

Introduction

Spectre is available as a Docker container, thanks to the efforts of [Givanna Putri](#). Docker is a cloud service that allows anyone to deliver software packages as a "complete unit" in a form of container. What this means is that the software package is released as a standalone computing environment, pre-installed with necessary pre-requisite libraries required by the software, and pre-configured for user convenience.

Spectre's Docker image will match the most recent versions of Spectre (denoted as 'master', referring to the master branch in Github). To download this version, simply follow the instructions below. If you wish to load a specific version of Spectre, you can specify a version (e.g. v0.5.3, v0.5.4. etc) instead of using 'master'. You can see a list of versions available via docker on [this page](#).

On this page:

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- [Running Spectre using Docker](#)

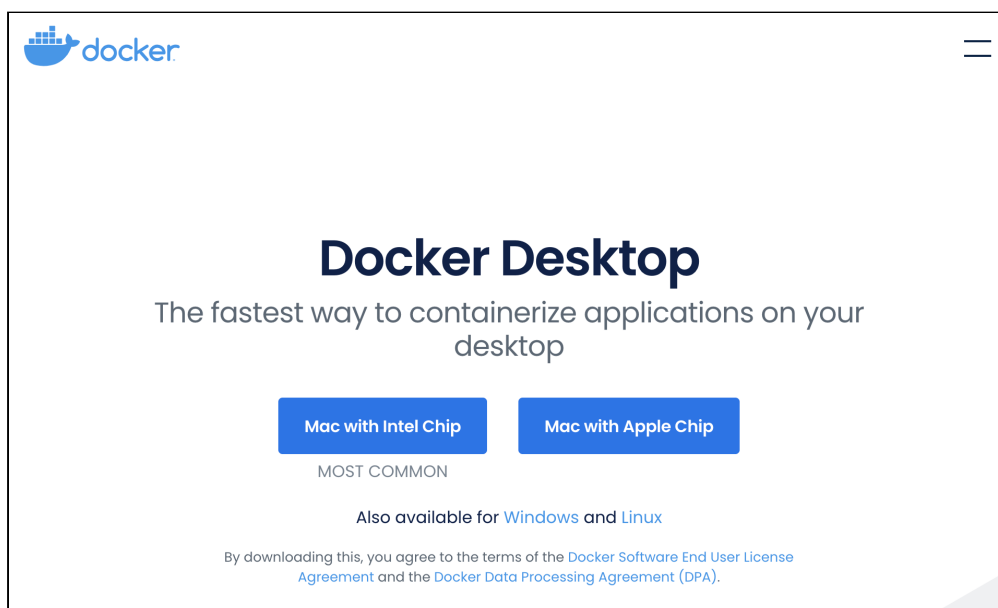
First time using Docker? Download and set up 'Docker Desktop'

Download Docker desktop app

Go to the following address:

<https://www.docker.com/products/docker-desktop>

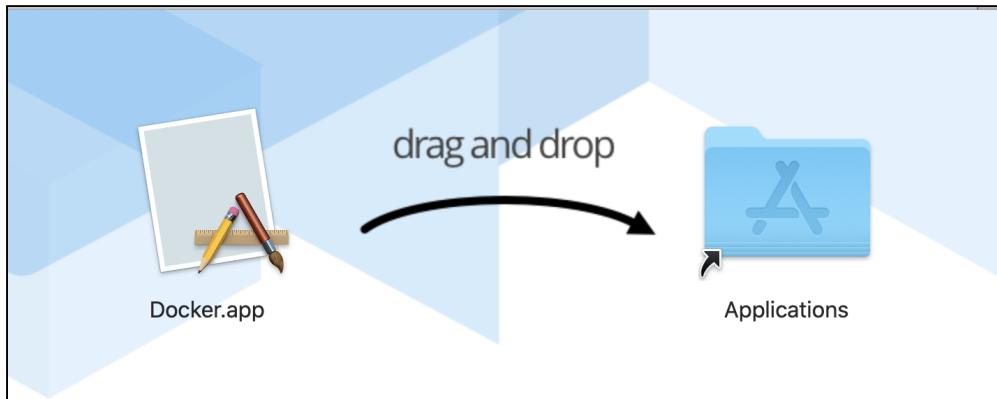
Download the correct version of Docker Desktop.



Go to your downloads folder and open the '.dmg' file.



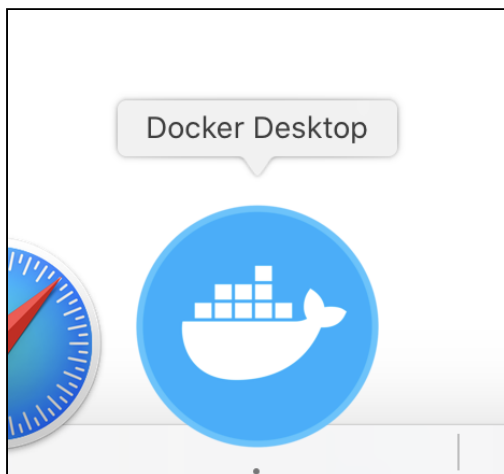
When the following window opens, drag and drop the 'Docker.app' icon into the 'Applications' shortcut.



You should now be able to find 'Docker' in your applications folder.

Set some preferences (optional)

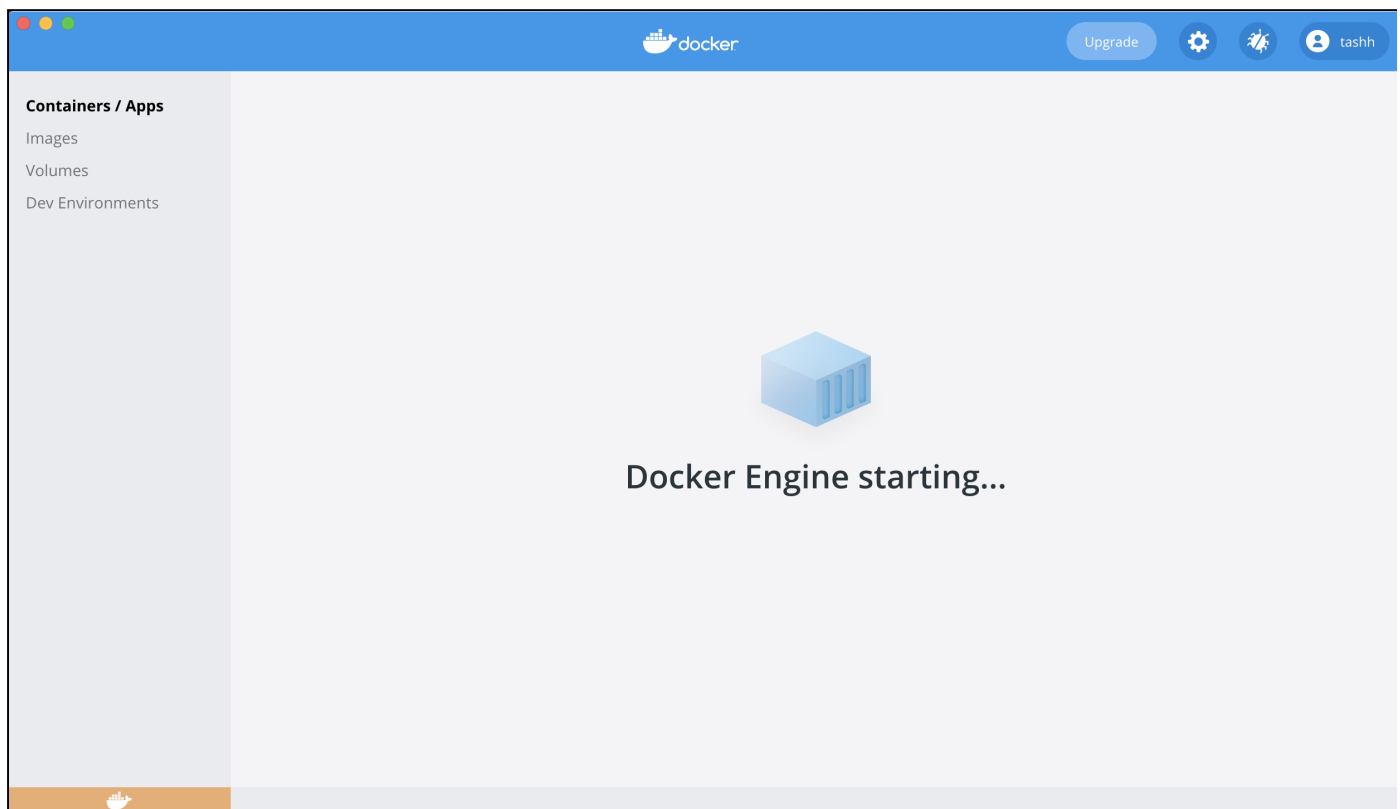
Open Docker app from the applications folder or bar at the bottom of the screen.



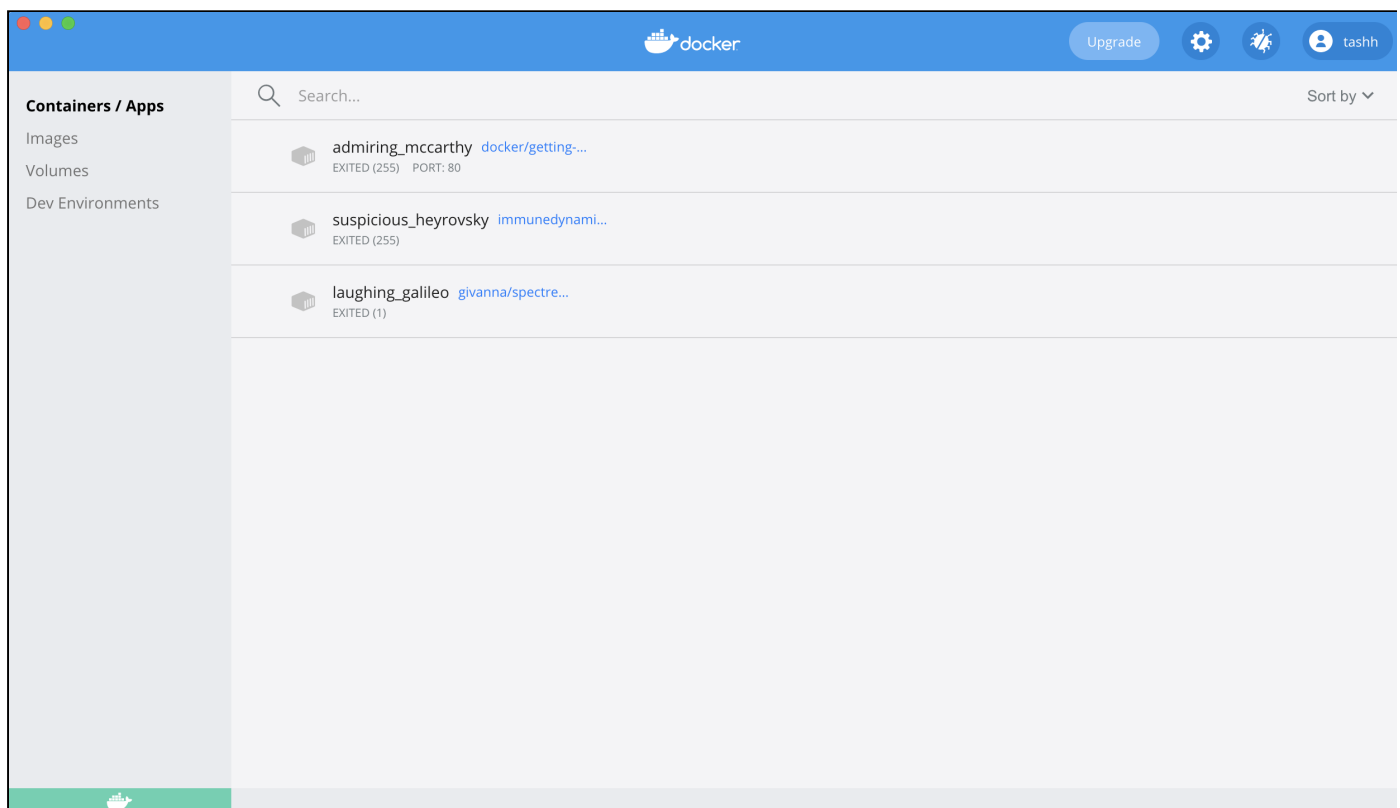
Once you turn it on, you should see the following icon in the bar at the top of the screen.



Additionally the program itself should open. Wait a few moments while the 'Docker Engine' starts.

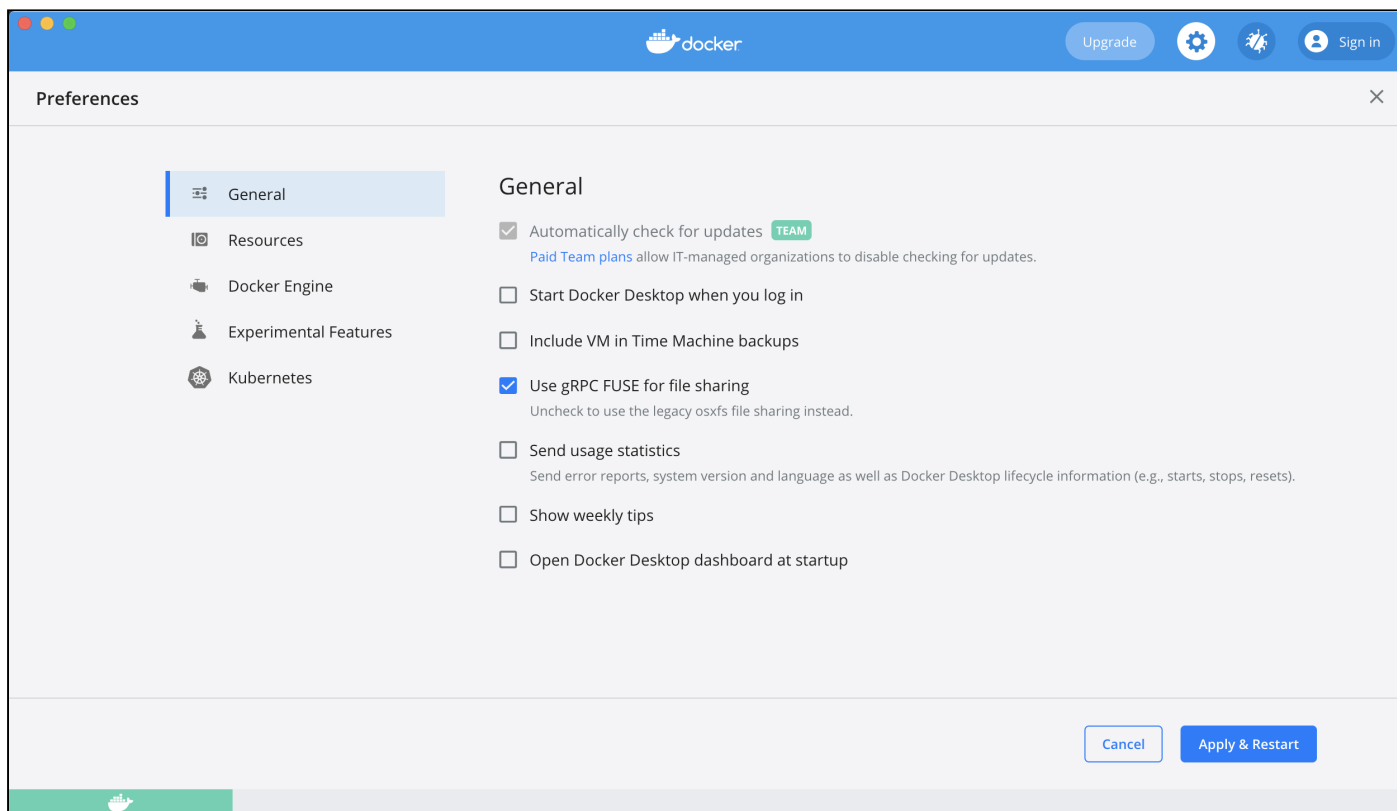


The icon in the lower left will turn green when ready.



Click the gears icon to open 'preferences'. Make sure you untick the options in General to mimic the screenshot below. This is to ensure Docker doesn't start when you boot your computer, and it doesn't share your usage data to Docker by default. Leave the automatic update checked if you prefer it to check for updates regularly.

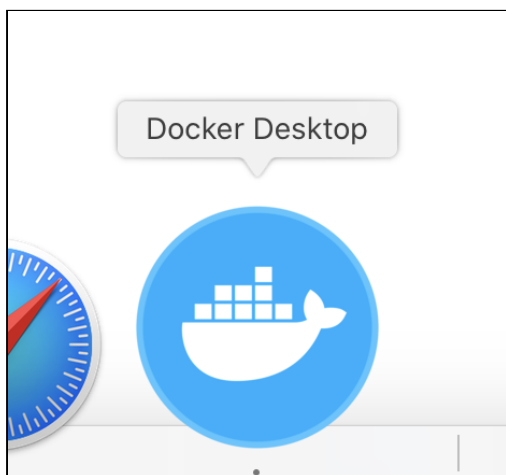
Press 'Apply & Restart' when done.



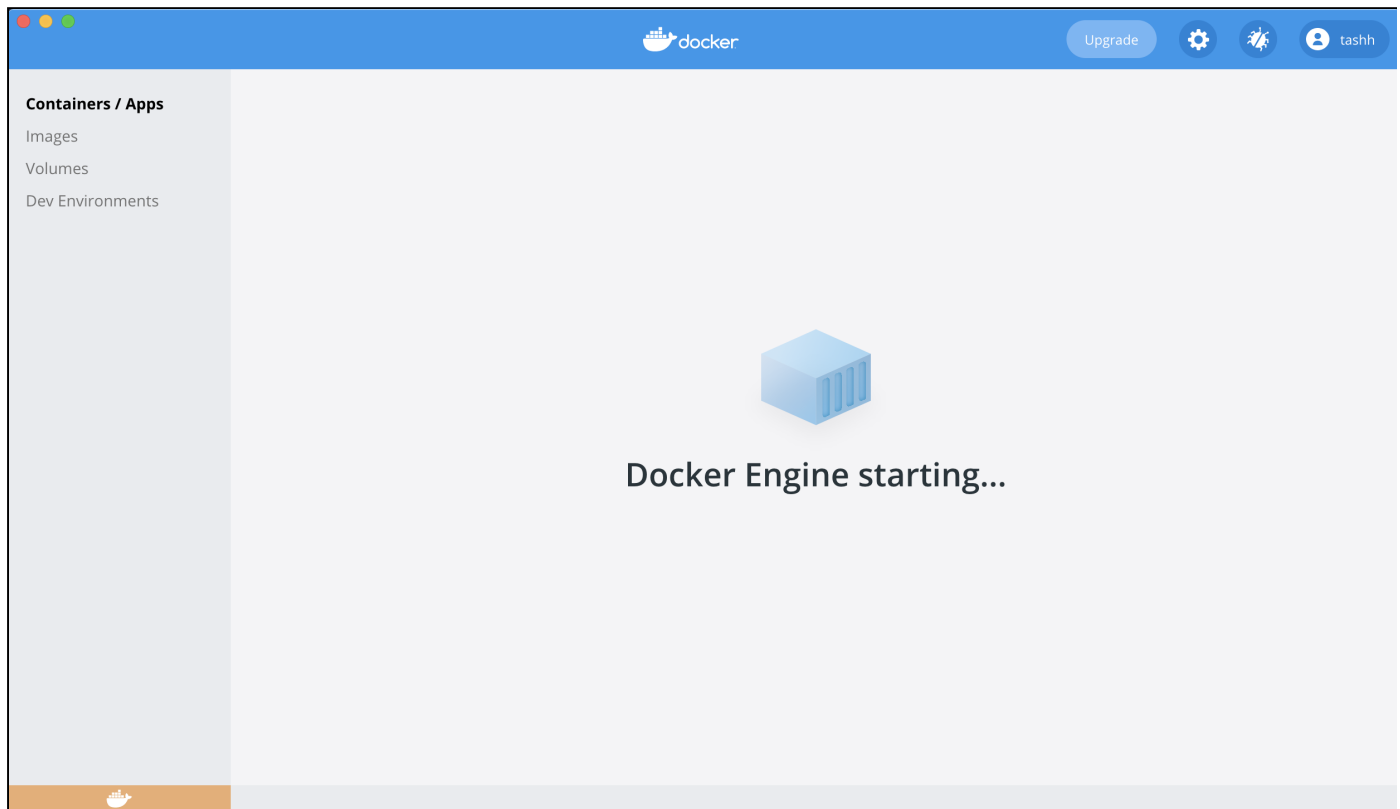
Close app until you would like to use it.

Running Spectre using Docker

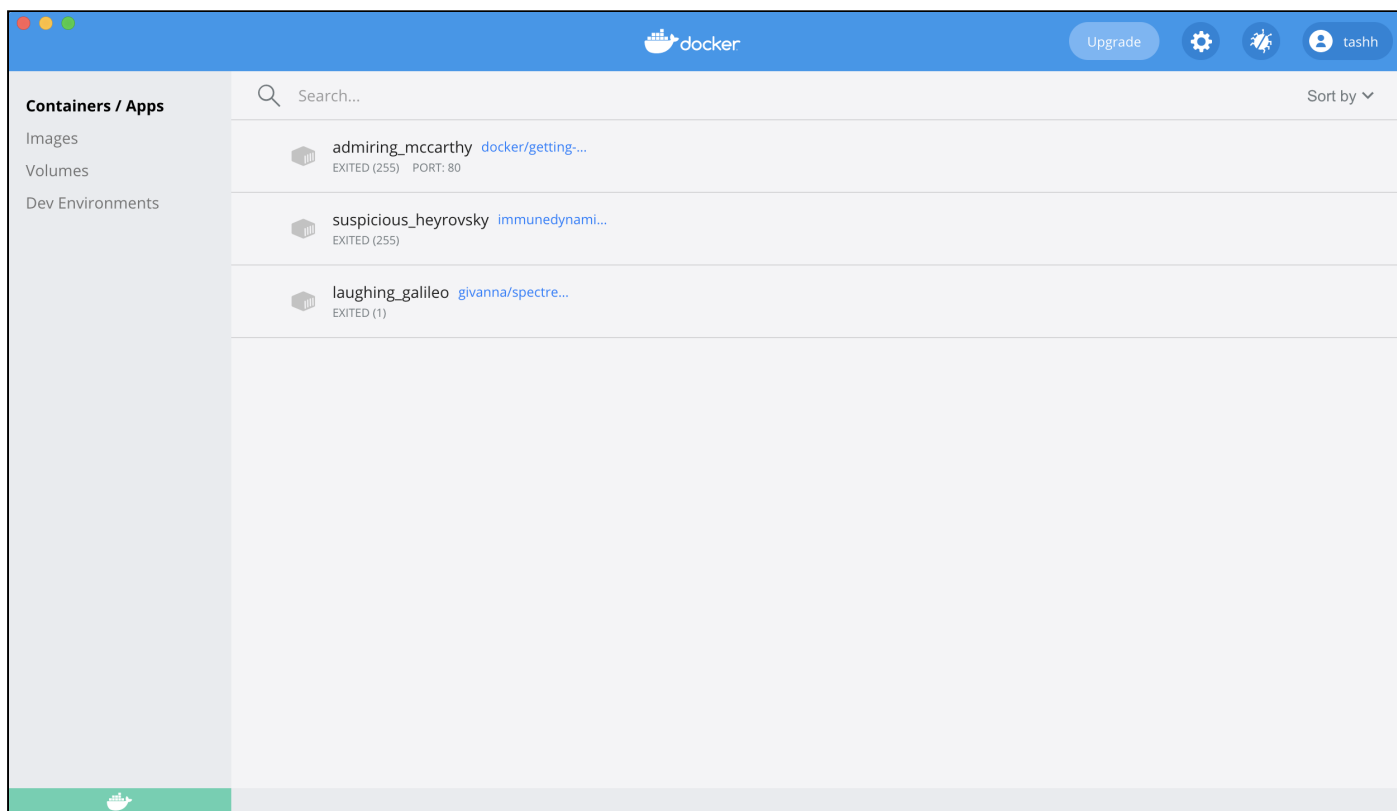
Open Docker app



Wait a few moments while the 'Docker Engine' starts.

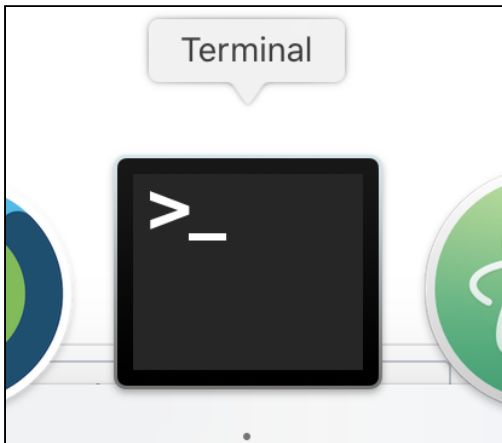


The icon in the lower left will turn green when ready.



Open 'Terminal' (on Mac) and run the following code

Can be found in the applications folder, or the bar at the bottom of your screen.



```
thomasa — -bash — 77x24
Last login: Sun Jun 20 16:36:45 on ttys000

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) TomA-MBP13t:~ thomasa$
```

Copy the following code into the terminal and press ENTER.

```
docker run --rm -e PASSWORD=spectre -p 8787:8787 -v ~/.home/rstudio/spectre_dir --name=spectre
immunedynamics/spectre:master
```

```
(base) vlan-2682-10-17-83-40:~ thomasa$ docker run --rm -e PASSWORD=spectre -p 8787:8787 -v ~/.home/
rstudio/spectre_dir --name=spectre immunedynamics/spectre:master
[s6-init] making user provided files available at /var/run/s6/etc...exited 0.
[s6-init] ensuring user provided files have correct perms...exited 0.
[fix-attrs.d] applying ownership & permissions fixes...
[fix-attrs.d] done.
[cont-init.d] executing container initialization scripts...
[cont-init.d] userconf: executing...
[cont-init.d] userconf: exited 0.
[cont-init.d] done.
[services.d] starting services
[services.d] done.
```



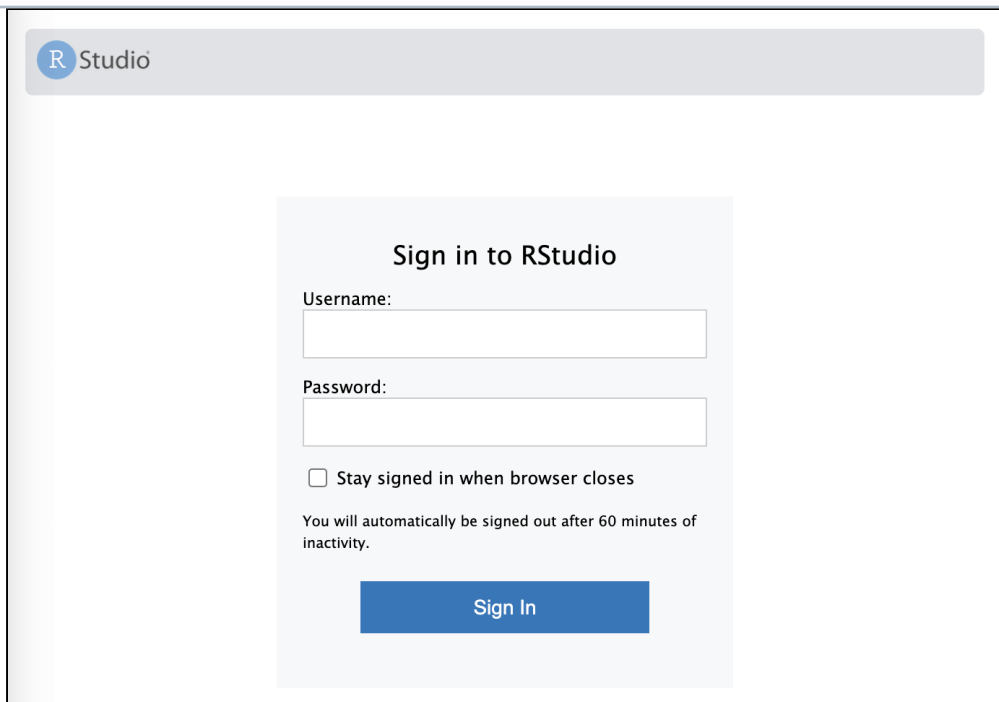
Tip

By default, the RStudio session that Docker will launch will be able to see everything in your Home directory and below. This is achieved in the code above using the '~' symbol. If you have data elsewhere (on a server etc) you can navigate to that location using Finger and drag + drop the target directory/folder into terminal:
In terminal, add the following segments, and then hit ENTER:


- `docker run --rm -e PASSWORD=spectre -p 8787:8787 -v`
- *DRAG+DROP the target folder from finder*
- `:/home/rstudio/spectre_dir --name=spectre immunedynamics/spectre:master`


Open your preferred web browser (chrome, safari, etc) and go to the following address

 <http://localhost:8787>



Sign in

 Name: rstudio
Password: spectre

 RStudio

Sign in to RStudio

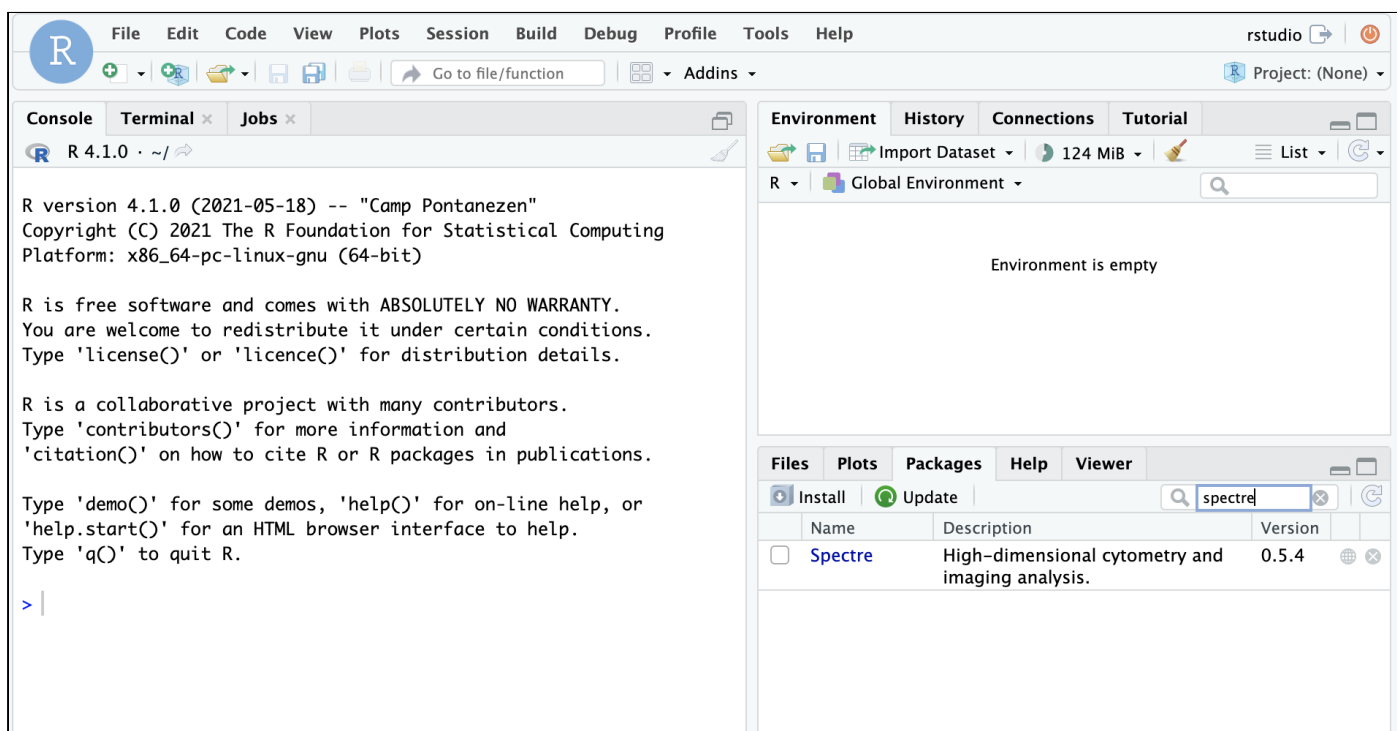
Username:

Password:

☐ Stay signed in when browser closes

You will automatically be signed out after 60 minutes of inactivity.

Sign In



R version 4.1.0 (2021-05-18) -- "Camp Pontanezen"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

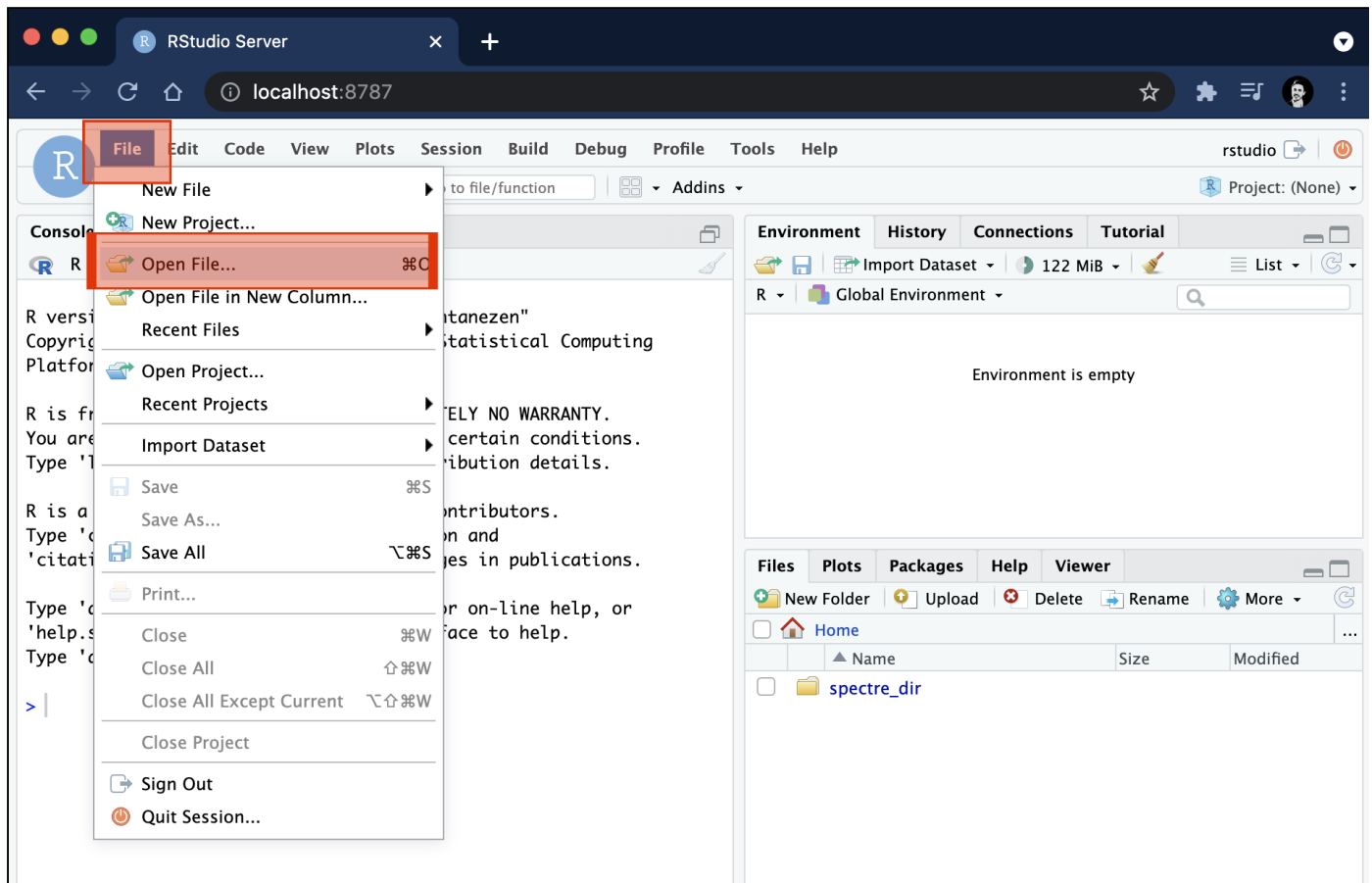
R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

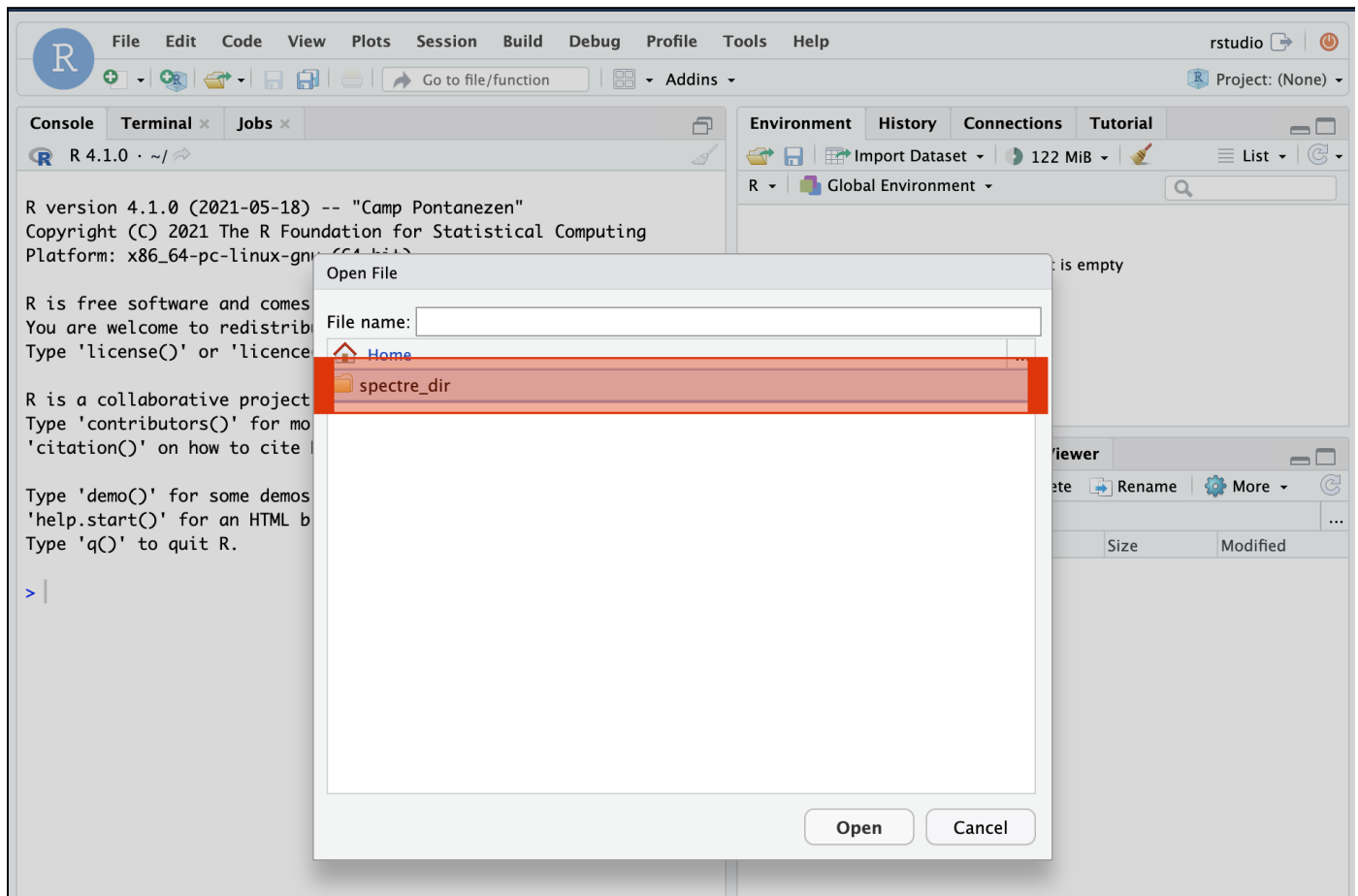
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

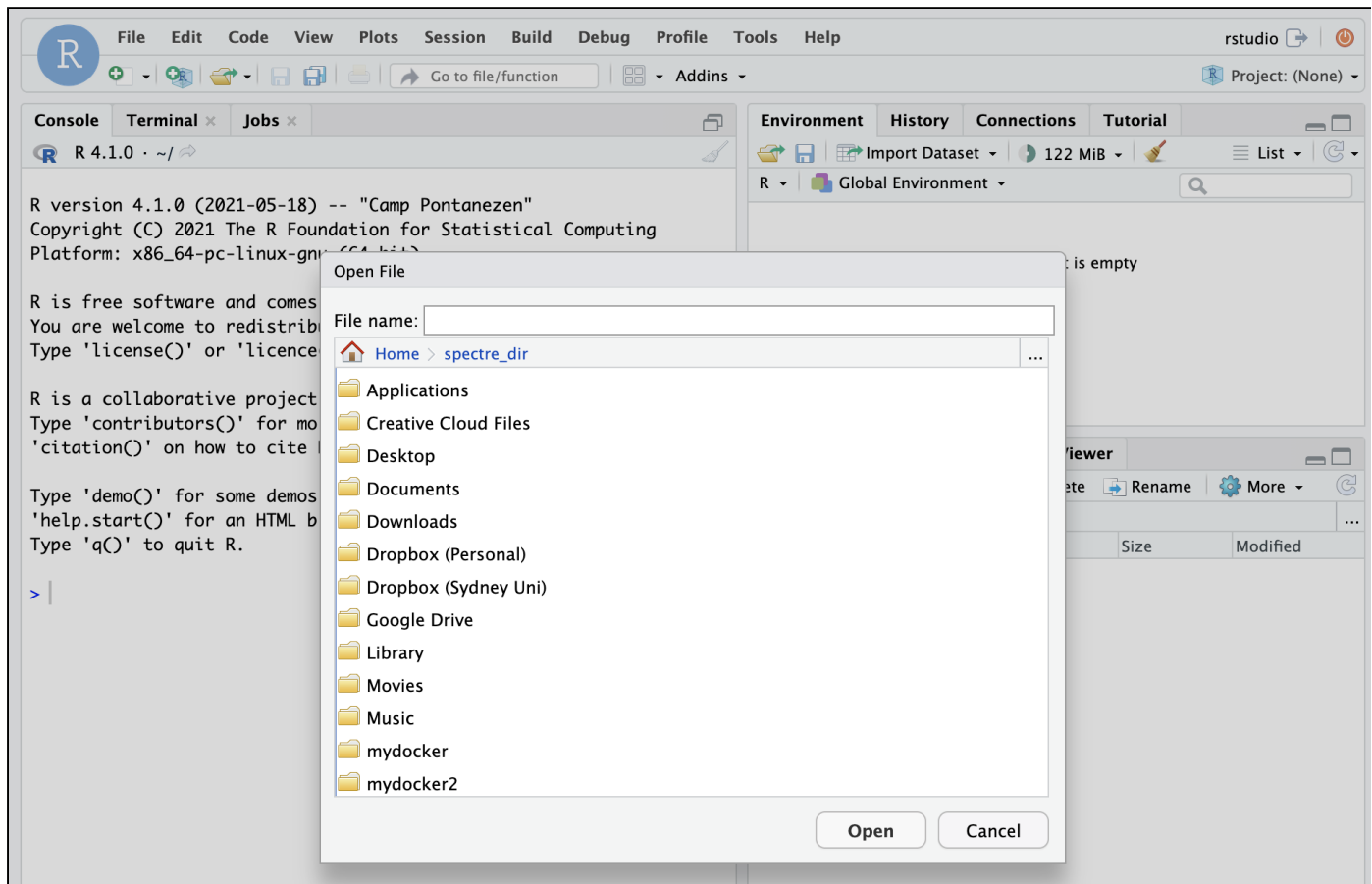
> |

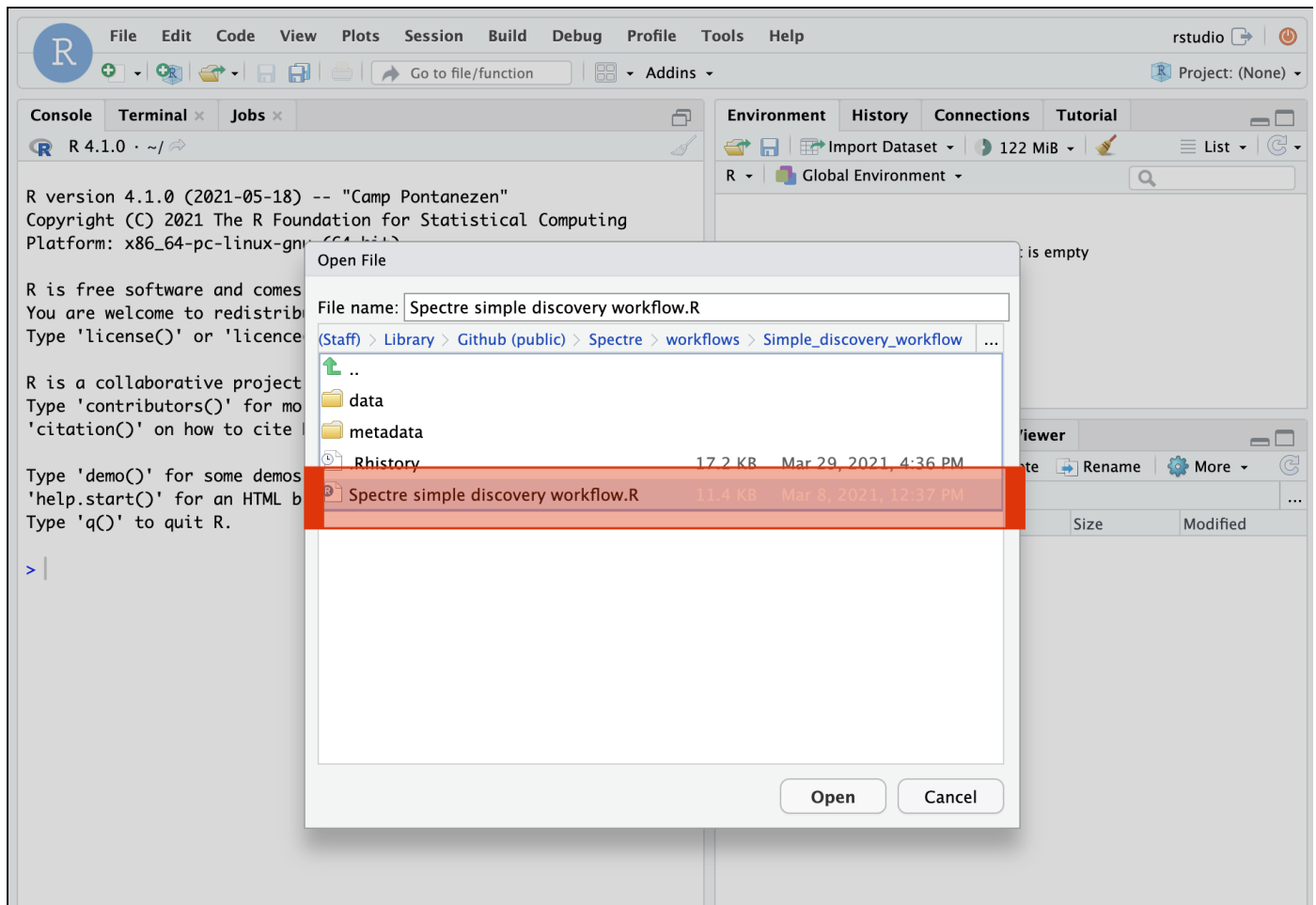
Name	Description	Version
<input type="checkbox"/> Spectre	High-dimensional cytometry and imaging analysis.	0.5.4

Open desired analysis script









The screenshot displays the RStudio environment. The main editor window shows an R script titled "Spectre simple discovery workflow.R" with the following code:

```
11 #####
12
13 ### Load libraries
14
15 library(Spectre)
16 Spectre::package.check() # Check that all required
17 Spectre::package.load() # Load required packages
18
19 ### Set PrimaryDirectory
20 dirname(rstudioapi::getActiveDocumentContext()$path)
21 setwd(dirname(rstudioapi::getActiveDocumentContext()$path))
22 getwd()
23 PrimaryDirectory <- getwd()
24
25 ### Set 'input' directory
26 setwd(PrimaryDirectory)
27 setwd("data/")
28 InputDirectory <- getwd()
29 setwd(PrimaryDirectory)
```

The Environment pane on the right shows "Global Environment" and "Environment is empty". The Files pane on the right shows a file explorer with a folder named "spectre_dir". The Console pane at the bottom shows the R version 4.1.0 (2021-05-18) and the R Foundation for Statistical Computing logo.

Perform analysis

The screenshot displays the RStudio environment. The main editor window shows an R script titled "Spectre simple discovery workflow.R". The script includes comments and code for loading the Spectre package, setting the primary directory, and setting the input directory. The console window at the bottom shows the R version (4.1.0) and the R Foundation's copyright notice.

```

11 #####
12
13   ## Load libraries
14
15   library(Spectre)
16   Spectre::package.check() # Check that all required
17   Spectre::package.load() # Load required packages
18
19   ### Set PrimaryDirectory
20   dirname(rstudioapi::getActiveDocumentContext()$path)
21   setwd(dirname(rstudioapi::getActiveDocumentContext()$path))
22   getwd()
23   PrimaryDirectory <- getwd()
24
25   ### Set 'input' directory
26   setwd(PrimaryDirectory)
27   setwd("data/")
28   InputDirectory <- getwd()
29   setwd(PrimaryDirectory)
30
15:25 ## (Untitled) R Script

```

The console output shows the R version and the R Foundation's copyright notice:

```

R 4.1.0 ~ /
R version 4.1.0 (2021-05-18) -- "Camp Pontanezen"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
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'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

```

Close when finished

```

^C[cont-finish.d] executing container finish scripts...
[cont-finish.d] done.
[s6-finish] waiting for services.
[s6-finish] sending all processes the TERM signal.
[s6-finish] sending all processes the KILL signal and exiting.
(base) TomA-MBP13t:~ thomasa$

```