

Recording Data from the Cosmic Watch to a Macintosh

Revision History

revision	date	author	notes
1	Jul 9 2021	J. Weber	Initial release, validated on using Mac OS X <i>Mojave</i> 10.14.6
2	Jan 25 2023	J. Weber	
3	Feb 01 2023	J. Weber	Mac binary replaces git, python

Purpose

This document details the procedure for installing [Cosmic Watch](#) software on a Macintosh (Mac) computer, and reading data from the Cosmic Watch detector.

Before You Begin

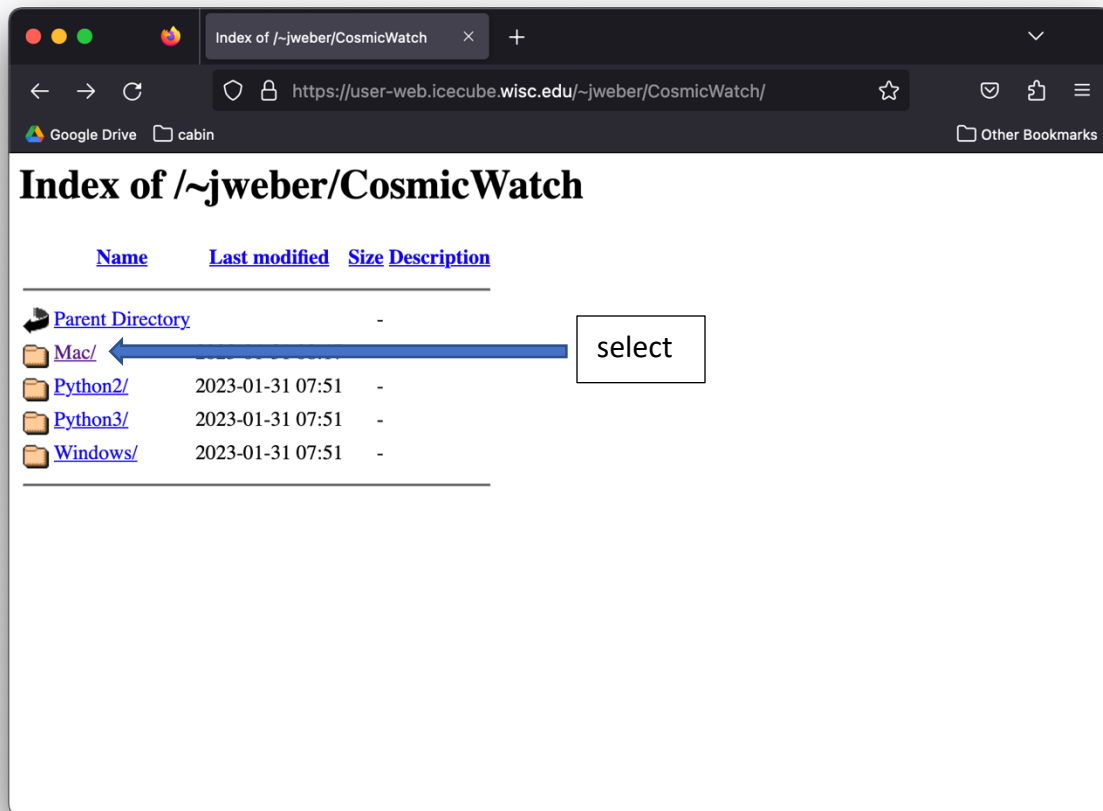
You will need the following before starting this procedure:

- Macintosh (Mac) desktop or laptop computer
- [Cosmic Watch](#) detector
- USB serial data cable, and optional adapters from Cosmic Watch to Mac. One end of the cable must be a USB [Mini-B](#) plug to connect to the Cosmic Watch. The other end will connect to the Mac. Newer Macs since 2016 may require a [USB-C](#) plug. Older Macs will likely require a [USB A](#) plug. Adapters or dongles may be required to make this connection complete. Connect the Cosmic Watch to the Mac via the serial data cable. The Cosmic Watch detector is powered through the USB cable.
- A wired or WiFi internet connection, to download required software dependencies and libraries.

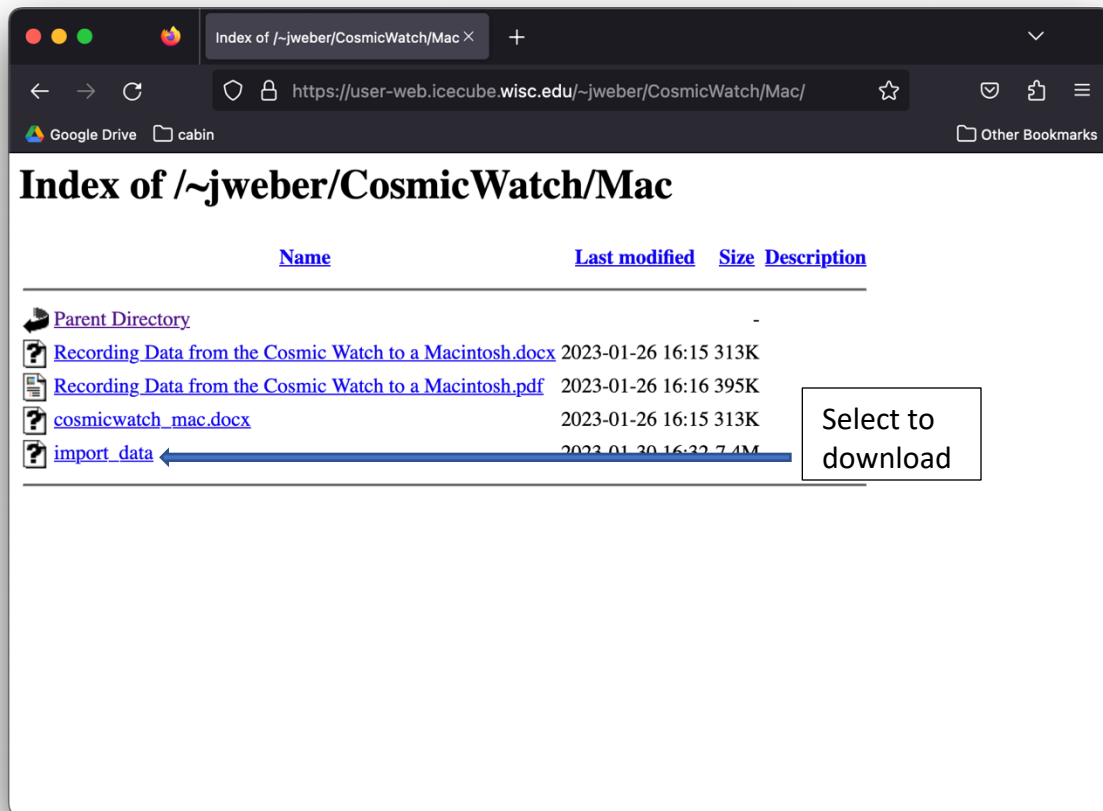
Download Cosmic Watch Software

From your browser navigate to the CosmicWatch download URL <https://user-web.icecube.wisc.edu/~jweber/CosmicWatch/> then to the [Mac](#) folder and download the [import_data](#) file.

RECORDING DATA FROM COSMIC WATCH TO MAC



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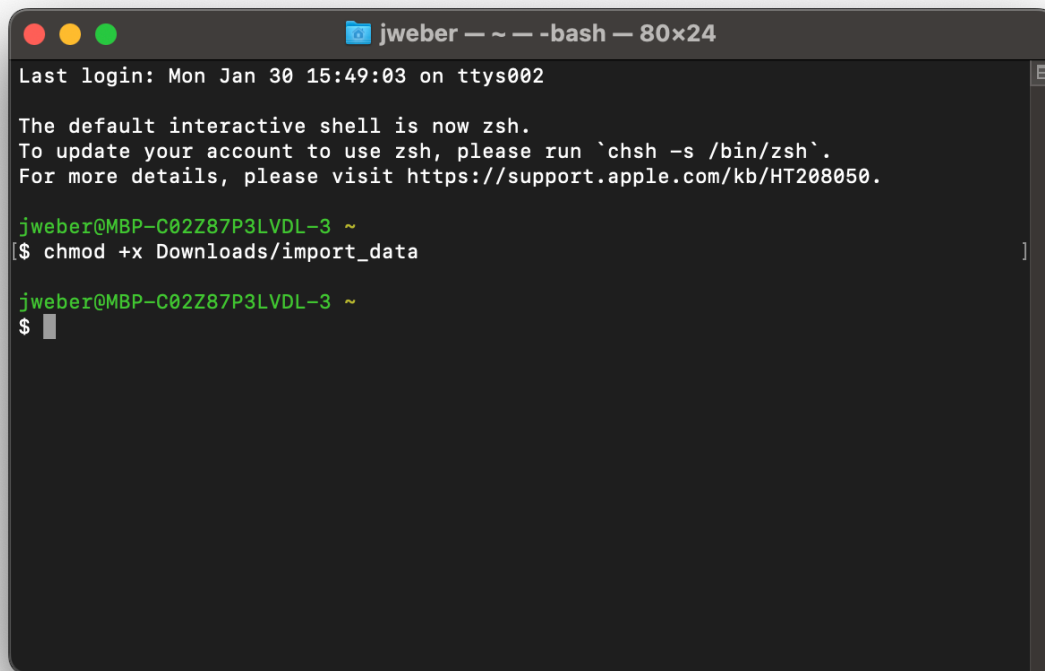


import_data is the Mac program (app) which allows you to communicate with the CosmicWatch detector. Use the Mac Finder app to locate the *import_data* file, which should be the newest file in your *Downloads* folder.

Open a Terminal app using this [link](#). Copy/paste the command
`chmod +x Downloads/import_data`

into the Terminal to make the *import_data* file an executable program, then hit the *return* key

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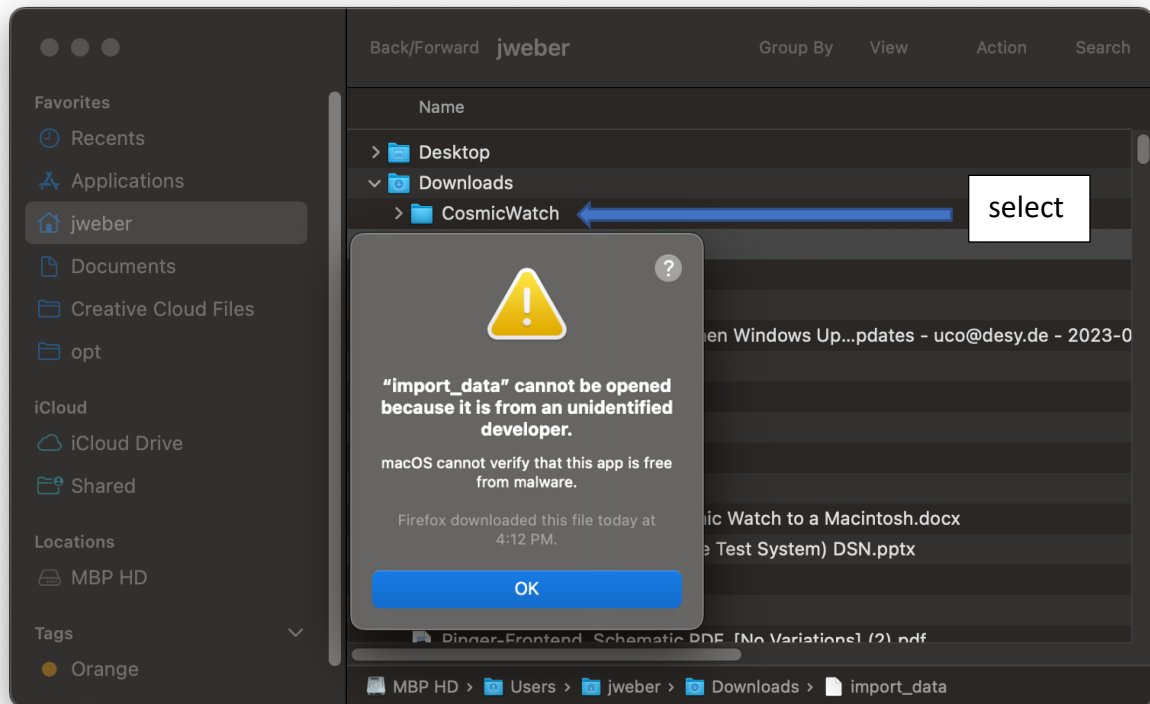
```
jweber — ~ — -bash — 80x24
Last login: Mon Jan 30 15:49:03 on ttys002

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.

jweber@MBP-C02Z87P3LVDL-3 ~
[$ chmod +x Downloads/import_data
jweber@MBP-C02Z87P3LVDL-3 ~
$
```

Back in the Finder window, click on *import_data* to open the program. Depending upon your system security settings you may get a warning that the program was not downloaded from the Mac App Store. Fear not, the program was developed at WIPAC and is safe to run. If you encounter a warning, see the Apple notes for safely opening programs from third parties: <https://support.apple.com/en-us/HT202491> .

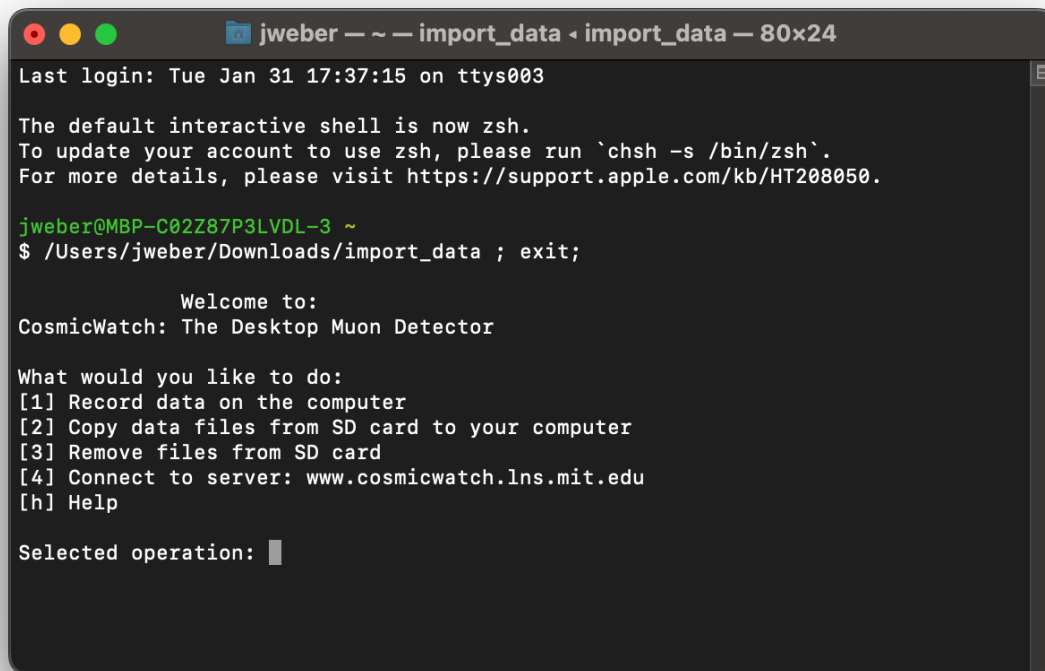
RECORDING DATA FROM COSMIC WATCH TO MAC



When you are able to open the *import_data* file in the Finder window, you may encounter a window with *“Terminal.app” would like to access files in your Downloads folder*. If so, hit OK to open the *import_data* file.

When you do successfully launch the *import_data* program you will see text output similar to the following:

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A screenshot of a macOS terminal window. The title bar shows the user 'jweber' and the window name 'import_data'. The terminal text shows a login message, a zsh shell notification, and a command to run a script. The script outputs a welcome message and a menu of options. The user has selected option 1, and the prompt 'Selected operation:' is visible with a cursor.

```
jweber — ~ — import_data ◀ import_data — 80x24
Last login: Tue Jan 31 17:37:15 on ttys003

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.

jweber@MBP-C02Z87P3LVDL-3 ~
$ /Users/jweber/Downloads/import_data ; exit;

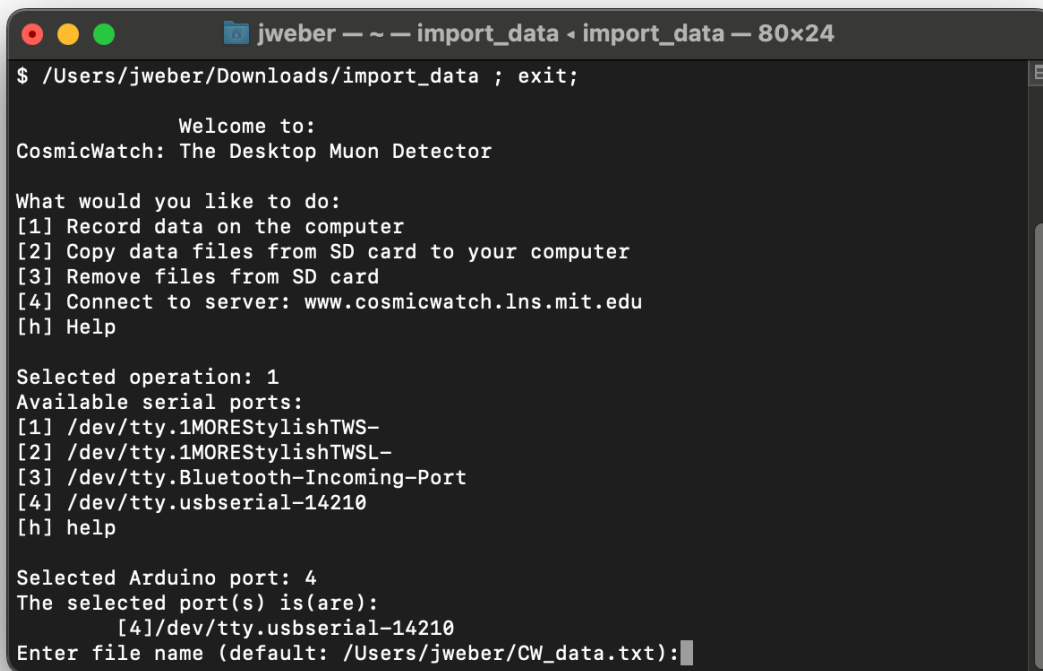
Welcome to:
CosmicWatch: The Desktop Muon Detector

What would you like to do:
[1] Record data on the computer
[2] Copy data files from SD card to your computer
[3] Remove files from SD card
[4] Connect to server: www.cosmicwatch.lns.mit.edu
[h] Help

Selected operation: █
```

Select option *1 Record data on the computer*, then hit *return*. Next select the serial port with *usbserial* in the name. In our example, this is option *4 /dev/tty.usbserial-14210*. Then hit the *return* key again to accept the default output file name:

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A screenshot of a macOS terminal window titled "jweber — ~ — import_data ◀ import_data — 80x24". The terminal shows the execution of a script located at "/Users/jweber/Downloads/import_data ; exit;". The script outputs a welcome message: "Welcome to: CosmicWatch: The Desktop Muon Detector". It then presents a menu of options: "What would you like to do: [1] Record data on the computer [2] Copy data files from SD card to your computer [3] Remove files from SD card [4] Connect to server: www.cosmicwatch.lns.mit.edu [h] Help". The user has selected option 1, leading to "Selected operation: 1". Next, it lists "Available serial ports:" with four options: "[1] /dev/tty.1MOREStylishTWS-", "[2] /dev/tty.1MOREStylishTWSL-", "[3] /dev/tty.Bluetooth-Incoming-Port", and "[4] /dev/tty.usbserial-14210". The user has selected option 4, resulting in "Selected Arduino port: 4". The terminal then displays "The selected port(s) is(are): [4]/dev/tty.usbserial-14210". Finally, it prompts the user to "Enter file name (default: /Users/jweber/CW_data.txt):", with the cursor positioned at the end of the default path.

```
$ /Users/jweber/Downloads/import_data ; exit;

Welcome to:
CosmicWatch: The Desktop Muon Detector

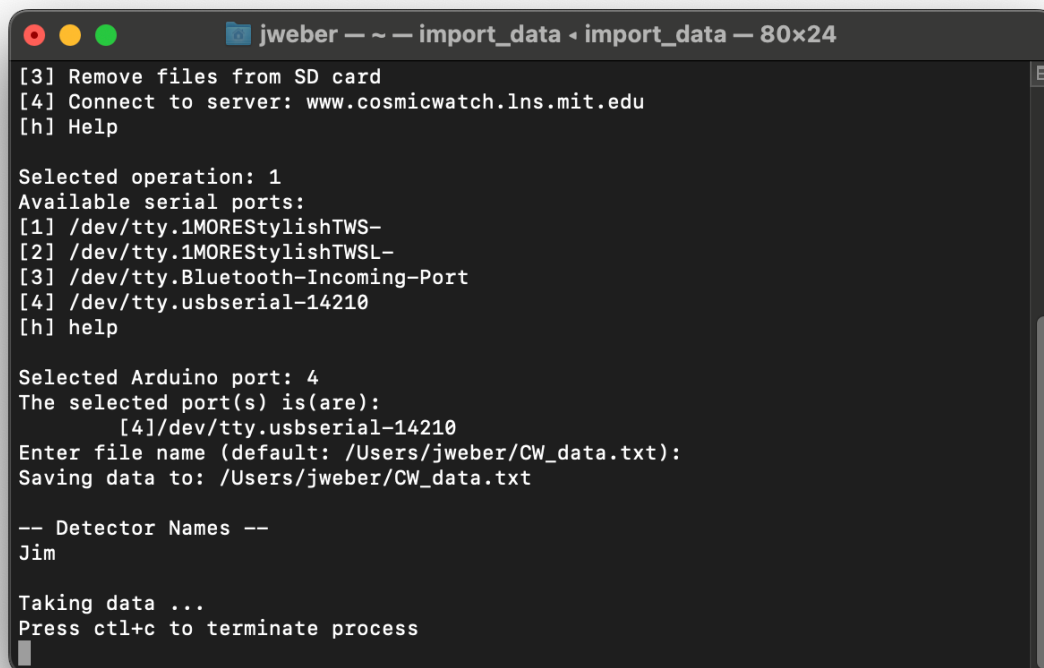
What would you like to do:
[1] Record data on the computer
[2] Copy data files from SD card to your computer
[3] Remove files from SD card
[4] Connect to server: www.cosmicwatch.lns.mit.edu
[h] Help

Selected operation: 1
Available serial ports:
[1] /dev/tty.1MOREStylishTWS-
[2] /dev/tty.1MOREStylishTWSL-
[3] /dev/tty.Bluetooth-Incoming-Port
[4] /dev/tty.usbserial-14210
[h] help

Selected Arduino port: 4
The selected port(s) is(are):
[4]/dev/tty.usbserial-14210
Enter file name (default: /Users/jweber/CW_data.txt):
```

RECORDING DATA FROM COSMIC WATCH TO MAC

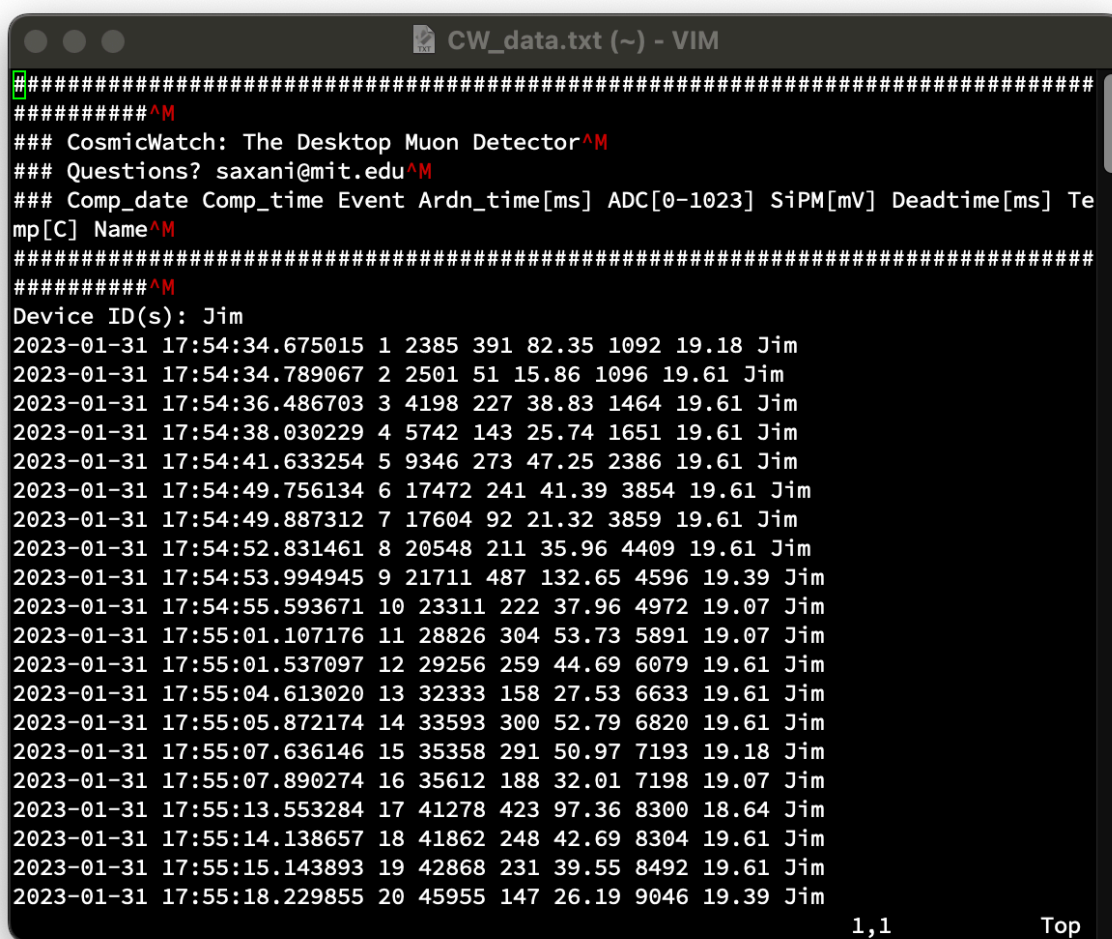
After setting the output data file, you should see that the CosmicWatch is “Saving data to:” your output data file. This indicates your Mac is counting muon detections from the CosmicWatch!

A screenshot of a terminal window on a Mac. The window title is 'jweber ~ -- import_data < import_data -- 80x24'. The terminal shows a menu with options: [3] Remove files from SD card, [4] Connect to server: www.cosmicwatch.lns.mit.edu, and [h] Help. The user has selected operation 1. A list of available serial ports is shown: [1] /dev/tty.1MOREStylishTWS-, [2] /dev/tty.1MOREStylishTWSL-, [3] /dev/tty.Bluetooth-Incoming-Port, and [4] /dev/tty.usbserial-14210. The user has selected port 4. The terminal then shows the selected Arduino port as 4 and the selected port(s) as [4]/dev/tty.usbserial-14210. It prompts for a file name, with the default being /Users/jweber/CW_data.txt, and shows 'Saving data to: /Users/jweber/CW_data.txt'. Below this, it says '-- Detector Names --' and 'Jim'. Finally, it says 'Taking data ...' and 'Press ctrl+c to terminate process'.

The Mac will record about 1 reading per second. To stop collecting data, hit *control+c* (that is the *control* key and lower case *c* key at the same time). You must stop the program with *control+c* before closing the program window, or the output data file may be empty.

To view your CosmicWatch data, use the Mac Finder to open the file *CW_data.txt* in your top level user directory, which is likely the same as your name:

RECORDING DATA FROM COSMIC WATCH TO MAC



```
#####  
#####^M  
### CosmicWatch: The Desktop Muon Detector^M  
### Questions? saxani@mit.edu^M  
### Comp_date Comp_time Event Ardn_time[ms] ADC[0-1023] SiPM[mV] Deadtime[ms] Temp[C] Name^M  
#####  
#####^M  
Device ID(s): Jim  
2023-01-31 17:54:34.675015 1 2385 391 82.35 1092 19.18 Jim  
2023-01-31 17:54:34.789067 2 2501 51 15.86 1096 19.61 Jim  
2023-01-31 17:54:36.486703 3 4198 227 38.83 1464 19.61 Jim  
2023-01-31 17:54:38.030229 4 5742 143 25.74 1651 19.61 Jim  
2023-01-31 17:54:41.633254 5 9346 273 47.25 2386 19.61 Jim  
2023-01-31 17:54:49.756134 6 17472 241 41.39 3854 19.61 Jim  
2023-01-31 17:54:49.887312 7 17604 92 21.32 3859 19.61 Jim  
2023-01-31 17:54:52.831461 8 20548 211 35.96 4409 19.61 Jim  
2023-01-31 17:54:53.994945 9 21711 487 132.65 4596 19.39 Jim  
2023-01-31 17:54:55.593671 10 23311 222 37.96 4972 19.07 Jim  
2023-01-31 17:55:01.107176 11 28826 304 53.73 5891 19.07 Jim  
2023-01-31 17:55:01.537097 12 29256 259 44.69 6079 19.61 Jim  
2023-01-31 17:55:04.613020 13 32333 158 27.53 6633 19.61 Jim  
2023-01-31 17:55:05.872174 14 33593 300 52.79 6820 19.61 Jim  
2023-01-31 17:55:07.636146 15 35358 291 50.97 7193 19.18 Jim  
2023-01-31 17:55:07.890274 16 35612 188 32.01 7198 19.07 Jim  
2023-01-31 17:55:13.553284 17 41278 423 97.36 8300 18.64 Jim  
2023-01-31 17:55:14.138657 18 41862 248 42.69 8304 19.61 Jim  
2023-01-31 17:55:15.143893 19 42868 231 39.55 8492 19.61 Jim  
2023-01-31 17:55:18.229855 20 45955 147 26.19 9046 19.39 Jim  
1,1 Top
```

Each line in `CW_data.txt` is a time stamped reading from the CosmicWatch. You can close the window when done.