Procedure Steps

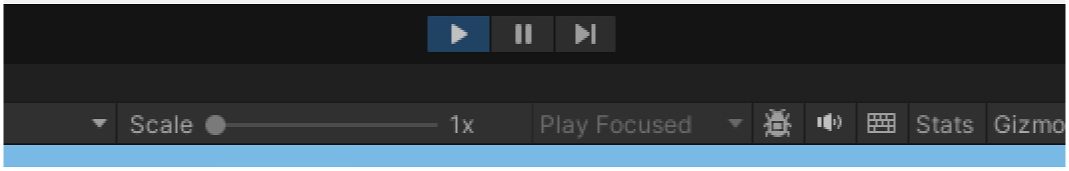
Opening Software / Prepare Hardware

- Oculus App (Shortcut on Desktop)
    - Only needs to be opened - No need to press or do anything additional here
    - Having this application open allows us to enable link connections later
- Unity Hub (Shortcut on Desktop)
    - Open the most recent Unity project titled “assemblyTask - unity”
    - There are two with the same name located here
        - Confirm the file location as needed: “C:\Users\shine\Development\git\Jalynnn\asTask”
    - This will then open the corresponding Unity Application
- Unity Application (Opened through Unity Hub)
    - Confirm that you are in the correct scene: “Assets > Scenes > New Scenes > Tutorial Video”
        - You can also confirm by checking the far top left of the monitor to confirm that it says “Tutorial Video”
    - Do **not** yet press play
- Locate LiveAmp EEG Device
    - Turn on the device by holding the power button until the blinking green turns solid green.
    - Enter pairing mode; a light under the green will turn solid blue
- Open LiveAmp.exe (Shortcut on Desktop)
    - Select “Scan for Devices”
    - It should find your LiveAmp device as long as it is in pairing mode
    - Confirm the connection by searching for “Device Serial Number” on top of the window
        - This SN should match the number on the back of the LiveAmp device
    - Press “Link”
    - You can minimize this window now
- Open Lab Recorder (Shortcut on Desktop)
    - Set your participant number correctly here.
    - We will come back to this window when we are ready to start recording
- Open BrainVision LSL Viewer (Shortcut on Desktop)
    - While this application is not completely necessary in our data collection, it allows the researcher to view the LSL inputs.
- Open Aurora 2023.9 (Shortcut on Desktop)
    - Select “Devices” which is the fifth option across the top (Should be the default open page)
        - Select **both** devices that are connected
        - Select “Select Device” in the bottom right
    - Select “Configurations” which is the last option across the top
    - Select the “Navy” Configuration

        - Select “Edit” in the bottom left of the right window showing the Navy configuration.
        - Across the top, the last tab says “LSL Stream Names”
        - Confirm that the info under “Tigger in stream name” says “LSL4Unity.Samples.SimpleCollisionEvent”
        - Press “Save” in the top right
    - Select “Select” in the bottom right of the “Navy” configuration window
- Set Up Quest 3 Headset
    - Confirm that the Oculus App is open
    - Connect the Link Cable from the Oculus to the PC
    - In the headset
        - A window should appear asking if you want to enable or not the quest link
            - Press “Enable”
            - If the window does not appear

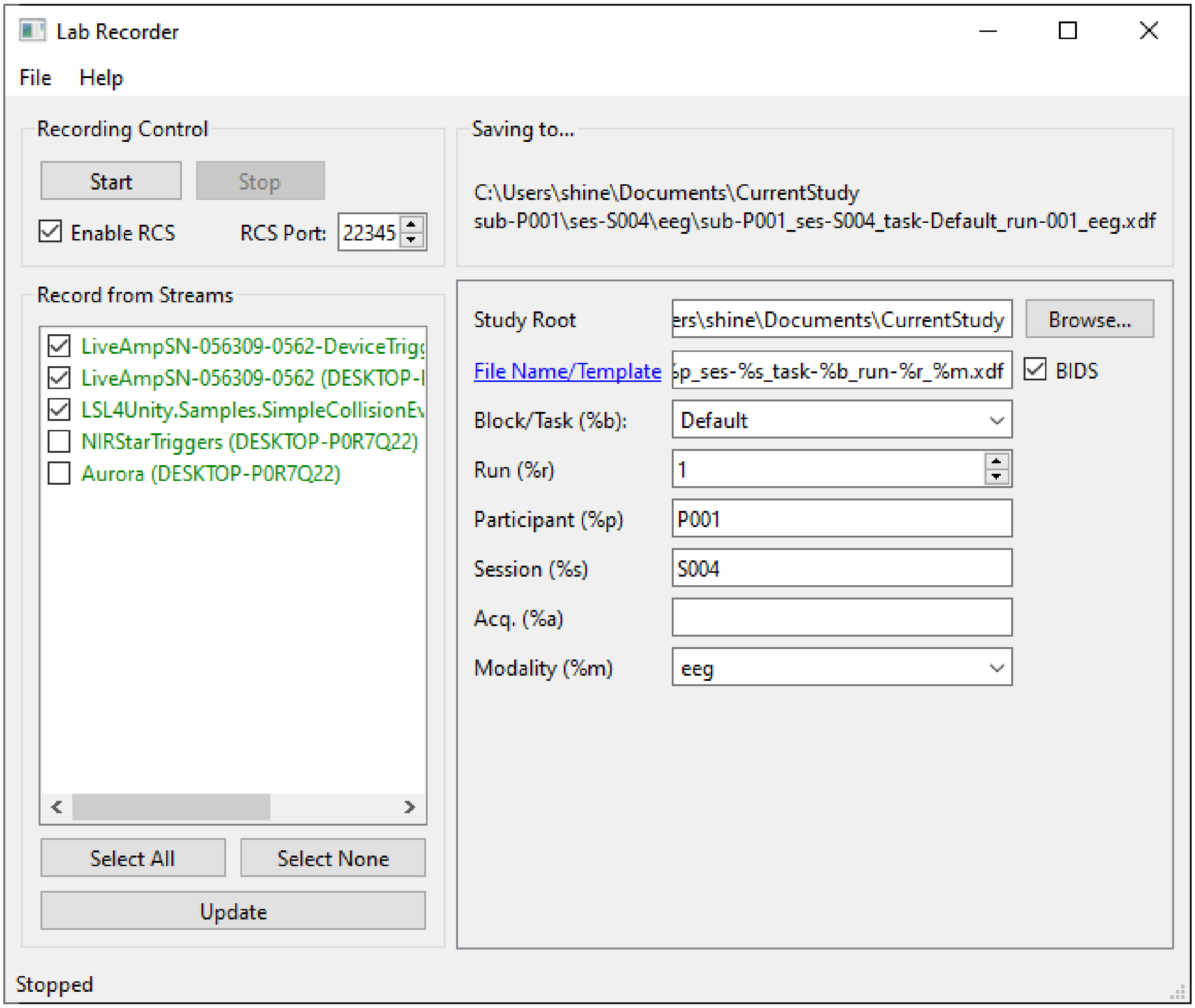
After Setting Up Participant with fNIRS / EEG / Cap / Head-Mounted Display (Quest 3)

- Aurora 2023.9
    - Press play to begin testing
- Open BrainVision Recorder (Shortcut - Green on far left)
    - EEG Testing has to occur in this software
- Unity Application
    - Press Play in the top middle



- Aurora 2023.9
    - Across the bottom of the screen, near the bottom middle, a section says “Trigger stream” and the bubble next to it should be green.
        - This indicates that the trigger received from Unity is received
        - If it is still red, then confirm that the play button has been pressed in Unity
    - You can begin recording by pressing the red circle on the top, which is the fifth option now.
- Lab Recorder
    - Confirm Unity and Aurora are both running
    - Press “Update” if you do not see the LSL inputs/outputs as such below
    - You should now see the window below
    - Select the same items shown here
        - “LiveAmpSN-#...”
        - “LiveAmpSN-#...”

        - “LSL4Unity.Samples.SimpleCollisionEvent…”
    - Press “Start” to start recording EEG data with LSL inputs being received.



☑ Enable RCS   RCS Port: 22345

Saving to...

C:\Users\shine\Documents\CurrentStudy
sub-P001\ses-S004\eeg\sub-P001_ses-S004_task-Default_run-001_eeg.xdf

Record from Streams

☑ LiveAmpSN-056309-0562-DeviceTrig(
☑ LiveAmpSN-056309-0562 (DESKTOP-I
☑ LSL4Unity.Samples.SimpleCollisionE\
☐ NIRStarTriggers (DESKTOP-P0R7Q22)
☐ Aurora (DESKTOP-P0R7Q22)

Study Root	ers\shine\Documents\CurrentStudy
File Name/Template	;p_ses-%s_task-%b_run-%r_%m.xdf ☑ BIDS
Block/Task (%b):	Default
Run (%r)	1
Participant (%p)	P001
Session (%s)	S004
Acq. (%a)	
Modality (%m)	eeg

Stopped

- LSL Viewer
    - Press Connect - should automatically sync and work alongside Lab Recorder
    - Press “Start” if you would like to witness the LSL streams
- Unity Application
    - Continue with the provided instructions (Need to merge documents)

When Complete

- Aurora 2023.9
    - Press the red square, which is the 6th option across the top, to stop recording.
- Lab Recorder
    - Press “Stop” to stop recording
- LSL Viewer

    - Press “Stop”
- Unity Application
    - Can press “Start” again to stop the application

Data Collection

- Aurora 2023.9
    - The sixth tab across the top says “Description”
    - At the bottom of this window, you can press the blue link to open the file location in File Explorer.
    - Lsl.tri is the file of the trigger events
    - You can now close the application
- Lab Recorder
    - Note the “Saving to…” location
        - Navigate to this location via the File Explorer
        - Once you have this open in File Explorer, you can close the Lab Recorder
- LSL Viewer
    - No data to be collected from this application.
- Unity Application
    - Unity logs

Data Analysis

- Lsl.tri from File Explorer can currently only be opened from a text editor
    - Does not yet show the metadata - on the to-do list
- MatLab
    - Transfer Files
        - You should already have a file explorer opened that looks similar to this: “C:\Users\shine\Documents\CurrentStudy\sub-P001\ses-S004\eeg”
        - Open this next to another file explorer opened at “C:\Users\shine\Documents\MATLAB” to have easy copy and paste
        - Copy the .xdf files from the CurrentStudy folder to the MATLAB location
            - .xdf file example: “sub-P001_ses-S004_task-Default_run-001_eeg”
    - Allow the Code to Run
        - These files should already be in the MATLAB folder:
            - “Load_xdf_innerloop.mexw64”
            - “Load_xdf.m”
        - If they are not, refer to this GitHub documentation: https://github.com/xdf-modules/xdf-Matlab/tree/0cdf054391fff7f0ea3416ee632ad1bd73d6623b
    - Run the following code:
        - 1st: addpath('C:\Users\shine\Documents\MATLAB')

        - 2nd: streams = load_xdf('sub-P001_ses-S001_task-Default_run-001_eeg.xdf')
        - Any additional LSL EEG logs? Be sure to change the name streams to not overwrite previous data
            - For me it was also easy to press the up button to access the previous command and change the participant or session number as needed.
    - Actually Analysis (Section Needs Work)
        - Open the saved stream from the workspace on the far right
        - You should see an array of structs
        - Double click one
            - Double click “Info” to see whether the LSL received was from Unity or LiveAmp
            - Double click “Time Series” to see when sent from Unity, the corresponding action
                - For example: “Start Button Pressed”
            - Double click “Time Stamp” to see the corresponding time stamp

Self Documentation - Modify LSL Signals

- VS Code
    - Code for text input:

```
public void lslStuff() {
            if (outlet != null)
            {
                sample[0] = "Start Button Pressed ID:" +
gameObject.GetInstanceID();
                // Debug.Log(sample[0]);
                outlet.push_sample(sample);
            }
        }
```

- Continue VS Code
    - Difficult to find, but this could help for future reference if wanting to send different stimulus outputs
        - “ChangePlaneColours”