



Energy and Flexibility Modelling

Hands-on 1 (macOS)

Please use the following citation for:

- **This exercise**

Tan, N., Cannone, C., Kell, A., Howells, M. (2022, January). Hands-on 1 (macOS): Energy and Flexibility Modelling. <http://doi.org/10.5281/zenodo.5920392>

- **clicSANDMac Software**

Cannone, C., Tan, N., Kell, A., de Wet, N., Howells, M., Yeganyan, R. (2021). clicSANDMac [computer software]. <http://doi.org/10.5281/zenodo.5879056>

- **OSeMOSYS Google Forum**

Please sign up to the help Google forum [here](#). If you are stuck, please ask questions here. If you get ahead, please answer questions in the same forum. Please state that you are using the 'clicSAND' Interface.

- **Step-by-step explanatory video on Youtube**

A video recording of this exercise is available on the CCG Youtube channel at: <https://www.youtube.com/watch?v=4Pfg8t8sb4w>

Learning outcomes

By the end of this exercise, you will know how to:

- 1) Install Mono framework for Mac
- 2) Install gcc, cbc, and glpsol
- 3) Install clicSANDMac



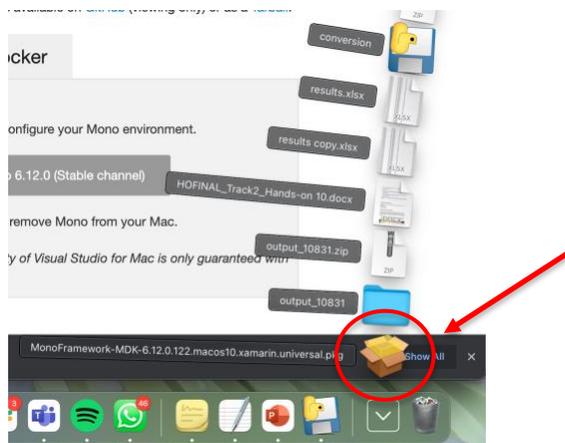
Install Mono framework for Mac

Download Mono with this [website](#).

This is the page you will see when clicking on the above link. Click on 'Download Mono 6.12.0 (Visual Studio channel*)' to start the download.

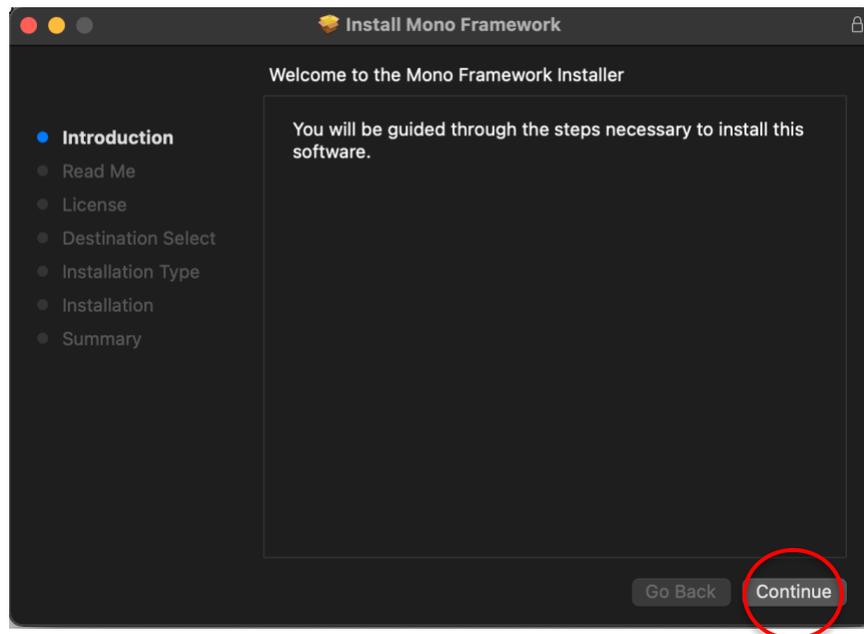
The screenshot shows the Mono website's download page for macOS. The navigation bar includes 'Home', 'Download', 'Documentation', 'News', and 'Community'. The main heading is 'Download', with release channels listed as 'Nightly', 'Preview', 'Stable', and 'Visual Studio'. It states the latest stable release is 6.12.0 (6.12.0.122) and provides links to GitHub and Tarball. The macOS section is active, showing instructions to download Mono as a Mac Package (.pkg) and a link to the installation guide. Two download buttons are present: 'Download Mono 6.12.0 (Visual Studio channel*)' (highlighted in blue) and 'Download Mono 6.12.0 (Stable channel)'. A note mentions support for macOS 10.9 and later, with a link to uninstall instructions. A disclaimer at the bottom recommends the Visual Studio channel for users of Visual Studio for Mac.

Once downloaded, the Mono package will be in your Downloads folder. This may be easily accessible from the lower right corner of your screen. Click on it.

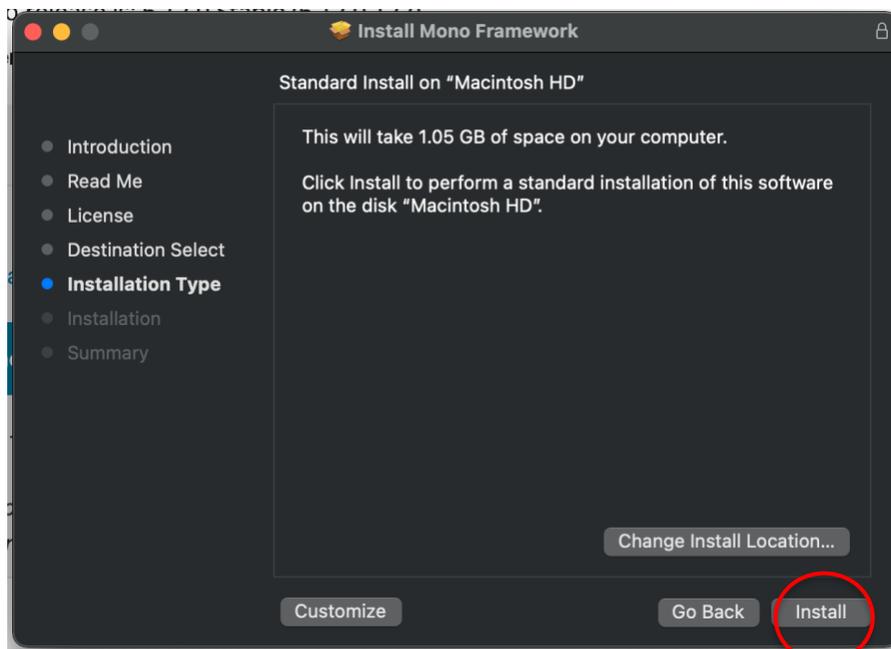




A pop-up screen will appear, welcoming you to the Mono Framework Installer.

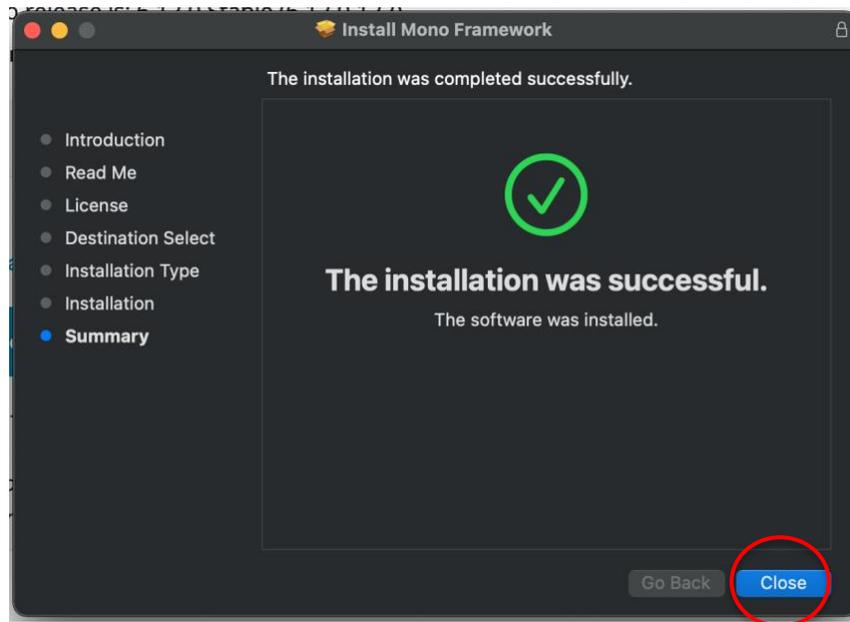


Click on 'Continue' and 'Agree' in the lower right corner of the pop-up screen for the next few pages, until you see the screen below. Click 'Install'.

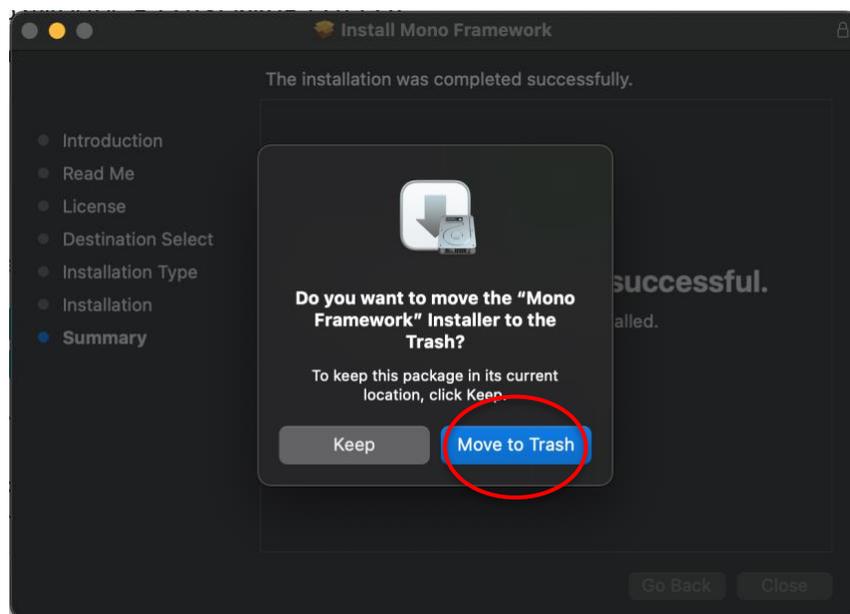




Once the installation is complete, you will see the screen below. Click on 'Close'.

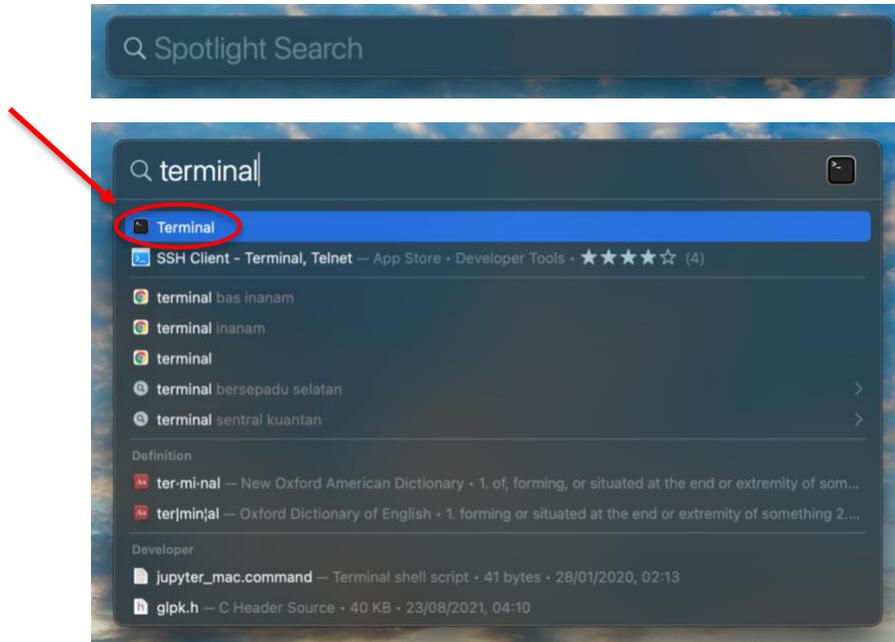


Click on 'Move to Trash' to finish.



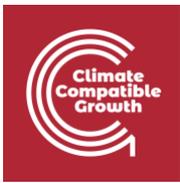
Install gcc, cbc, and glpsol

To install gcc, you need to run a command in a terminal. Click on **command** (⌘) + **space bar** to activate spotlight search. In here, type in “terminal” and click or press enter on the first option.

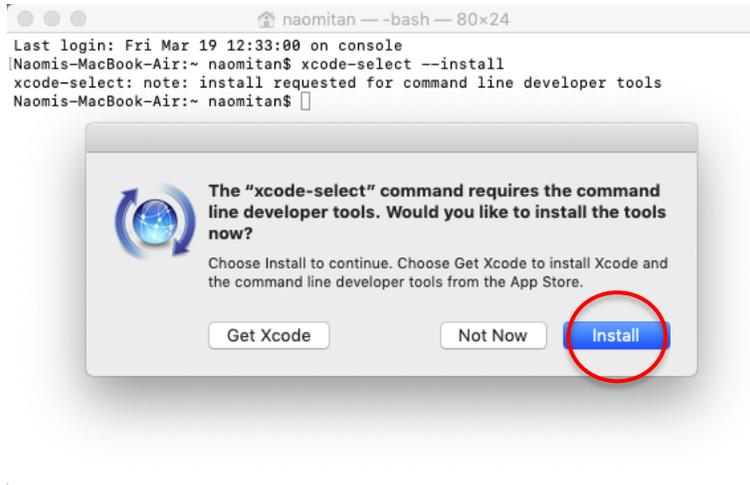


A pop-up screen will appear. This is the terminal.

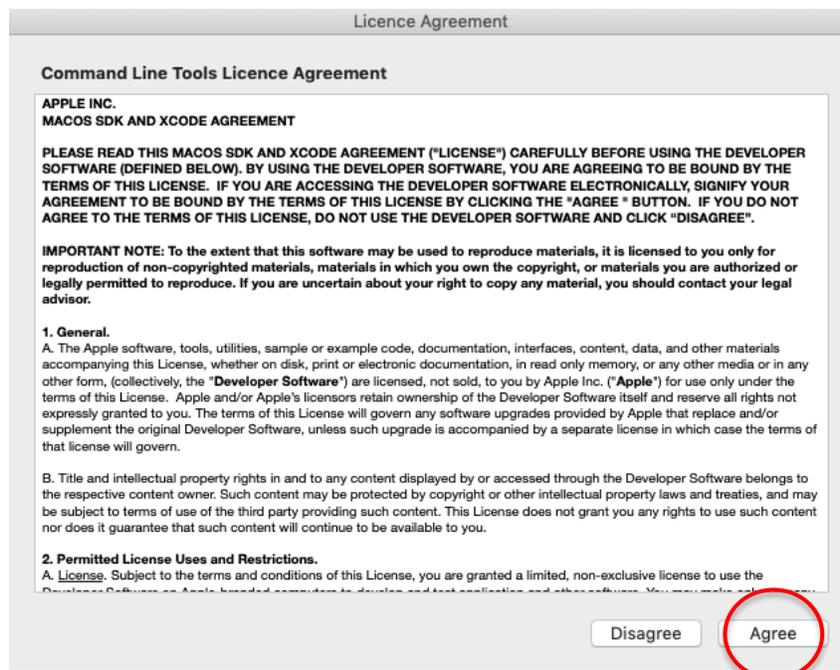




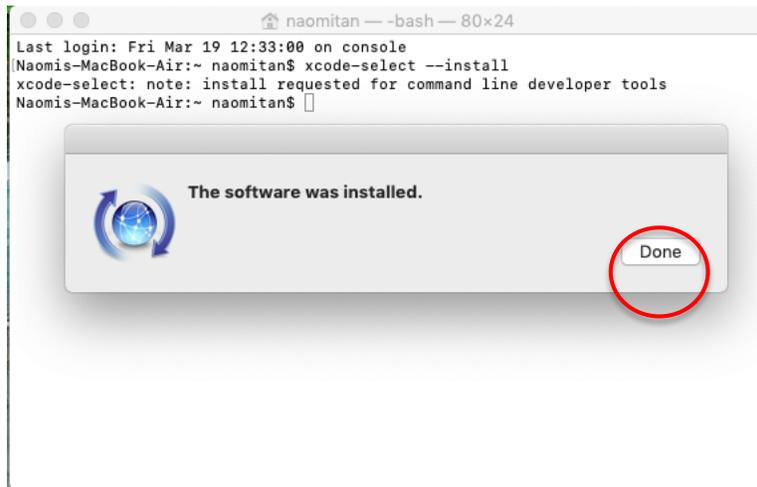
Copy and paste this command in the terminal: **xcode-select --install** and hit enter. This will start the installation. You will see the pop-up screen below. Click on 'Install'.



Click on 'Agree'.



You will see the below pop-up stating installation is complete. Click on 'Done'.



To install cbc and glpsol, copy and paste the commands from [install.sh](#) to your terminal in one go. Press enter. Your screen should look like the screenshot below.

```

Downloads — curl -# https://ftp.gnu.org/gnu/glpk/glpk-5.0.tar.gz -O — 80...
Last login: Fri Jan 14 13:07:33 on console

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) Naomis-MacBook-Air-2:~ naomitan$ #!/bin/sh
(base) Naomis-MacBook-Air-2:~ naomitan$ cd ~/Downloads
(base) Naomis-MacBook-Air-2:Downloads naomitan$ #download and install cbc
(base) Naomis-MacBook-Air-2:Downloads naomitan$ /usr/bin/curl -# https://ampl.co
m/dl/open/cbc/cbc-osx.zip -O
##### 100.0%
(base) Naomis-MacBook-Air-2:Downloads naomitan$ unzip cbc-osx.zip -d cbc-osx
Archive:  cbc-osx.zip
  inflating: cbc-osx/cbc
  inflating: cbc-osx/coin-license.txt
(base) Naomis-MacBook-Air-2:Downloads naomitan$ install cbc-osx/cbc /usr/local/b
in
(base) Naomis-MacBook-Air-2:Downloads naomitan$
(base) Naomis-MacBook-Air-2:Downloads naomitan$ #download, configure, compile an
d install glpk
(base) Naomis-MacBook-Air-2:Downloads naomitan$ /usr/bin/curl -# https://ftp.gnu
.org/gnu/glpk/glpk-5.0.tar.gz -O
##=#=#

```

The script needs curl and unzip to be installed, which should already be installed by default. clicSANDMac currently expects these to be installed in /usr/local/bin



Install clicSANDMac

Download the latest clicSANDMac.zip from this [website](#).

Name	Size	Preview	Download
Additional Info.zip	11.5 MB		
md5:48bdfec01eb139a9fec5b4b027d614			
clicSANDMac.zip	13.7 MB		
md5:7a018fa12ebe5deba185caf9263cdf2e			
conversion.app.zip	49.2 MB		
md5:3371191b75b564c7c7242af8d21f1315			
Results_Visualization_Template.xlsx	8.9 MB		
md5:2b234a08090140bbc2143c6ea12bea86			

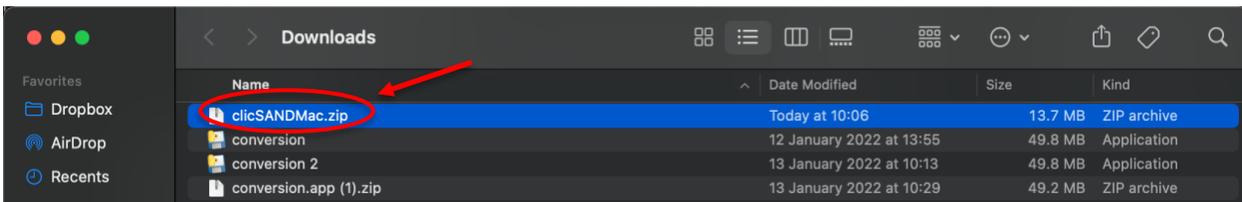
Versions

- Version v.1.1.0 (Jan 31, 2022) DOI: 10.5281/zenodo.5925647
- Version v.1.0.3 (Jan 20, 2022) DOI: 10.5281/zenodo.5884075
- Version v.1.0.2 (Jan 19, 2022) DOI: 10.5281/zenodo.5879057

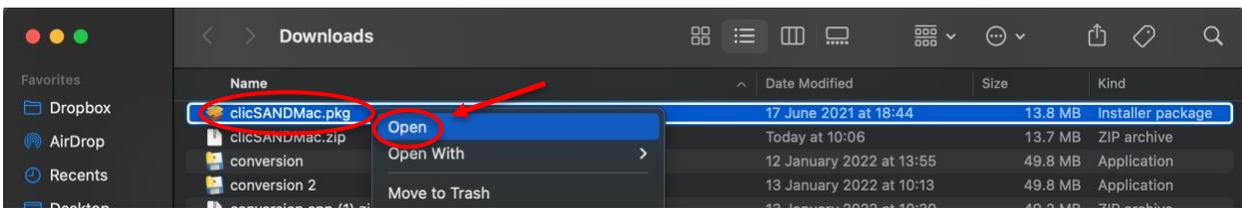
Cite all versions? You can cite all versions by using the DOI 10.5281/zenodo.5879056. This DOI represents all versions, and will always resolve to the latest one. [Read more.](#)

Share

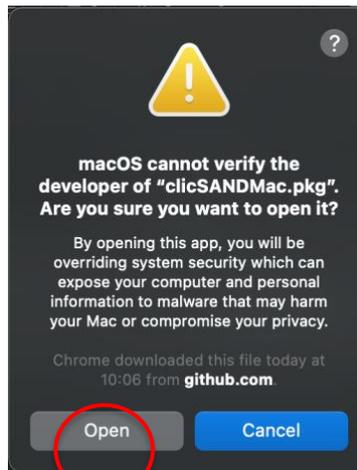
You will see clicSANDMac.zip in your Downloads folder. Unzip the file (by clicking on clicSANDMac.zip).



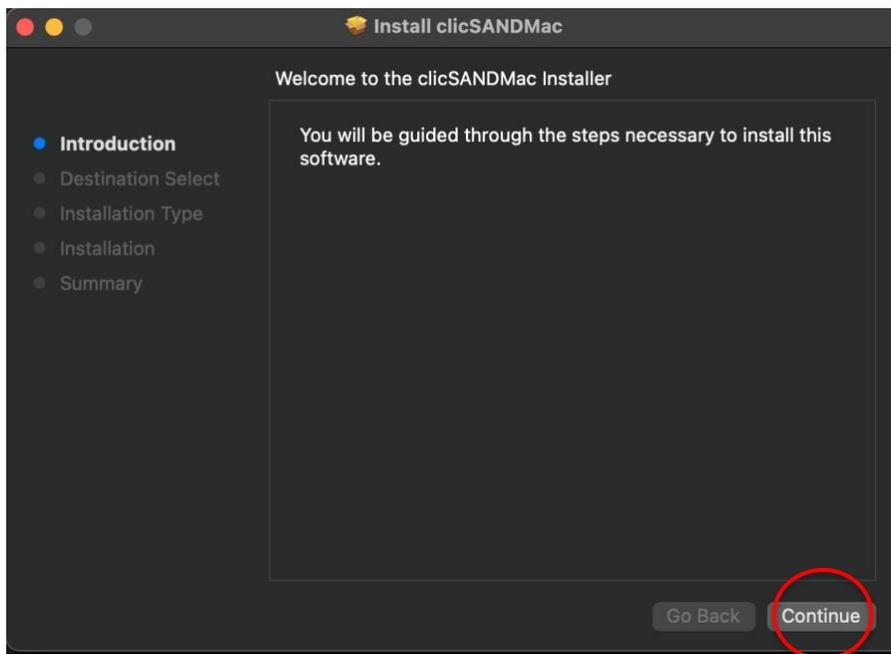
After unzipping, right click on clicSANDMac.pkg and click on 'Open' to launch the installer.



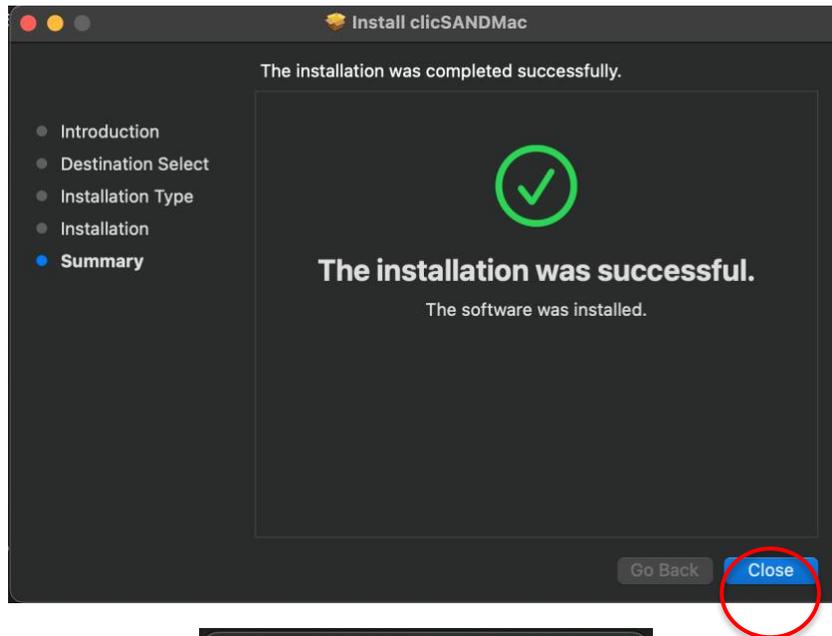
A pop-up screen will appear stating macOS cannot verify the developer of clicSANDMac.pkg. Click 'Open'.



Click 'Continue' on the installer welcome screen. Click Install. You will be prompted for your password. The download will start.



A window will pop-up saying that the installation was successful. Click 'Close', and then 'Move to Trash' to finish.



clicSANDMac will be in your 'Applications' folder now!

