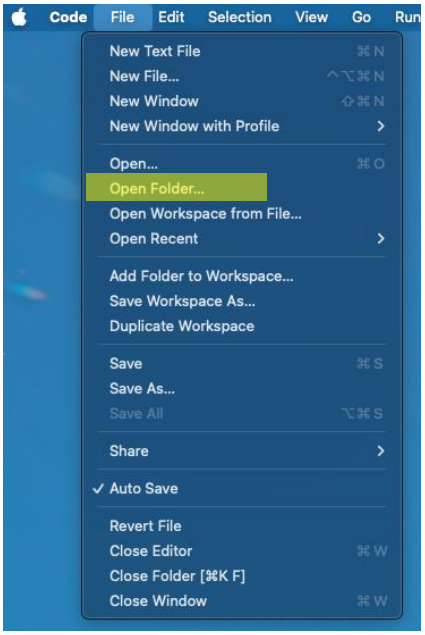
Sphero Research Project

Setting Up Visual Studio Code & Sphero Code

First Time Setup (VS Code & Git repo):

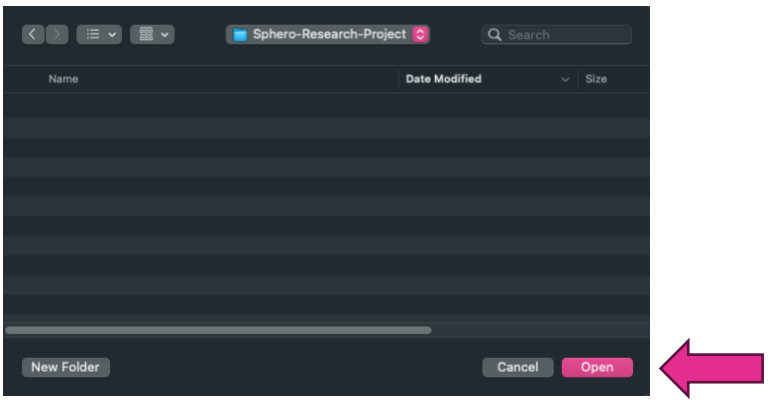
1. **Download and Install** Microsoft Visual Studio Code (VS Code):
   (Mac/Windows): https://code.visualstudio.com/download

2. **Open VS Code → File →Open Folder**

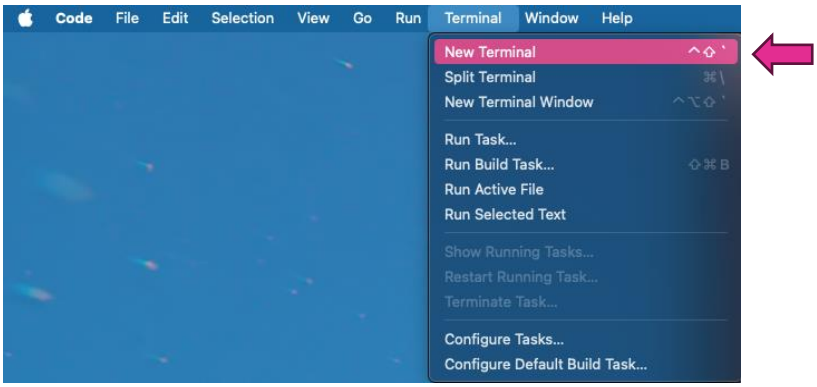


3. **Create a New Folder:**
   - Make a new folder called "Sphero-Research-Project" wherever you would like to save the project files.

4. **Click Open:** to use this empty folder as your project directory.



5. **Click <u>Terminal</u> → New Terminal**



6. **<u>Clone the Git Repository:</u>** get a local copy of all necessary files at this link: https://github.com/amanda-pang/Sphero-Research-Participants

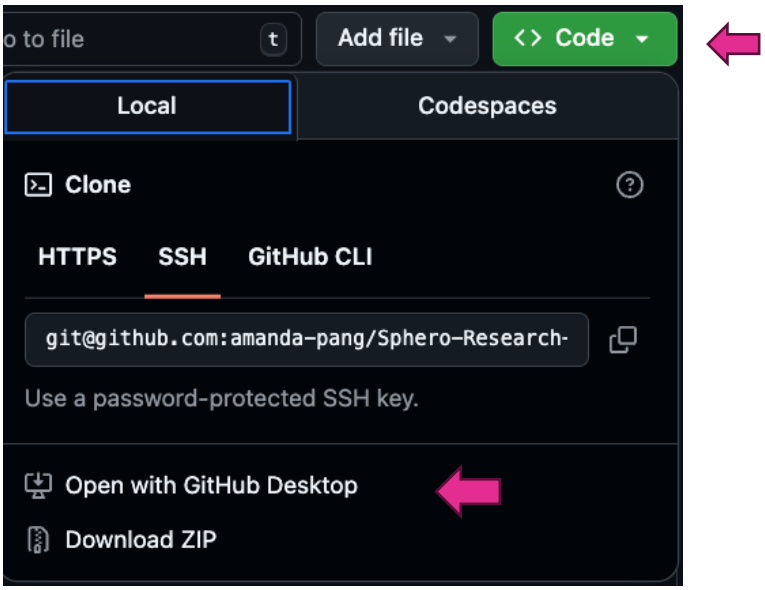
METHOD 1:

- Copy and paste this into your new terminal:

git clone https://github.com/amanda-pang/Sphero-Research-Participants.git

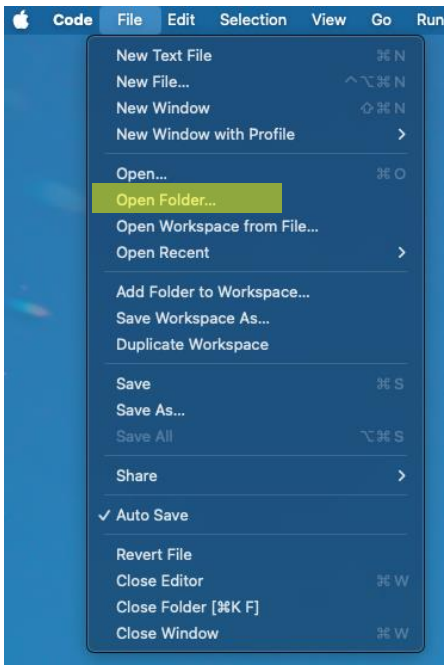
METHOD 2:

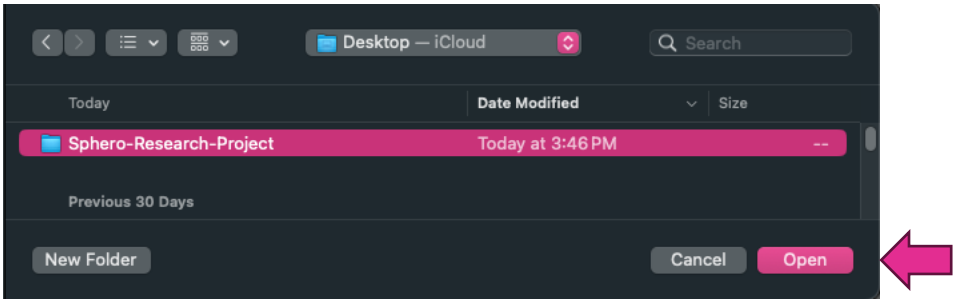
- **Go to this link:** https://github.com/amanda-pang/Sphero-Research-Participants
- Download github desktop
- Click on the "Code" button and Select "Open with GitHub Desktop"

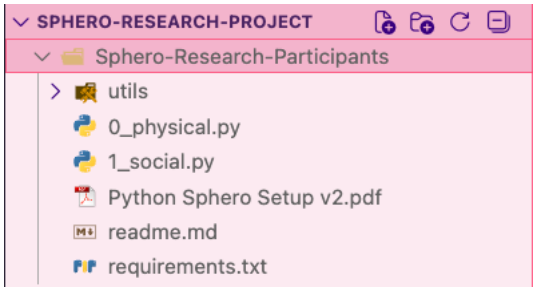


RUNNING YOUR SPHERO (FIRST TIME)

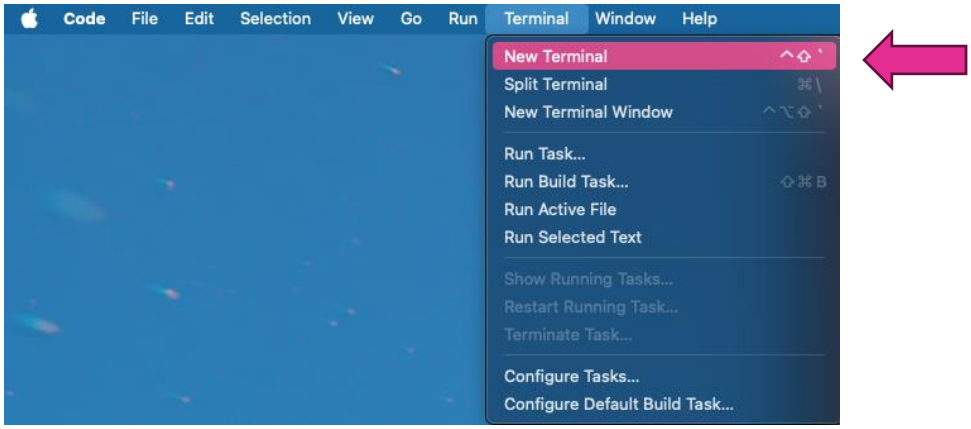
1. **Open VS Code → File → Open Folder → Sphero-Research-Project**
    - Open the folder where you've saved all the project files







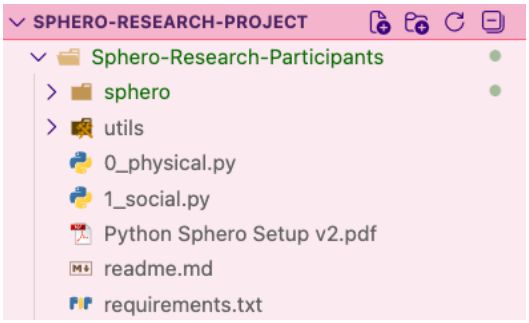
2. **Click Terminal → New Terminal**



3. **Install your virtual environment:** Move into the Sphero-Research-Participants directory and execute the following commands one by one in your terminal:

MacOS:

- cd Sphero-Research-Participants
- Python -m venv sphero
- source sphero/bin/activate
- pip install -r requirements.txt
  - (or if this doesn't work, try pip3 install -r requirements.txt)

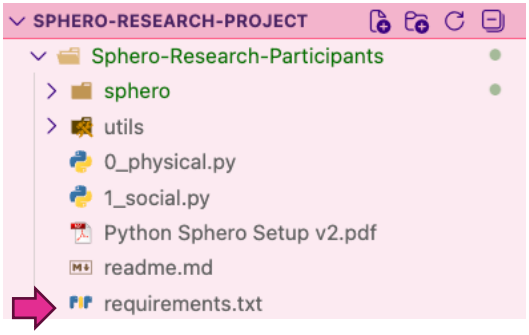



```
(base) amanda_mac@Amandas-MacBook-Pro Sphero-Research-Participants % source sphero/bin/activate
(sphero) (base) amanda_mac@Amandas-MacBook-Pro Sphero-Research-Participants %
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % pip install -r requirements.txt
```

Windows:

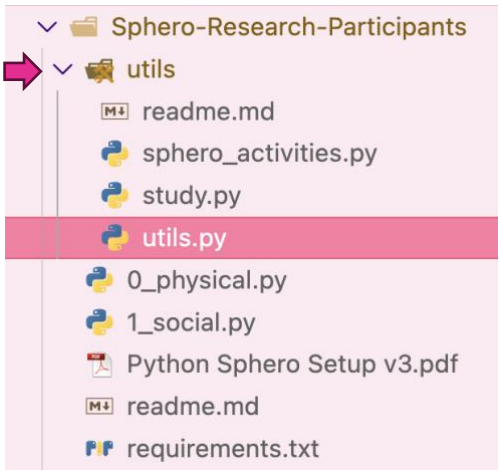
1. **Create & Activate virtual environment:** will create a new folder "sphero"
   - cd Sphero-Research-Participants
   - Python -m venv sphero
   - .\sphero\Scripts\Activate.ps1

2. **Replace requirements.txt** file with this:




```
bleak==1.1.1
certifi==2025.8.3
charset-normalizer==3.4.3
click==8.1.8
gTTS==2.5.4
idna==3.10
numpy==2.3.3
requests==2.32.5
spherov2==0.12.1
transforms3d==0.4.2
typing_extensions==4.15.0
urllib3==2.5.0
```

- **Type this into your terminal:**
  - pip install -r requirements.txt



3. Make 2 changes to **utils.py**

- **Uncomment out line 18**
- **Comment out line 15**

```
9  def speak(text):
10     text_to_speak = text
11     tts = gTTS(text=text_to_speak, lang='en')
12     tts.save("speech.mp3")
13
14     # macos
15     os.system("afplay speech.mp3")
16
17     # windows
18     # os.system('start "" "speech.mp3"')
19
```

```
9  def speak(text):
10     text_to_speak = text
11     tts = gTTS(text=text_to_speak, lang='en')
12     tts.save("speech.mp3")
13
14     # macos
15     # os.system("afplay speech.mp3")
16
17     # windows
18     os.system('start "" "speech.mp3"')
19
```

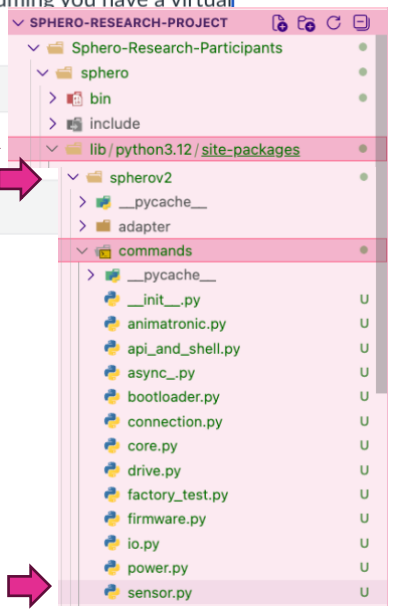
4. **Make one change to the spherov2 library** following instructions in the screenshot below:

The spherov2 library on PyPI has a bug where collision events produce an error before the on_collision callback is reached.

You can make a manual change to the `sensor.py` file in the library to get collisions working locally. Assuming you have a virtual environment running and the library is already installed, open this file:

1. `\venv\lib\site-packages\spherov2\commands\sensor.py`
2. Go to line 116 and change the last letter in the string from 'L' to 'h'.

`unpacked = struct.unpack(">3hB3hBh", packet.data)`

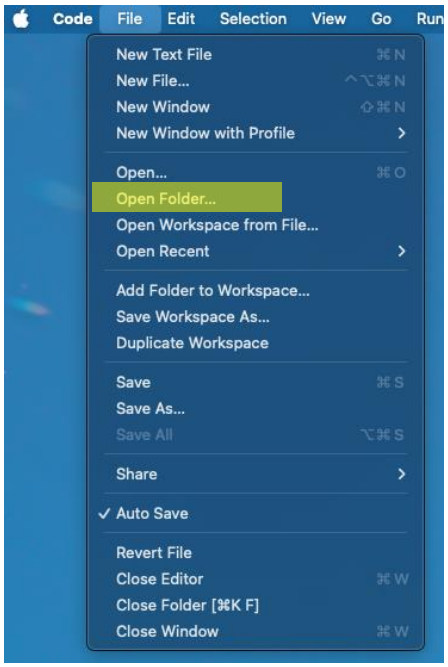


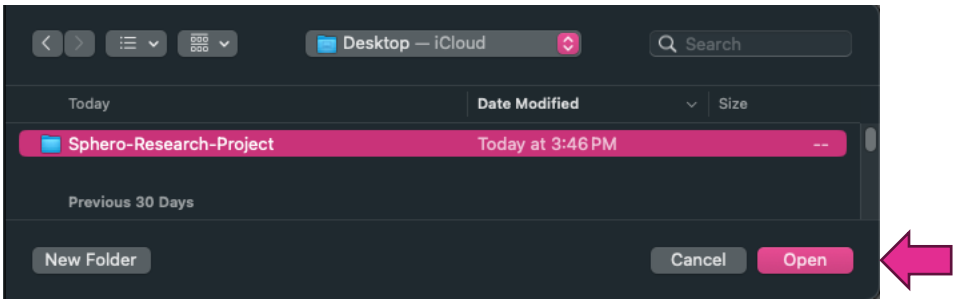

```
115 2.  def __collision_detected_notify_helper(listener, packet):
116         unpacked = struct.unpack('>3hB3hBL', packet.data)
```

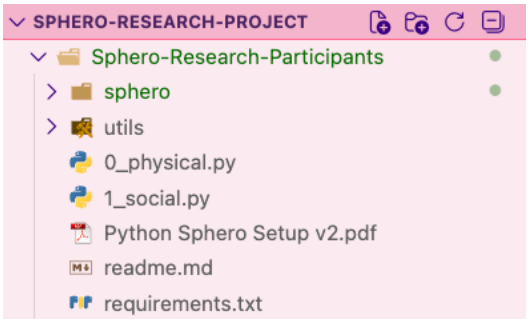
```
115     def __collision_detected_notify_helper(listener, packet):
116         unpacked = struct.unpack('>3hB3hBh', packet.data)
```

RUNNING YOUR SPHERO (EVERY TIME)

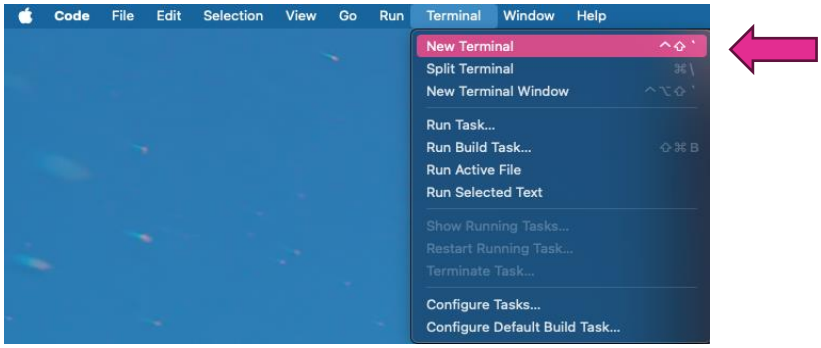
1. **Open VS Code → File → Open Folder → Sphero-Research-Project**
    - Open the folder where you've saved all the project files







2. **Click Terminal → New Terminal**



3. **Activate your Virtual Environment:** type these commands one by one into your terminal

MacOS:

- cd Sphero-Research-Participants
- source sphero/bin/activate

Windows:

- cd Sphero-Research-Participants
- .\sphero\Scripts\Activate.ps1

4. **Running Physical / Social:** Sphero Research Conditions

4a. If you are currently in the *"Physical"* arm, type this command in the terminal:

- python 0_physical.py

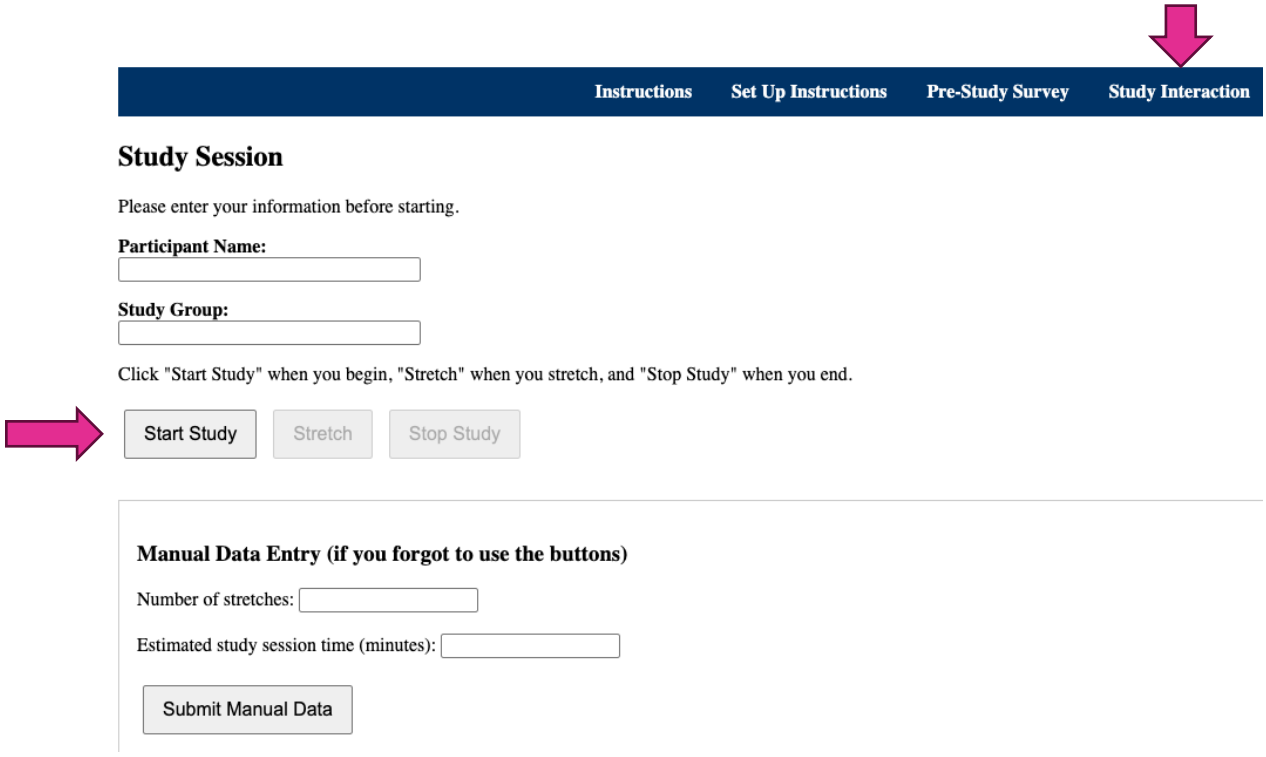
```
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 0_physical.py
```

4b. If you are currently in the *"Social"* arm, type this command in the terminal:

- python 1_social.py

```
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 1_social.py
```

5. Use our **website** to track the ***start*** and ***end*** of your study session via the "***Study Interaction***" tab.
   - **Log** when you complete a stretch by clicking "***Stretch***".
   - If you forget track any part of your study session, you may also enter this data manually



6. That's it! Just leave your Sphero buddy nearby while you work, and leave **VS Code open** with the program running in the background.

7. **Every day when you try to rerun the code, you'll need to activate your virtual environment first, then execute the file**.

Paste this command into your terminal to activate virtual environment:

Mac
- source sphero/bin/activate

Windows
- *.\sphero\Scripts\Activate.ps1*
- python "your_arm.py"

Disconnect & End

1. When you are **done** with your studying/working session:
   - **Disconnect** your Sphero and **quit** the program by typing this into your terminal:

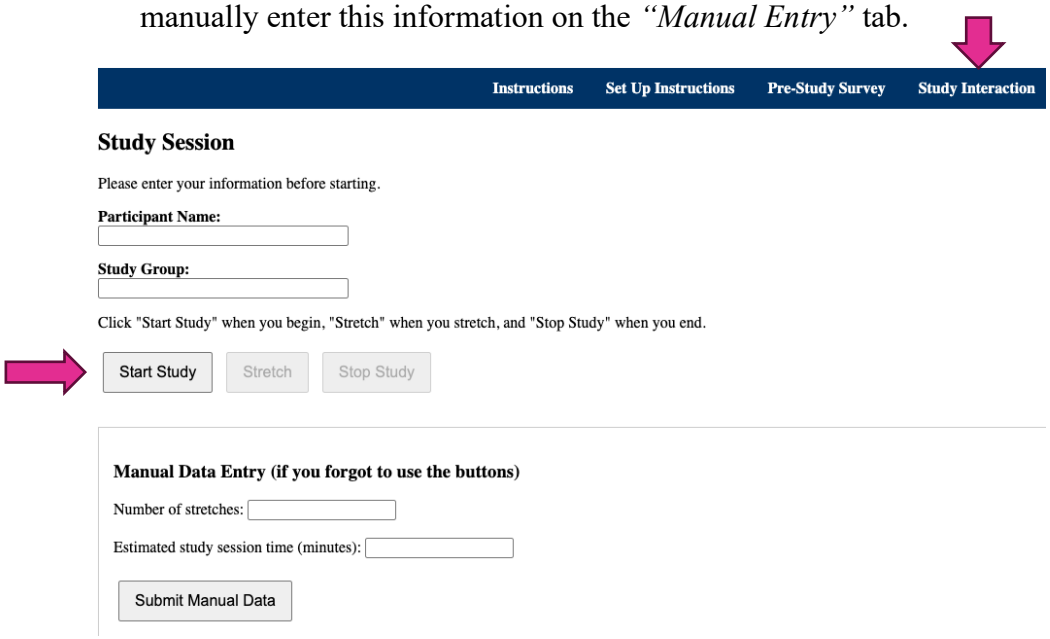
Mac
- **Ctrl z**

Windows
- **Ctrl c**

```
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 0_physical.py
^Z
zsh: suspended  python 0_physical.py
```

- **deactivate**
  - optional: to exit the virtual environment

2. Navigate to our **website**, and click **"End Study Session".**
   - If you forget to log any events (start/end time, or a stretch break), you may manually enter this information on the *"Manual Entry"* tab.



Thank you for participating in our study!!