

Getting Started Guide - OSP Software (macOS)

This is an expanded version of the [Quick Guide](#) for the macOS software.

For more information about the OSP software, please refer to the [manual](#).

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1 - Introduction

This guide is a more comprehensive version of the [Quick Guide - OSP Software Only \(macOS\)](#), which covers the following:

- *Installation Steps* - These are the same as the Quick Guide, but are more comprehensively explained, with more images provided.
- *Sanity Checks* - Ensuring that the capabilities of the OSP's software are functional.
- *Troubleshooting* - How to resolve issues with starting up OSP software.
- *Uninstallation* - How to remove OSP software from your computer.

Note that the software of the Open Speech Signal Processing Platform (OSP) consists of two main components:

- **Real Time Master Hearing Aid (RT-MHA)** - This is the hearing-aid algorithm which takes the audio from the environment and modifies it for the listeners' specific prescription.

- **Embedded Web Server (EWS)** - This makes any web browser enabled device into a graphical user interface which can control the RT-MHA algorithm. There are two flavors of EWS available in this release written in two different programming languages: Node.js and PHP/Laravel. The Node.js version is currently being developed and will eventually replace all of the functionality found in the PHP/Laravel version.

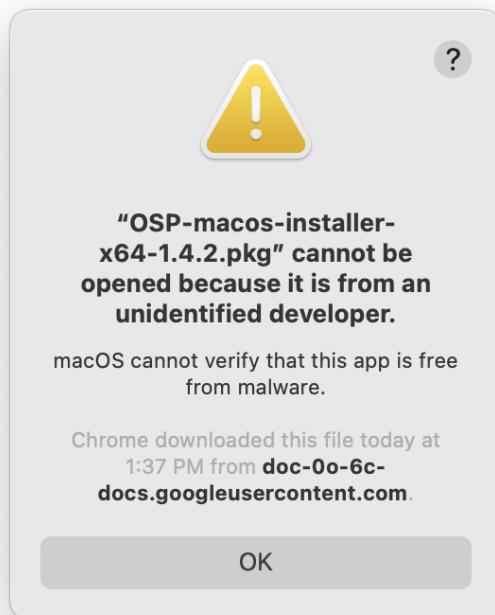
2 - Requirements

- macOS computer with a working browser, wifi connection.
- Working knowledge of navigating and using “System Preferences” and a terminal.
- 2+ GB of free storage space.
- A pair of wired/wireless headphones and/or your computer’s built-in microphone and speakers.

3 - Installation Steps

1. Go to this [link to the "Binaries" folder on GitHub](#) to find and download the “OSP-macos-installer-x64-1.6.0.pkg” installer file.
1. Save the installer file to an easy-to-locate place in your computer, and wait for the download to complete.
2. Open the file. You may be prompted to enter your computer login password.

If you instead see a message that prevents you from opening it, such as “*OSP....pkg cannot be opened because it is from an unidentified developer*”, close the message but do not move the file to Trash.



Follow these steps below.

- a. Open “*System Preferences*”. You can find this in “*Applications*” within Finder or via Spotlight Search (command + spacebar)

keys).

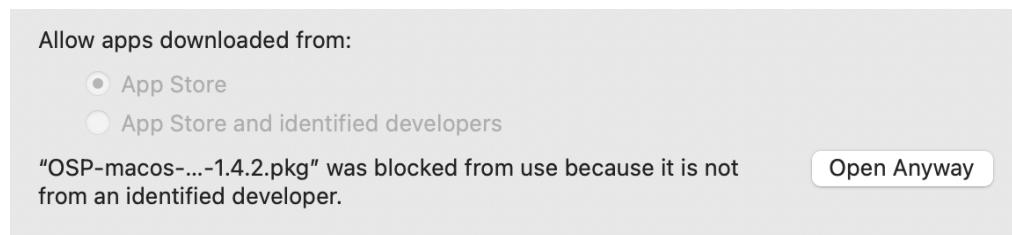


System
Preferences.app

b. Go to “*Security and Privacy*”.



c. In the “*General*” tab, you should see the “*unidentified developer*” message here as well. Select the “*Open Anyway*” button.



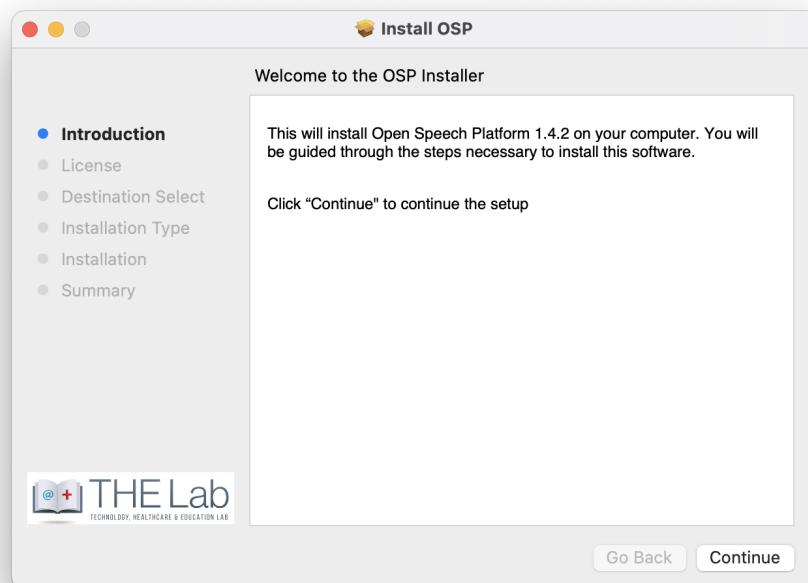
Open Anyway

d. You may see a message confirming to open the installer file, such as “*macOS cannot verify the developer of...Are you sure*

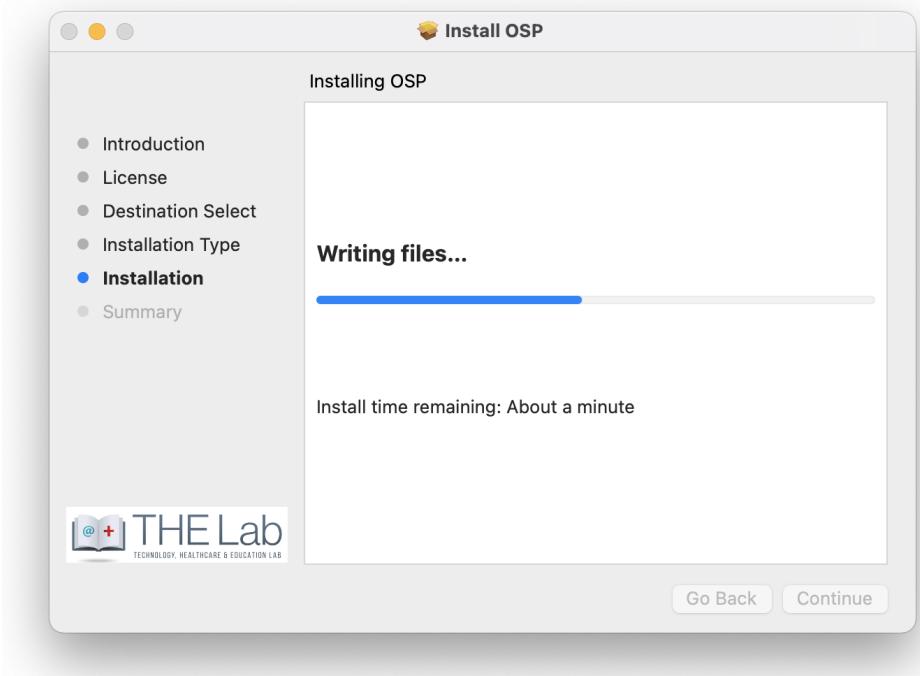
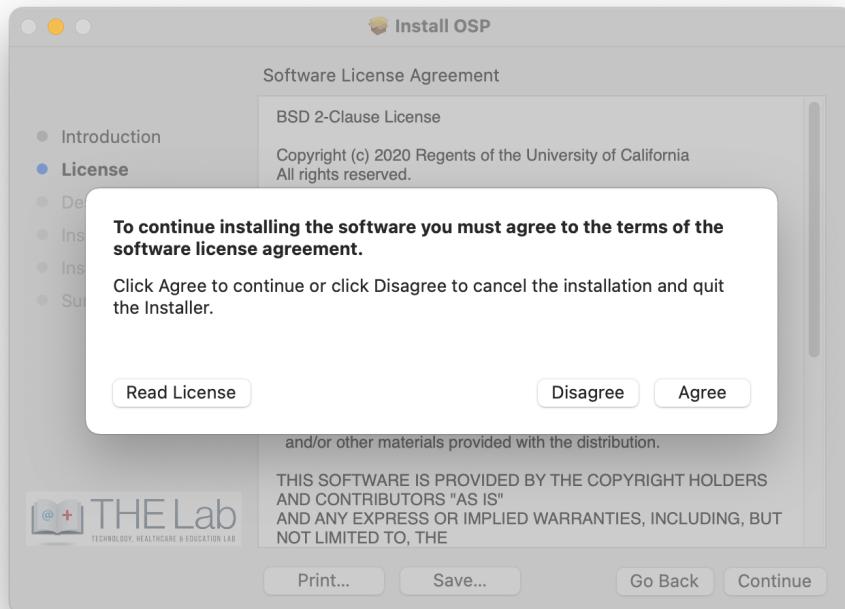
you want to open it?". Select the “Open” button.



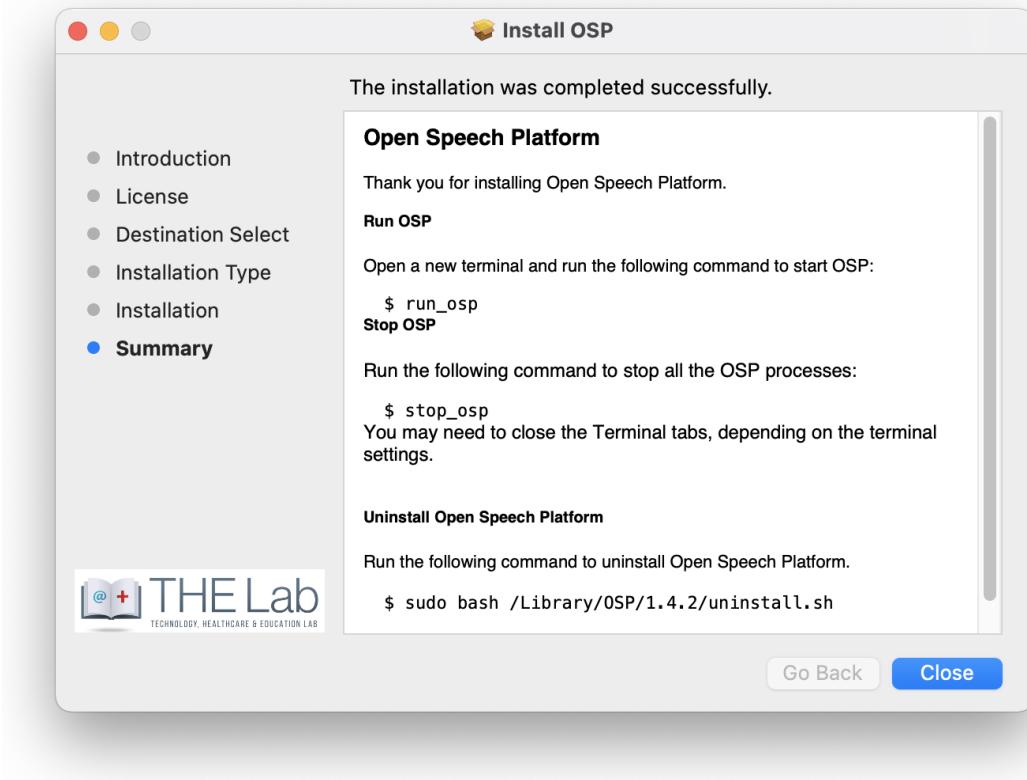
- e. You should now be able to see the installation window for instructions.



3. Follow the instructions for installing OSP. Agree on the licensing agreement and wait for the process to finish.



You should see the image below for installation success.

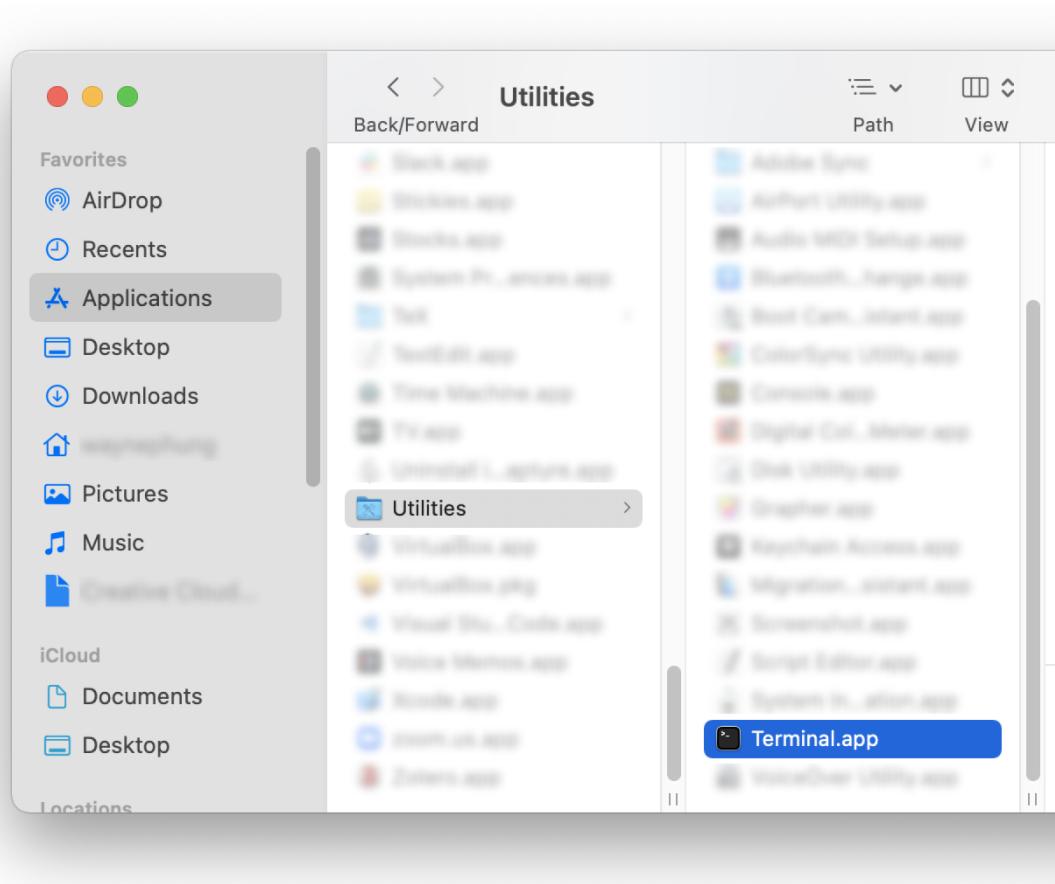


4. After installation is complete, open a new Terminal window.



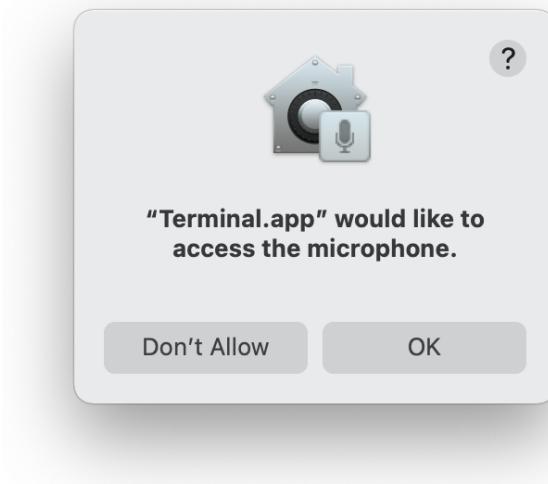
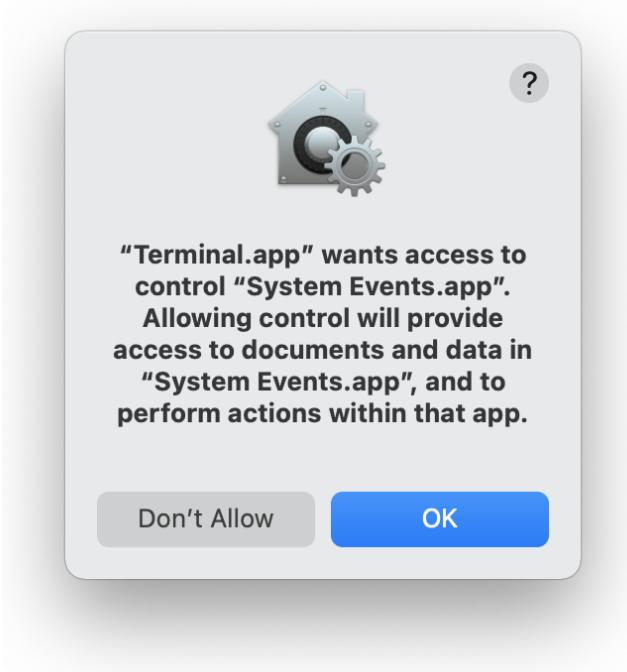
You can the Terminal app in “Applications” > “Utilities” folder within

Finder or via Spotlight Search (command + spacebar keys)

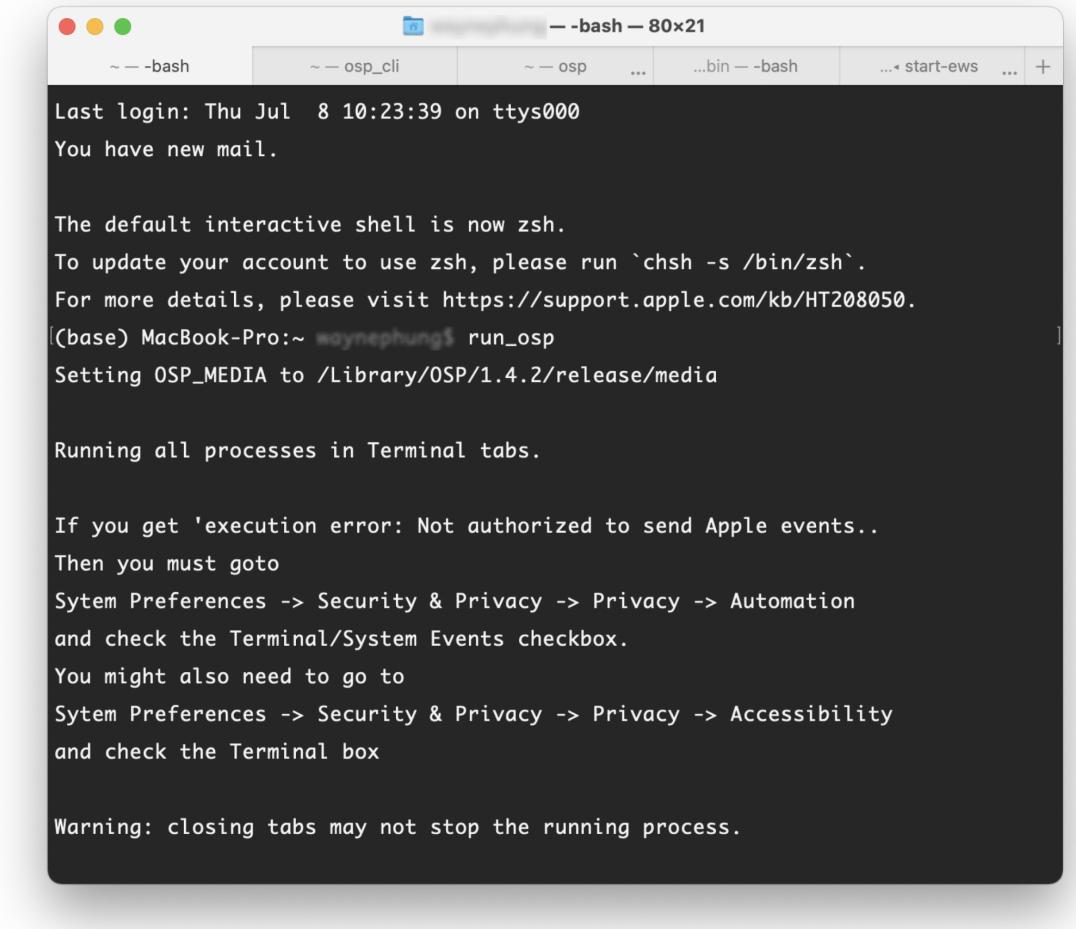


5. In the terminal, type in the command **run_osp** and press enter.

If you are asked to grant the terminal access to “System Events.app” and your computer’s “Microphone”, select “Ok” for both.



Otherwise, you should normally see five terminal tabs automatically opened, running processes, and generating messages.



The screenshot shows a macOS Terminal window with multiple tabs open. The active tab is titled '-bash - 80x21'. The terminal output is as follows:

```
Last login: Thu Jul  8 10:23:39 on ttys000
You have new mail.

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro:~ waynephung$ run_osp
Setting OSP_MEDIA to /Library/OSP/1.4.2/release/media

Running all processes in Terminal tabs.

If you get 'execution error: Not authorized to send Apple events..
Then you must goto
System Preferences -> Security & Privacy -> Privacy -> Automation
and check the Terminal/System Events checkbox.
You might also need to go to
System Preferences -> Security & Privacy -> Privacy -> Accessibility
and check the Terminal box

Warning: closing tabs may not stop the running process.
```

If you don't see these tabs and/or get message ““*execution error*”:
Not authorized to send Apple events...”, see “[5 - Troubleshooting](#)” of
this guide.

6. You would be automatically redirected to your browser, where you'll see the landing page for Node.js version of EWS (URL should be localhost:5000).

The Open Speech Platform

A Real-time, Open, Portable, Extensible Speech Lab. Visit our [website](#) to learn more.

Researcher Page
Includes amplification, noise and feedback parameters.

Beamforming Task
Manipulation of the parameters associated with OSP's adaptive beamformer

Multi-Alternative Forced Choice (Multi-AFC) Task
Mobile-assisted word recognition tests using minimal contrast sets.

CoarseFit Task
Includes amplification, noise and feedback parameters.

Goldilocks Listener
Includes researcher interface and end user interface

Freping
Includes amplification, noise and feedback parameters.

Reset
Reset to Original Prescription

Optionally, you can access a legacy version of the OSP software by entering localhost:8080 in the browser search bar.

The Open Speech Platform Webapps for research.

Researcher Page
Includes amplification, noise and feedback parameters.

4 Alternate Forced Choice (4AFC) Task
Includes a 4AFC Task webapp in which an end user can play a sound on click and select a response from 4 options.

Goldilocks
Includes researcher interface and end user interface

Ecological Momentary Assessment (EMA)
Includes an EMA webapp, using which an end user can respond to a prompted question or set of questions.

AB Tasks ▾
Includes an AB Task webapp, using which an end user can select a relationship between two presented stimuli, A and B, evaluated on a 7 point likert scale.

Go to our website
This is a link to the Open Speech Platform website!

Calibration
Calibrate the MHA device using measured values.

4 - Sanity Checks

In this section, follow the steps below to verify that RT-MHA, Node.js version of EWS, and audio input/output work. For OSP to operate correctly:

- Audio input (microphone) and output (sound heard from your computer speakers/headphones) works as you intended.
- You should be able to select and hear audio files from some of the apps and demos.
- The command line interface (CLI) in the terminal works and functions correctly.

4.1 - Checking Your Audio Devices

The steps below ensure that you have the proper microphone and headphones/computer speakers set up for OSP usage.

There are two ways to access your computer settings for audio input and output sources in macOS: System Preferences and Audio MIDI Setup.

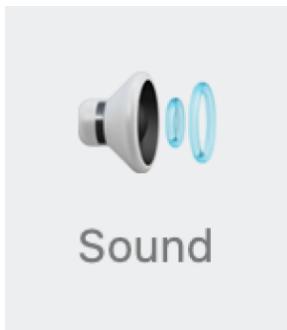
Via System Preferences

1. Find and open “*System Preferences*” either from “*Applications*” within Finder or via Spotlight Search (command + spacebar keys).

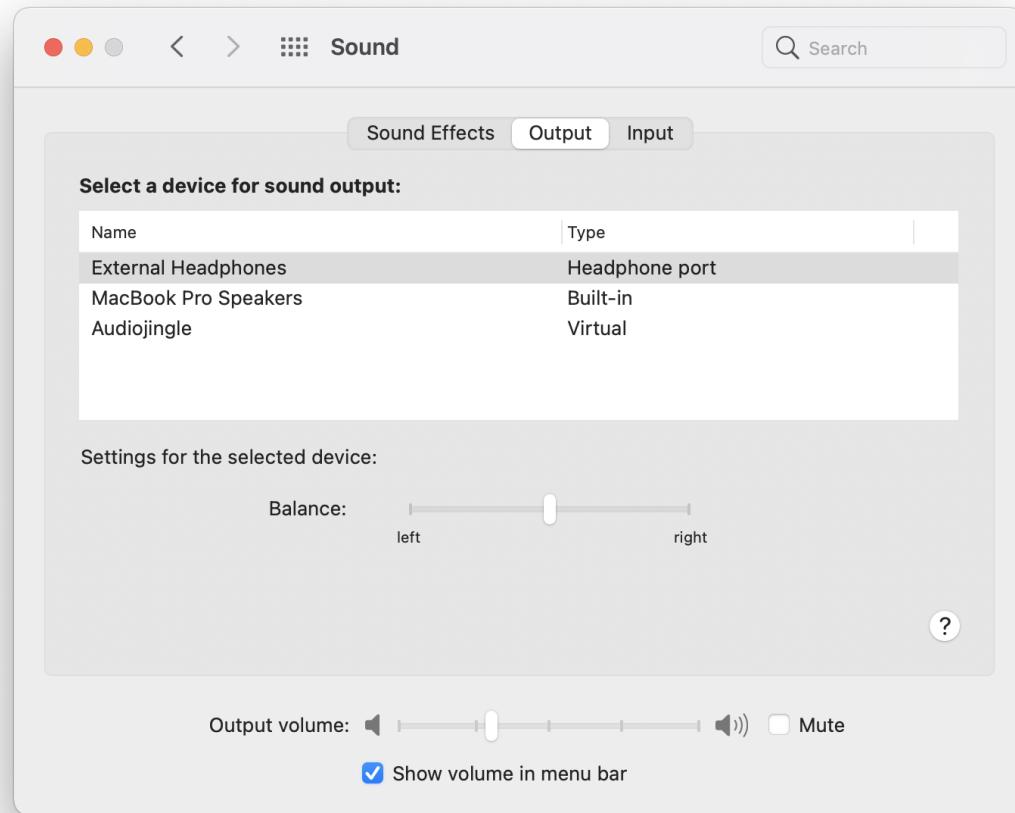


System
Preferences.app

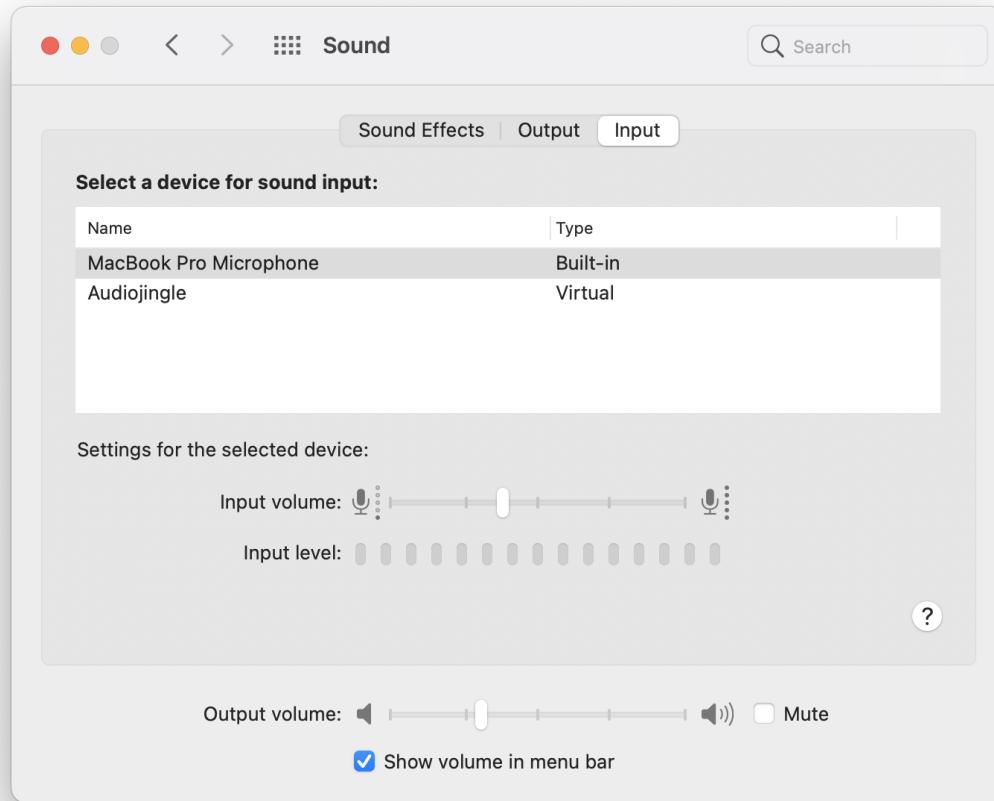
2. From System Preferences, select “Sound”.



3. Select “Output” to check the audio output device used and volume heard. **Make sure that audio output is not muted.**



4. Select “Input” to check the audio input device (microphone) used and input volume/levels. **Make sure that audio input is not muted.**



Via Audio MIDI Setup

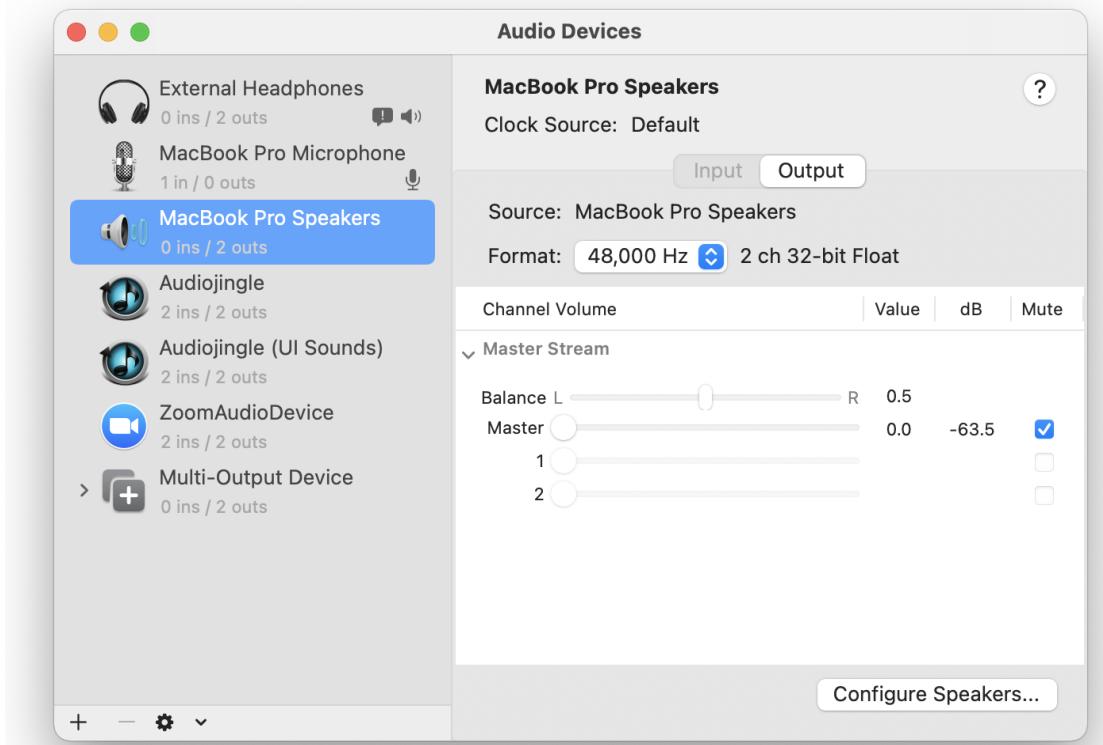
1. Find and open “Audio MIDI Setup” either from “Applications” > “Utilities” within Finder or via Spotlight Search (command +

spacebar keys).



Audio MIDI Setup.app

2. The image below is the Audio MIDI Setup interface, where you can connect your audio sources for microphone input and volume output and make other changes to sound settings.



4.2 - Checking RT-MHA and the CLI

The steps below ensure that you are able to manipulate RT-MHA and the terminal CLI for OSP.

1. Go to the terminal window that has OSP running. Otherwise, open a new terminal window and enter the command: **run_osp**
2. You may hear an increase in background noise. Try speaking to your microphone/audio input source and you should be able to hear yourself speaking.



3. Go back to your terminal and click on the tab named “osp_cli”. You should see the following.

```
Last login: Wed Jul  7 21:15:16 on ttys000
You have new mail.

export OSP_MEDIA="/Library/OSP/1.4.2/release/media"; export OSP_REC=/Library/OSP/recording; export PATH="/usr/local/osp/bin:/opt/anaconda3/bin:/opt/anaconda3/condabin:/Library/Frameworks/Python.framework/Versions/3.9/bin:/usr/local/bin:/usr/bin:/sbin:/Library/TeX/texbin:/Library/Apple/usr/bin"; cd "/Library/OSP/1.4.2/release/bin"; /Library/OSP/1.4.2/release/bin/osp_cli

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro:~          export OSP_MEDIA="/Library/OSP/1.4.2/release/media"; export OSP_REC=/Library/OSP/recording; export PATH="/usr/local/osp/bin:/opt/anaconda3/bin:/opt/anaconda3/condabin:/Library/Frameworks/Python.framework/Versions/3.9/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin:/Library/TeX/texbin:/Library/Apple/usr/bin"; cd "/Library/OSP/1.4.2/release/bin"; /Library/OSP/1.4.2/release/bin/osp_cli
OSP Console. Enter "help" for help.
OSP> |
```

4. Type in the command **play**, and press return/enter.
You should hear an audio file played. You should also see parameters and the word “success” in the terminal.

```
OSP> play
Sending {"method": "set", "data": {"left": {"audio_filename": "tomsdiner.wav", "audio_play": 1, "alpha": 1}, "right": {"alpha": 1}}}
success
OSP>
```

5. To immediately stop the audio file playing, type in the command **stop** and press return/enter.

You should hear the audio file stop. You should also see parameters and the word “success” in the terminal.

```
[OSP> stop
]
Sending {"method": "set", "data": {"left": {"audio_play": 0}}}
success
OSP>
```

6. Finally, enter the commands **help** and **get**
 - a. **help** - Explains all of the available commands and capabilities that you can use in osp_cli.
 - b. **get** - Delivers all of the audio parameters and values from RT-MHA, which are modifiable from the commands given from the **help** command.

In-depth explanation of the CLI is further explained in the [OSP software manual](#).

7. An optional command to remember is **stop_osp**. This will stop all the OSP processes currently running. You may need to close the terminal tabs, depending on the terminal settings. To restart OSP, you may need to open a new terminal window and enter the command **run_osp** again.

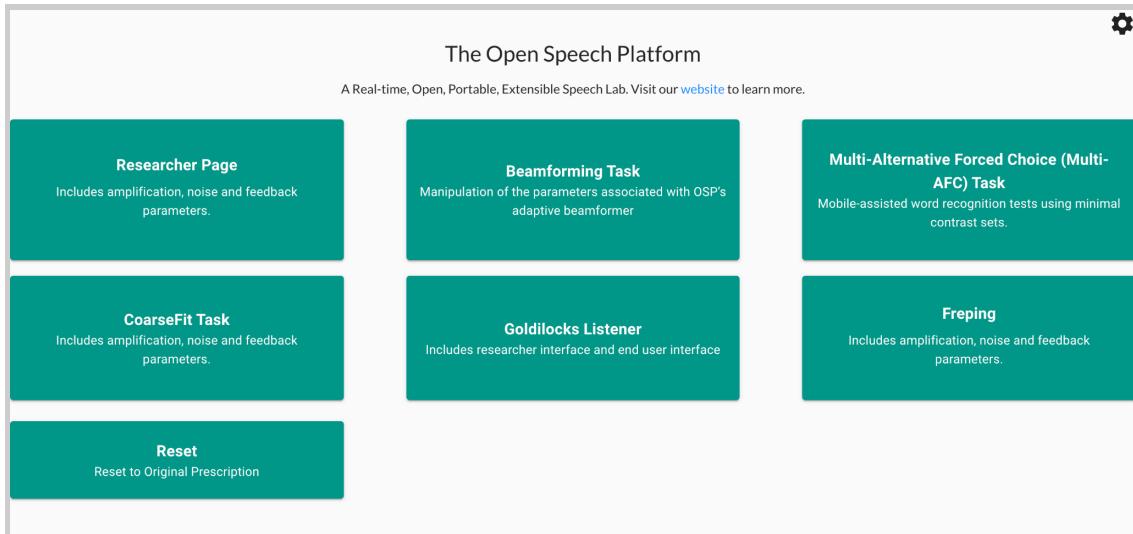
4.3 - Checking EWS

The steps below ensure that you can:

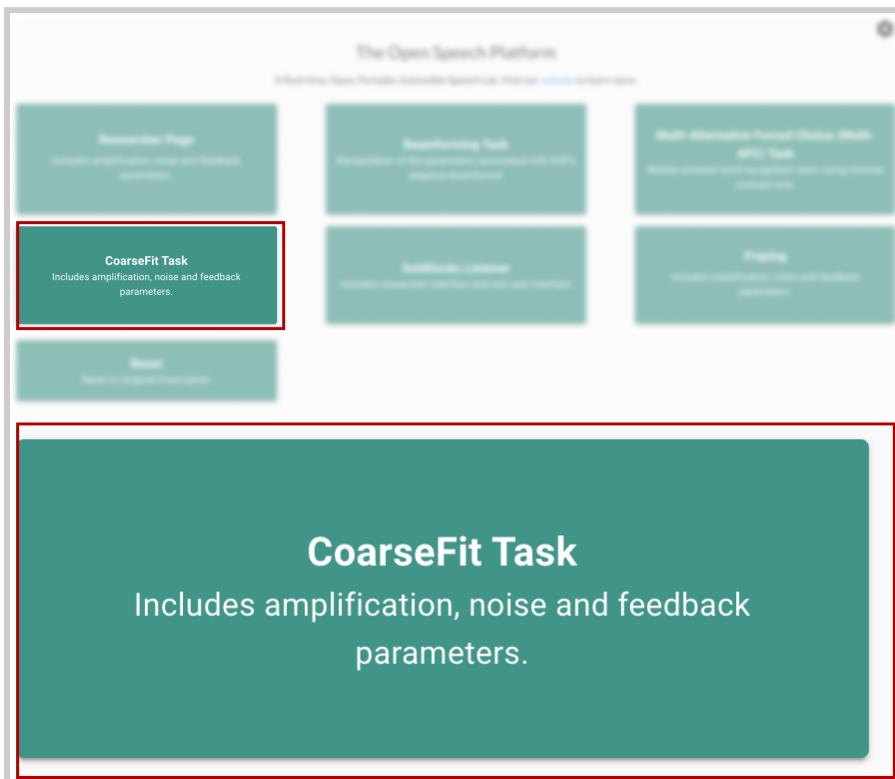
- you can use the browser interface version of OSP (also known as EWS)
- you can listen to audio feedback from the browser
- RT-MHA settings and files are accurately represented in both versions of EWS ([Node.js](#) and [PHP/Laravel](#))

Node.js Version of EWS

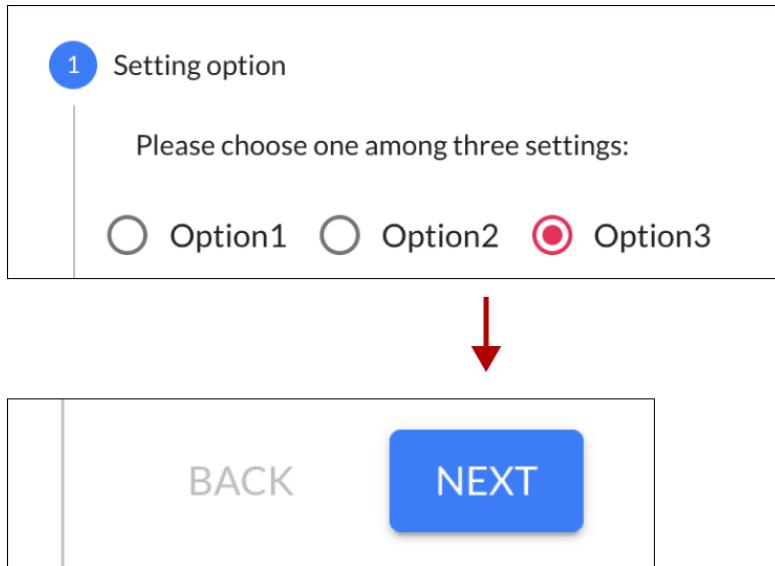
1. Go to the browser that was launched when you entered the **run_osp** command. The URL should be <http://localhost:5000> and should appear like the image below.



2. On the left-hand side, select “CoaseFit Task”.



3. Under “Setting option”, choose any one of the three options. Scroll down to notice changes to the images and text. Then, select the “Next” button.



4. Choose one of the five hearing loss levels (Normal to Profound), which help change the volume heard. Then, click on the horizontal bar, scroll down, and select an audio file named “stims4/stim4.wav”.

2 Loss Assessment

Please adjust the hearing loss:

Normal Mild Medium Severe Profound

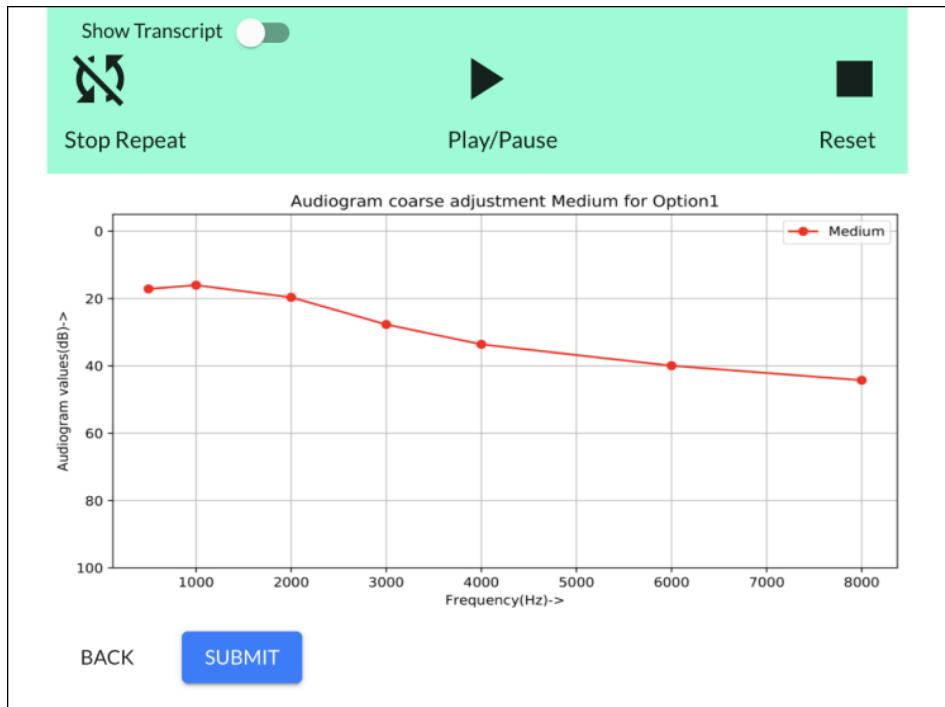
Select...

sock.wav
stims0/stim0.wav
Stim1/stim1.wav
stims2/stim2.wav
stims3/stim3.wav
stims4/stim4.wav
tack.wav

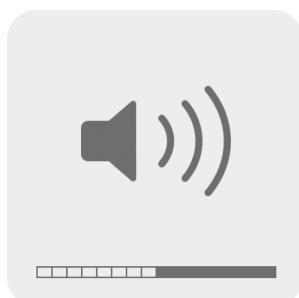
values(dB) ->

values(dB) ->

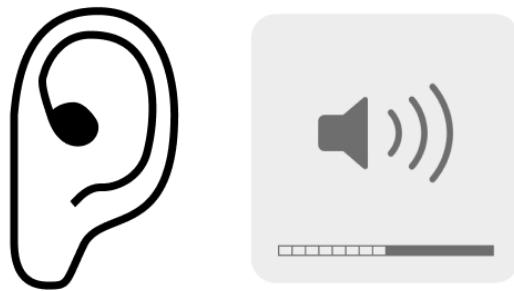
As you change your selection, you should see changes to the graph based on the hearing loss levels chosen.



5. At this point, you should have an audio input and output source connected to your computer and ready for listening. If not, refer to the previous section "[4.1 - Checking Your Audio Devices](#)". Make sure that your audio output is not muted.



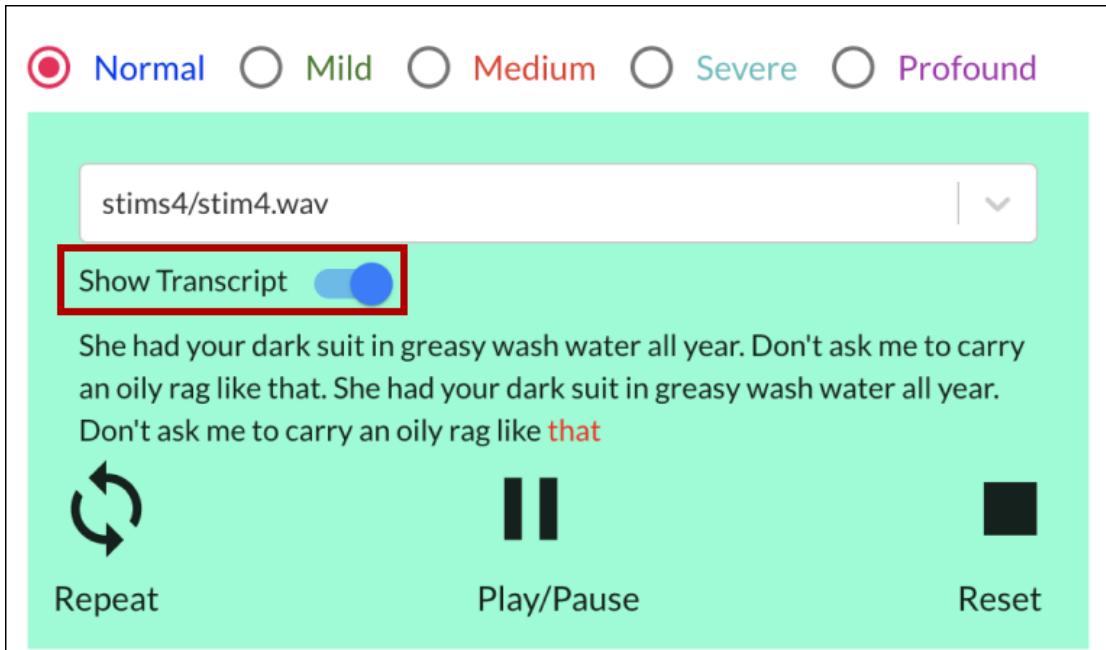
6. Press the “Play/Pause” button and listen for audio feedback. Adjust the volume on your computer accordingly until you can comfortably listen to the audio file.



7. Experiment with the different buttons as you play the audio file.

Note: only the “stim#/stim#.wav” files have transcripts available. To view the transcript, click on the “Show Transcript” toggle.

After playing a “stim#/stim#.wav” audio file, you should also be able to notice that the selected word heard and shown has a different shade of color (usually shown in red) during audio playback.



PHP/Laravel Version of EWS

1. Go to a new browser tab, type into the search bar "<http://localhost:8080>", and press enter. You should see the legacy version of EWS, as shown below.

The Open Speech Platform Webapps for research.

Researcher Page

Includes amplification, noise and feedback parameters.

4 Alternate Forced Choice (4AFC) Task

Includes a 4AFC Task webapp in which an end user can play a sound on click and select a response from 4 options.

Goldilocks

Includes researcher interface and end user interface

Ecological Momentary Assessment (EMA)

Includes an EMA webapp, using which an end user can respond to a prompted question or set of questions.

AB Tasks ▾

Includes an AB Task webapp, using which an end user can select a relationship between two presented stimuli, A and B, evaluated on a 7 point likert scale.

Go to our website

This is a link to the Open Speech Platform website!

Calibration

Calibrate the MHA device using measured values.

2. In the upper-right hand corner, click on the button labeled “Researcher Page”.

The Open Speech Platforms Webapps for research.

Researcher Page

Includes amplification, noise and feedback parameters.

4 Alternate Forced Choice (4AFC) Task

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Researcher Page

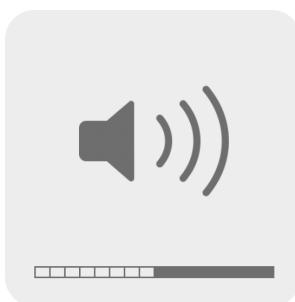
Includes amplification, noise and feedback parameters.

3. You should see this screen for the Researcher Page, within “Amplification”.

The screenshot shows the 'Amplification' tab selected in a top navigation bar. Below it is a 'Controls' section with dropdown menus for 'Control Via' (G50/G80, CR/G65), 'AFC' (On, Off), and 'Global MPO' (120). A 'Channel' selector shows 'Both'. To the right is a vertical toolbar with 'Read', 'Save', and 'Save as' options. The main area contains a table with parameters for various channels (CR, G50, G65, G80, Knee, MPO, Attack, Release) across frequency bands (250, 500, 1000, 2000, 4000, 8000, All).

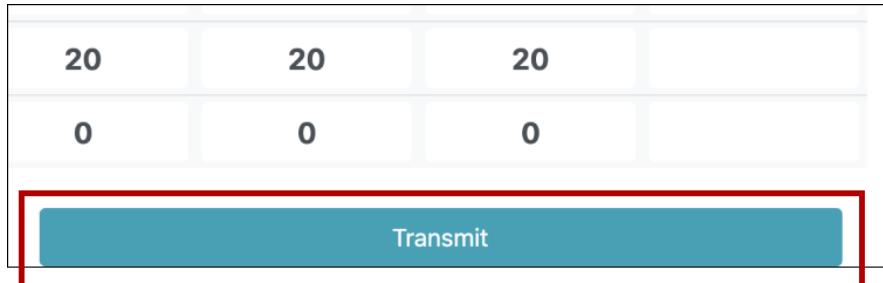
Parameter	250	500	1000	2000	4000	8000	All
CR	1	1	1	1	1	1	
G50	0	0	0	0	0	0	
G65	0	0	0	0	0	0	
G80	0	0	0	0	0	0	
Knee	45	45	45	45	45	45	
MPO	120	120	120	120	120	120	
Attack	5	5	5	5	5	5	
Release	20	20	20	20	20	20	

4. At this point, you should have an audio input and output source connected to your computer and ready for listening. If not, refer to the previous section [“4.1 - Checking Your Audio Devices”](#). Make sure that your audio output is not muted.



5. Scroll to the bottom of the page and click on the “Transmit” button. Then, speak into your computer or headset’s microphone and listen

for immediate audio feedback.

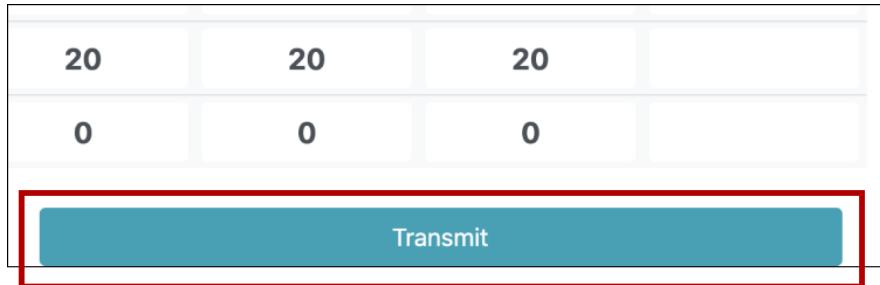


6. Scroll back up and view the “Controls” settings. Next to “Control Via:”, click on CR/G65. Then, in the boxed cell within the “All” column and “G65” row, type in “5”. Notice the change in values.

Changing the value in the boxed cell to “5” should change the gain for “g65” to be 5 decibels (dB SPL) across all frequency bands (250 to 8000 Hertz).



7. Scroll to the bottom of the page and click on the “Transmit” button again. Speak into your computer or headset’s microphone and listen for immediate audio feedback. Notice the differences in volume.



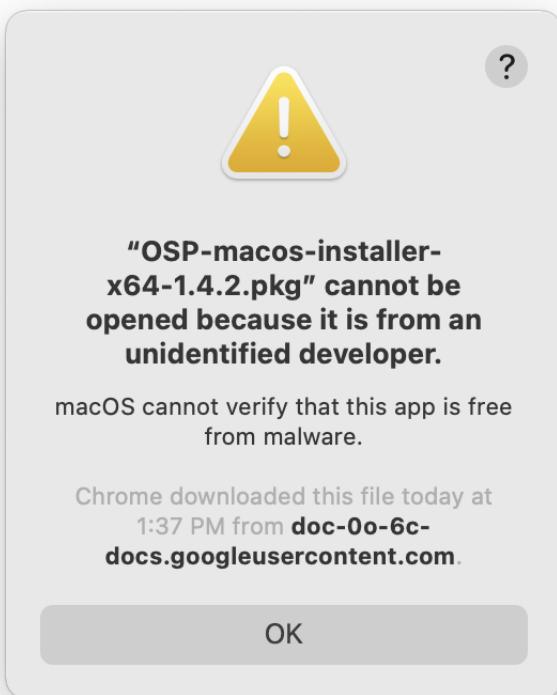
5 - Troubleshooting

This section outlines the steps to resolve possible issues with setting up your OSP software.

- You cannot open the installer file to continue installation from step 3 of “[Installation Steps](#)”. [Refer to 5.1.](#)
- You cannot open multiple terminal tabs needed for OSP. [Refer to 5.2.](#)
- You encounter an error when starting up the PHP/Laravel version of OSP “Deprecated: Method ReflectionParameter::getClass()...” [Refer to 5.3.](#)

5.1 - Can't Open Installer File

You may see an “unidentified developer” message that prevents you from continuing the installation. This would mean you need to change permissions on your computer to allow the installer to run.



1. Find and open “*System Preferences*” either from “*Applications*” within Finder or via Spotlight Search (command + spacebar keys).

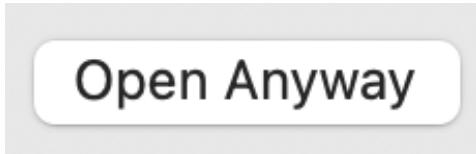
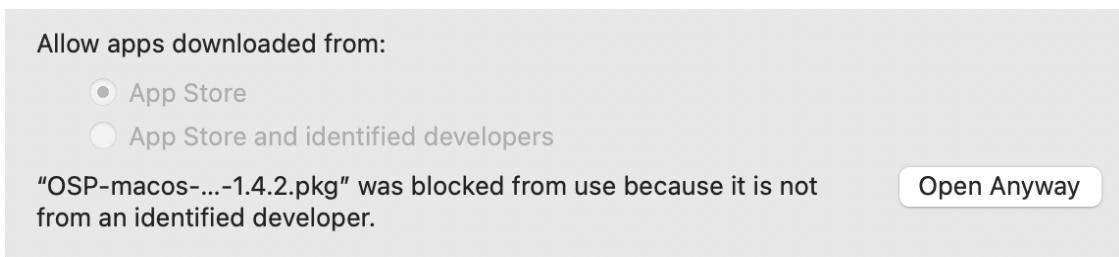


System
Preferences.app

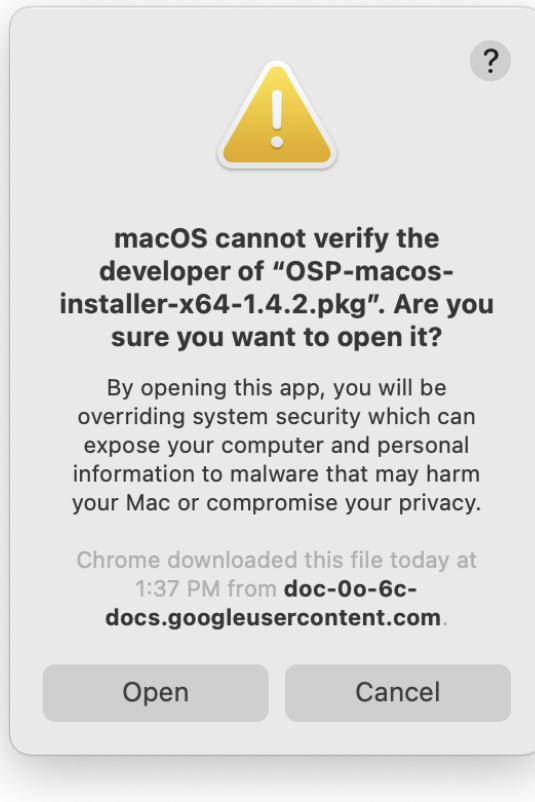
2. From System Preferences, select “Security & Privacy”.



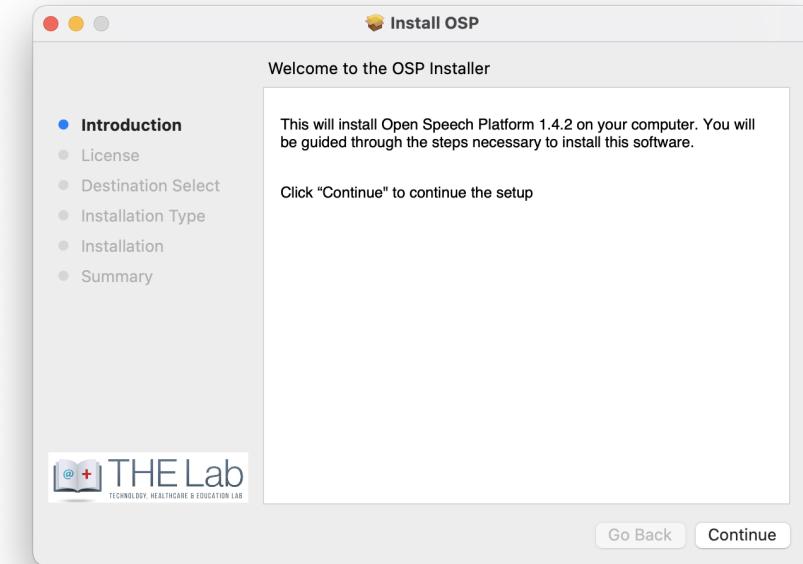
3. Within “General”, you should see the “unidentified developer” message here as well. Select “Open Anyway”.



4. You will be asked to confirm opening the file. Select “Open”.



5. You should see this installer window opened. Proceed to Step 4 of the “[Installation Steps](#)”.



5.2 - Can't Open Multiple Terminal Tabs

If the five terminal tabs don't open when you enter the `run_osp` command, you will need to double check the permissions granted.

6. Find and open “*System Preferences*” either from “*Applications*” within Finder or via Spotlight Search (command + spacebar keys).

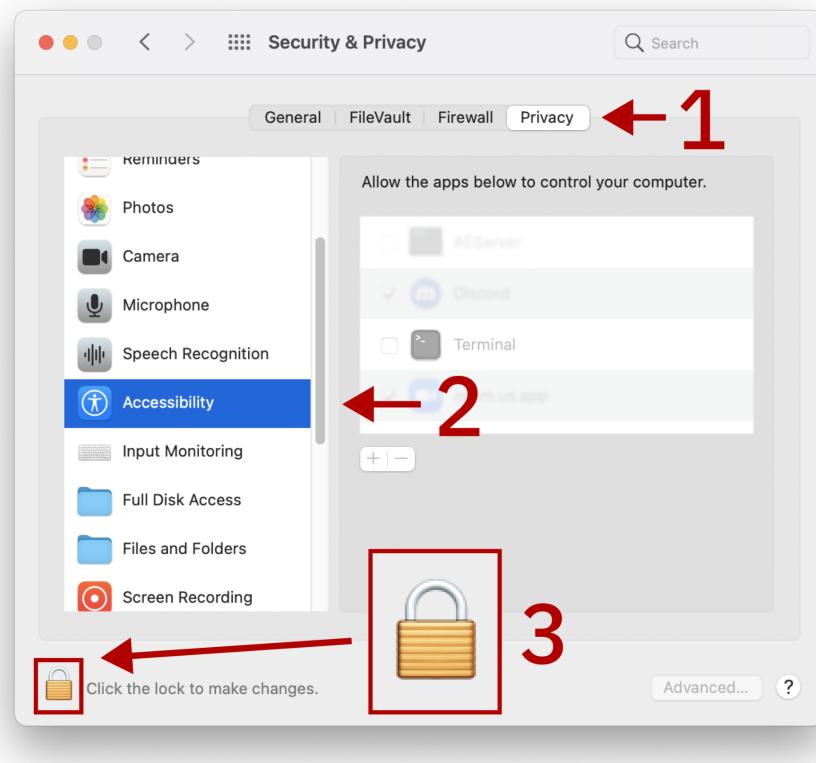


System
Preferences.app

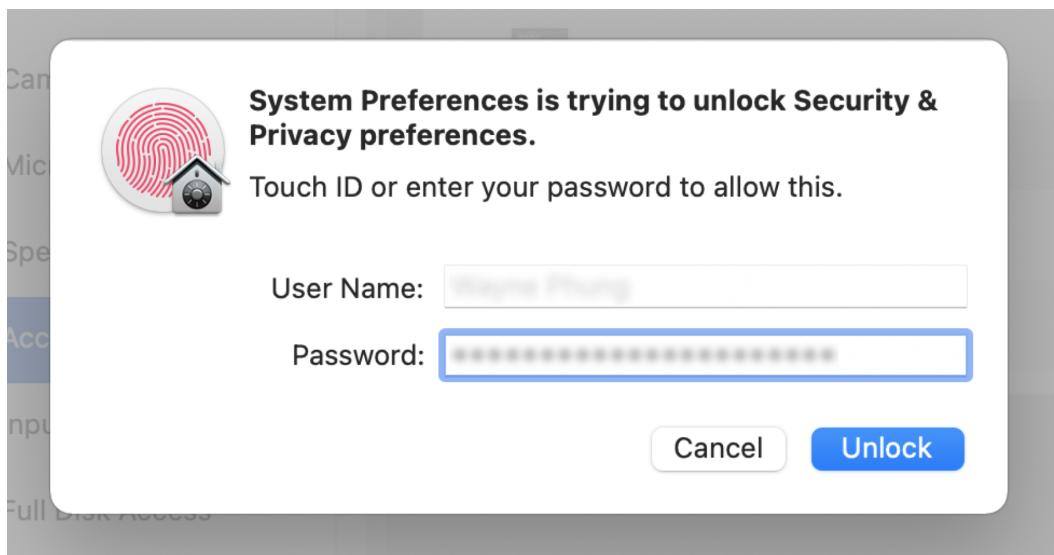
7. From System Preferences, select “Security & Privacy”.



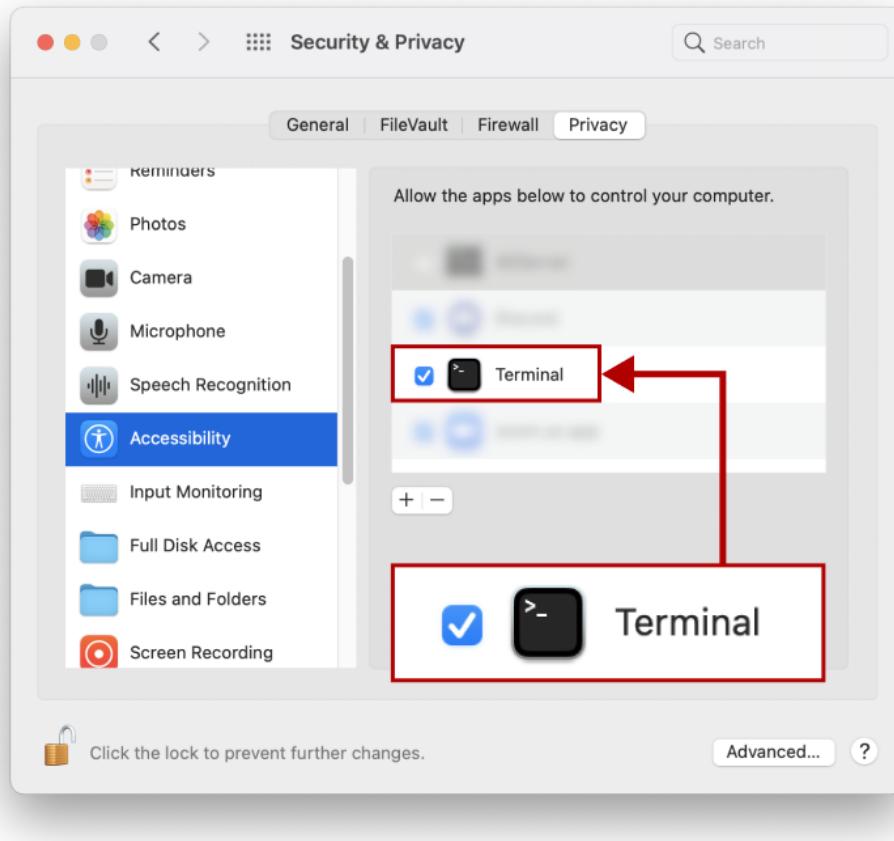
8. Go to “Privacy”. On the left sidebar, scroll down to “Accessibility”, then click on the lock icon at the bottom.



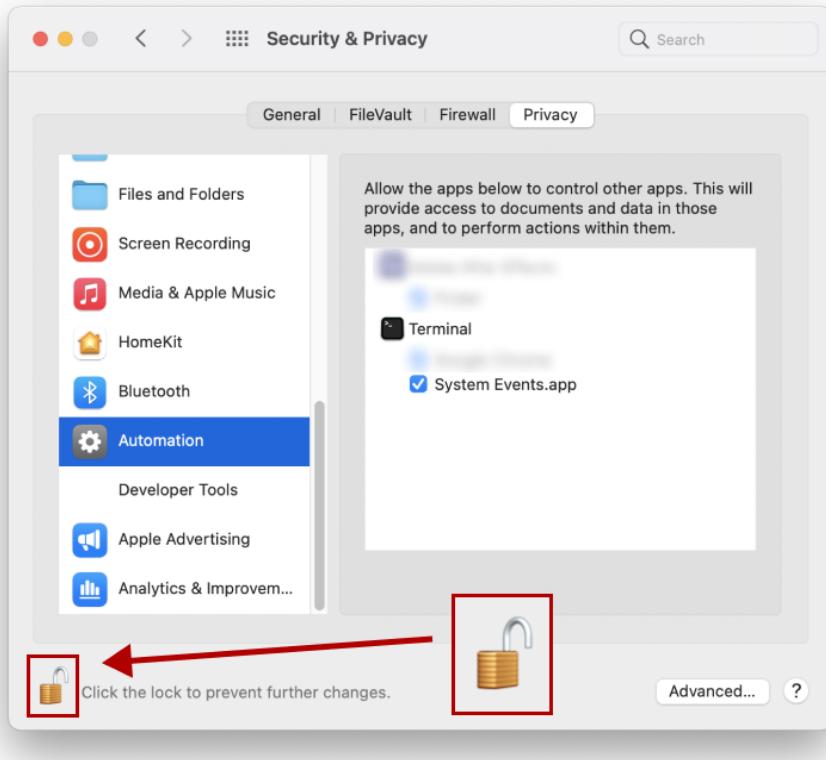
9. Use Touch ID or enter your password to unlock these settings.



10. Click on the checkbox next to Terminal to enable Terminal access.
You should see a checkmark.



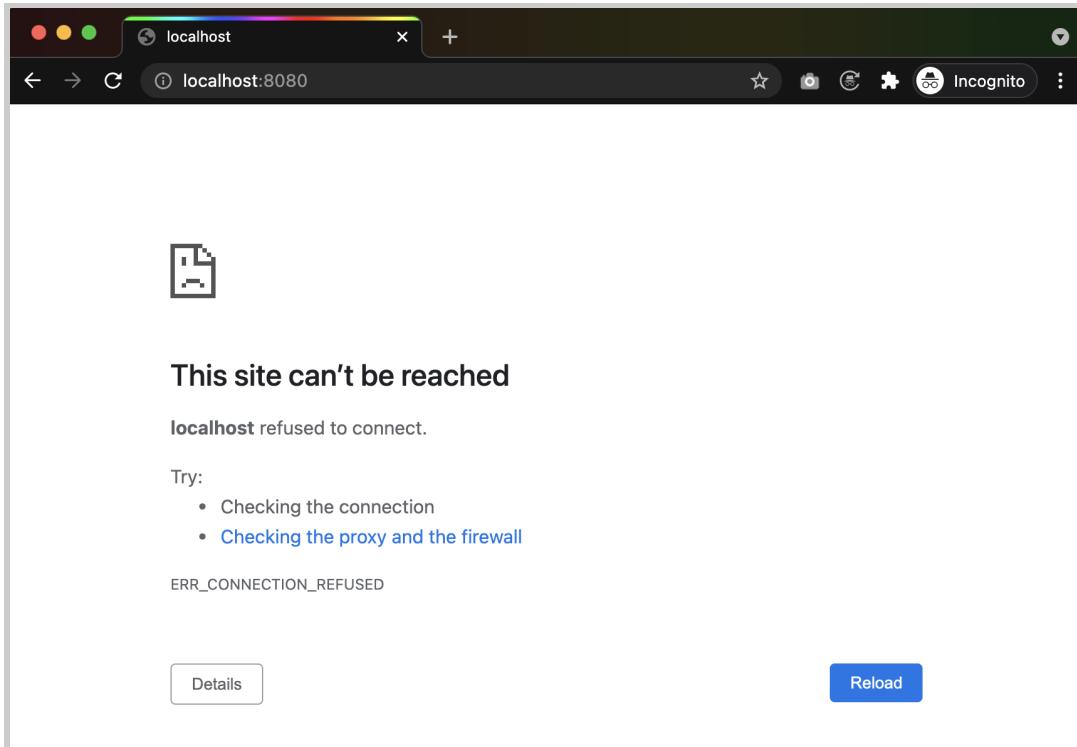
11. Go to the left sidebar again and scroll down to “Automation”. Under Terminal, click on the checkbox next to “System Events.app” to show the checkbox.



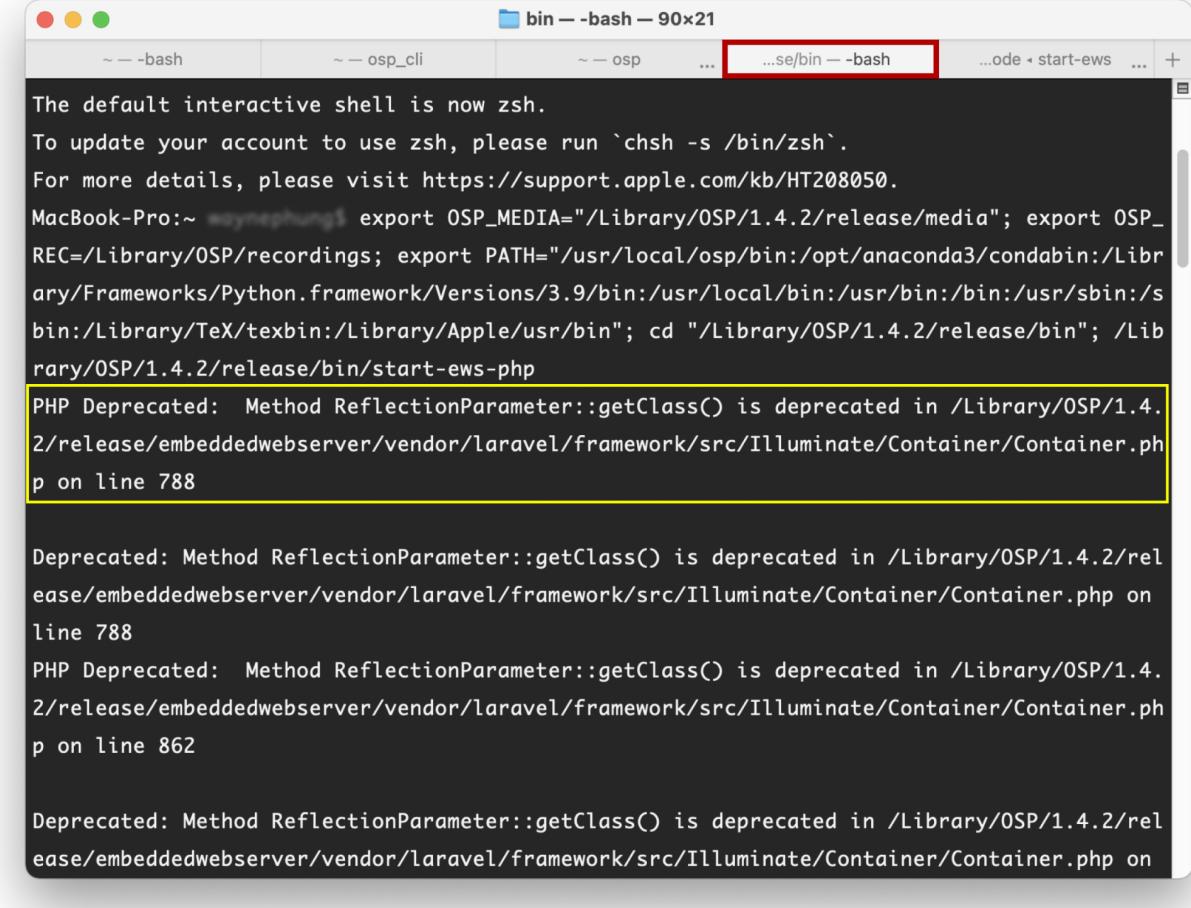
12. In the terminal, type in the command **run_osp** and press enter. You should now see the five terminal tabs opening.

5.3 - Deprecated Error when Starting PHP Version of EWS

If you can't connect to the PHP/Laravel version of EWS via <http://localhost:8080>, you may see this error.



You may encounter this error when you navigate to the “bin - bash” terminal tab.



The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit <https://support.apple.com/kb/HT208050>.
MacBook-Pro:~ [REDACTED] export OSP_MEDIA="/Library/OSP/1.4.2/release/media"; export OSP_REC=/Library/OSP/recording; export PATH="/usr/local/osp/bin:/opt/anaconda3/condabin:/Library/Frameworks/Python.framework/Versions/3.9/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin:/Library/TeX/texbin:/Library/Apple/usr/bin"; cd "/Library/OSP/1.4.2/release/bin"; /Library/OSP/1.4.2/release/bin/start-ews-php
PHP Deprecated: Method ReflectionParameter::getClass() is deprecated in /Library/OSP/1.4.2/release/embeddedwebserver/vendor/laravel/framework/src/Illuminate/Container/Container.php on line 788

Deprecated: Method ReflectionParameter::getClass() is deprecated in /Library/OSP/1.4.2/release/embeddedwebserver/vendor/laravel/framework/src/Illuminate/Container/Container.php on line 788
PHP Deprecated: Method ReflectionParameter::getClass() is deprecated in /Library/OSP/1.4.2/release/embeddedwebserver/vendor/laravel/framework/src/Illuminate/Container/Container.php on line 862

Deprecated: Method ReflectionParameter::getClass() is deprecated in /Library/OSP/1.4.2/release/embeddedwebserver/vendor/laravel/framework/src/Illuminate/Container/Container.php on

To resolve this issue, follow these steps:

1. Open a new terminal window.
2. Enter the command **php -v** to check the current version of PHP installed in your computer.

```
[MacBook-Pro:~ [REDACTED]] php -v  
PHP 8.0.8 (cli) (built: Jul 1 2021 14:19:56) ( NTS )
```

The PHP/Laravel version of EWS doesn't support versions later than 7.4 (such as 8.0.8). If you have a version of PHP installed within your computer that is later than 7.4, this may be the cause of the error.

Otherwise, if you don't have PHP installed, follow step #3, install PHP 7.4 with the command **brew install php@7.4**, then skip to step #6.

3. Install [Homebrew](#) with this command:

```
/bin/bash -c "$(curl -fsSL  
https://raw.githubusercontent.com/Homebrew/install/  
HEAD/install.sh)"
```

Wait until the process is finished.

4. Open Finder. Go to “Macintosh HD” and navigate through these folder names in order: “usr” > “local” > “Cellar”> “php”. Within “php” check the version number.
5. Enter the command **brew unlink php** to detach usage of the current version of PHP.

```
[MacBook-Pro:~] brew unlink php  
Unlinking /usr/local/Cellar/php/8.0.8... 24 symlinks removed.  
[MacBook-Pro:~]
```

6. Enter the command **brew link php@7.4** to use the 7.4 version of PHP.

```
[MacBook-Pro:~] brew link php@7.4  
Linking /usr/local/Cellar/php@7.4/7.4.21... 25 symlinks created.
```

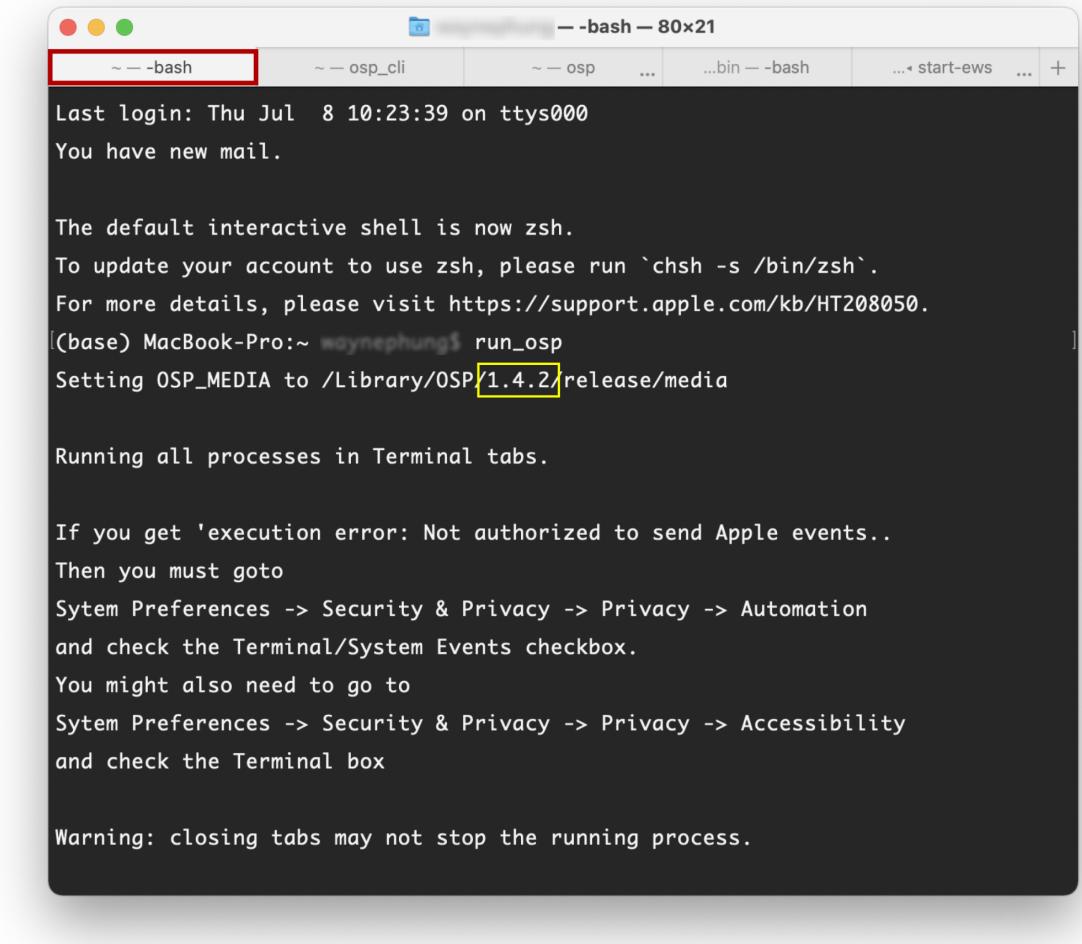
7. Enter the command **php -v** to check that the 7.4 PHP version is correctly linked.

```
[MacBook-Pro:~ waynephung]$ php -v
PHP 7.4.21 (cli) (built: Jul 1 2021 23:31:08) ( NTS )
```

8. (Re)start OSP again: **run_osp**
9. Once you are redirected to the Node.js version of EWS, enter <http://localhost:8080> in the search bar to re-launch PHP/Laravel version of EWS.
10. If you wish to uninstall [Homebrew](#), enter this command:
/bin/bash -c "\$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/uninstall.sh)"

6 - Uninstalling OSP

1. First, find the version number. Have a terminal running and enter the command **run_osp** to launch OSP. Go to the “-bash” terminal tab, and find the “Setting OSP_MEDIA to /Library” message.



The screenshot shows a macOS Terminal window titled "-bash - 80x21". The window contains the following text:

```
Last login: Thu Jul  8 10:23:39 on ttys000
You have new mail.

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro:~ waynephung$ run_osp
Setting OSP_MEDIA to /Library/OSP/1.4.2/release/media

Running all processes in Terminal tabs.

If you get 'execution error: Not authorized to send Apple events..
Then you must goto
System Preferences -> Security & Privacy -> Privacy -> Automation
and check the Terminal/System Events checkbox.
You might also need to go to
System Preferences -> Security & Privacy -> Privacy -> Accessibility
and check the Terminal box

Warning: closing tabs may not stop the running process.
```

2. Enter the command:

sudo bash /Library/OSP/1.4.2/uninstall.sh

Replace “**1.4.2**” with the version number you found. When prompted, enter your computer sign-in password.



```
MacBook-Pro:~ [REDACTED] sudo bash /Library/OSP/1.4.2/uninstall.sh
Password: [KEYhole icon]
```

3. You will be asked if you want to proceed with uninstallation. To proceed, enter “y”.

```
The following packages will be REMOVED:  
OSP-1.4.2  
Do you wish to continue [Y/n]?y|
```

4. You should see the following message that the uninstall process has been finished.

```
Application uninstalling process started  
[1/3] [DONE] Successfully deleted shortcut links  
[2/3] [DONE] Successfully deleted application informations  
[3/3] [DONE] Successfully deleted application  
Application uninstall process finished
```

7 - Next Steps and Resources

For a full understanding of OSP software capabilities, refer to the [manual](#).

Below are hyperlinks to other OSP-related resources:

- [OSP Website](#) - General information of OSP.
- [OpenSpeechPlatform on GitHub](#) - This is a public repository where you will find installer files and other documentation files for setting up both OSP software and hardware. Check back for future OSP release notes, updated installer files, and updated documentation.

- [“Binaries” folder on GitHub](#) - This is the specific folder where you can download the software builds for either macOS or for the OSP hardware provided.
- [Google Form “OSP Feedback Form”](#) - You can complete this form if you would like to follow up regarding any topics or issues using OSP to a project staff member.