 67 rows.
4. If you change a value in a row, make sure to select the last column value (even if it remains the same). This re-copies the following rows to the current row
5. If there are multiple videos for the same trial, they will have the suffix G1, G2, G3 (they're not synchronized in time).
 - a. Pick an event in the trial that can be seen by all cameras. This is your calibration point. For example, if in video G1, the laser shows up at frame 17, and the same thing happens in video G2 in frame 27, then there is a 10 frame difference between the videos.
 - b. Pick only one video as your frames of reference, and save the data from all camera angles of one trial to one scoresheet.
6. In your browser: "Move" the data file from **your temp folder** to the **Ethogram data (new system)** folder. This will automatically remove it from your desktop.

Location: Giant Snake Project>Ethogram data (new system)

7. On your desktop: Delete the video from **your temp folder** (it should still exist in the **trial videos** folder) to make room for the next videos!

Date	Data tasks	Meeting Topic	Paper
Week 1	Install software before meeting	Snake Behavior Instructions	https://doi.org/10.1093/biolinnean/blaa222
Week 2	Try to score 1 video	Compare data and resolve conflicts	https://doi.org/10.1016/j.cub.2014.11.011
Week 3	Score half of trial videos	Ask if any cool behaviors observed	https://doi.org/10.1007/BF01968221
Week 4	Score 2nd half of trial videos	Discuss species/behavior preferences	https://doi.org/10.1371/journal.pone.0080872
Week 5	Self-assign a dataset	Show the students how to search for papers	https://doi.org/10.1111/j.1558-5646.1993.tb01212.x
Week 6	Self-assigned data collection	Open to new data!	https://doi.org/10.1111/j.1095-8312.1992.tb00642.x
Week 7	Self-assigned data collection	Talk about snake tree and families	https://doi.org/10.1111/j.1439-0310.2004.01034.x
Week 8	Self-assigned data collection	Discuss progress, develop potential hypotheses	https://doi.org/10.1111/j.1558-5646.1992.tb01124.x
THANKSGIVING			
Week 10	Self-assigned data collection	Discuss progress, develop potential hypotheses	https://doi.org/10.1086/657041
Week 11	Self-assigned data collection	Discuss progress, develop potential hypotheses	https://doi.org/10.1086/693159
WINTER BREAK+ 1st week of semester			
Week 12	Self-assigned data collection	No meeting - scheduling new meeting time	Students lead paper selection and discussion
Week 13	Self-assigned data collection	Set hypotheses in stone, dataset in stone	Students lead paper selection and discussion
Week 14	Self-assigned data collection	Discuss progress, find useful papers to cite	Students lead paper selection and discussion
Week 15	Self-assigned data collection	Discuss progress, find useful papers to cite	Students lead paper selection and discussion
Week 16	Self-assigned data collection	Discuss progress, find useful papers to cite	Students lead paper selection and discussion
Week 17	Self-assigned data collection	Discuss progress, find useful papers to cite	Students lead paper selection and discussion
Week 18	Self-assigned data collection	Start discussing figures, interpretation	Students lead paper selection and discussion
SPRING BREAK			
Week 20	Statistics and poster design	Discuss the poster template	Focus on student results
Week 21	Statistics and poster design	Finalize Abstracts	Focus on student results
Week 22	Statistics and poster design	Finalize data and statistics	Focus on student results
Week 23	Statistics and poster design	Practice together	Focus on student results
Week 24			SYMPOSIUM
Week 25			SYMPOSIUM