Slides, videos, links and more:
https://github.com/physicell-training/ws2022

Setting up PhysiCell on Windows

Furkan Kurtoglu & Aneequa Sundus
@PhysiCell

PhysiCell Project

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Overview

This installation guide is prepared for installing PhysiCell to new fresh Windows. If you installed previous PhysiCell version in your PC, please uninstall MSYS 1 (previous version) and remove related directories from environmental variables.

- PhysiCell
- MSYS 2
- Adding them to path
- Anaconda
- Test modules “biorobots” and “ode-energy-sample”

Minimal setup

- ImageMagick
- COPASI
- PhysiCell Model Builder

Traditional* setup

*Traditional setup includes optional tools that helps for pre-simulation edits and pro-simulation analysis

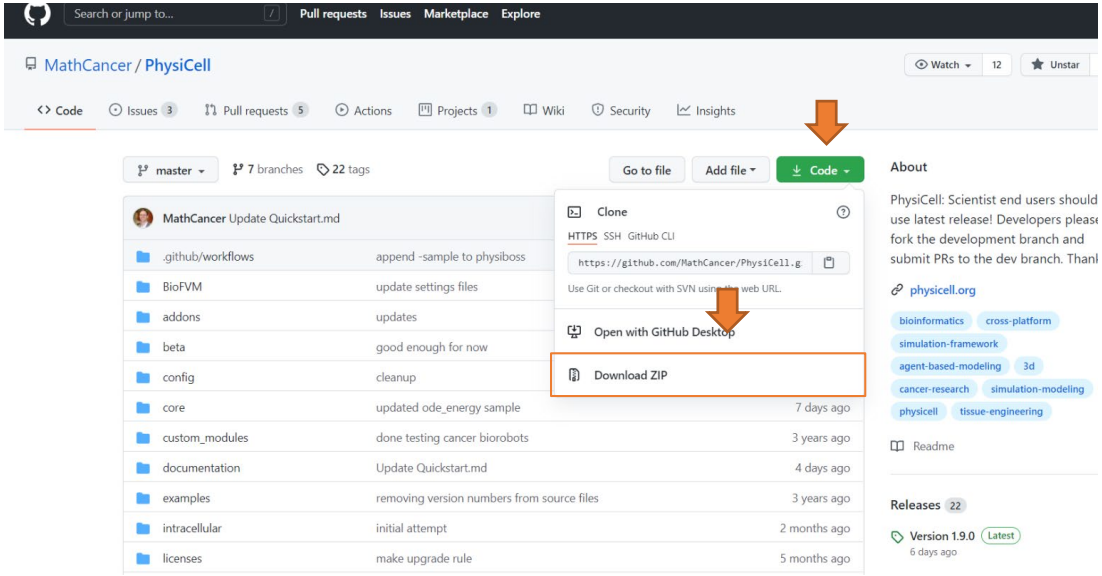
Youtube video

- Here is the video link for the recording of installation on Windows:

https://www.youtube.com/watch?v=Jp3ZOMt761M

PhysiCell

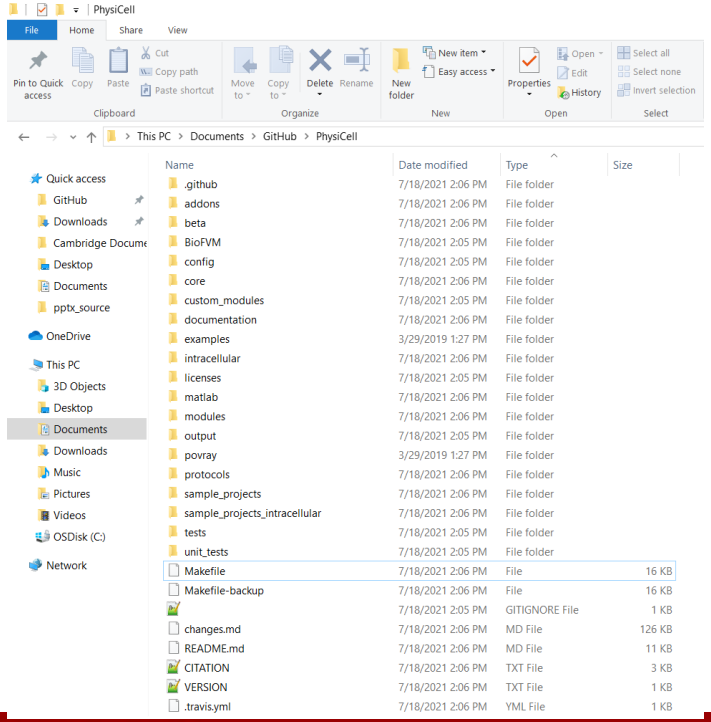
- To download PhysiCell please proceed following link: https://github.com/MathCancer/PhysiCell



- Please, click green “Code” button at right.
- Then, download as “ZIP”.
- Extract to the desired directory.

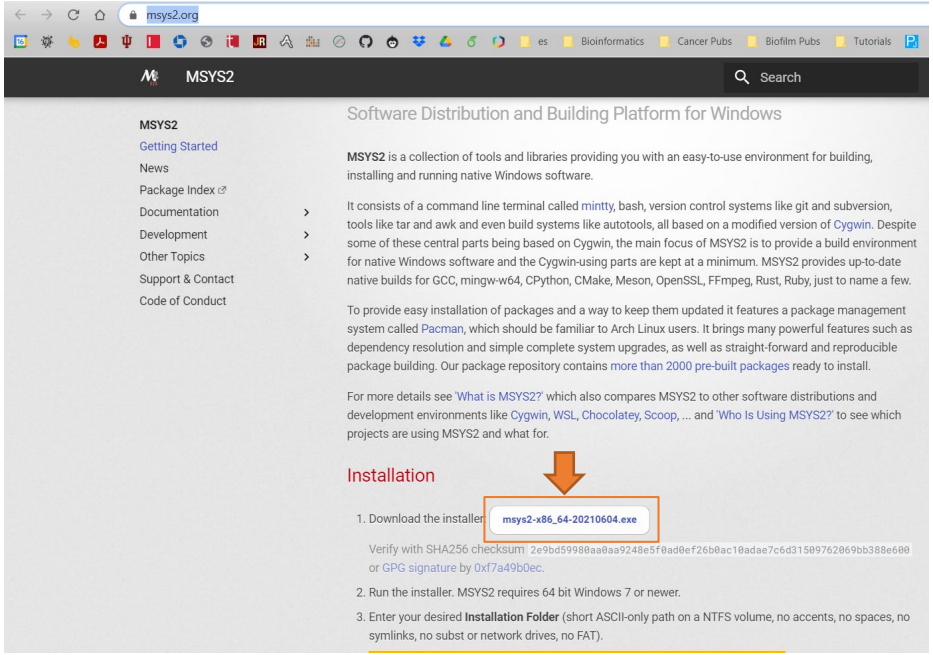
PhysiCell

- After the extraction, PhysiCell folder should look like this:



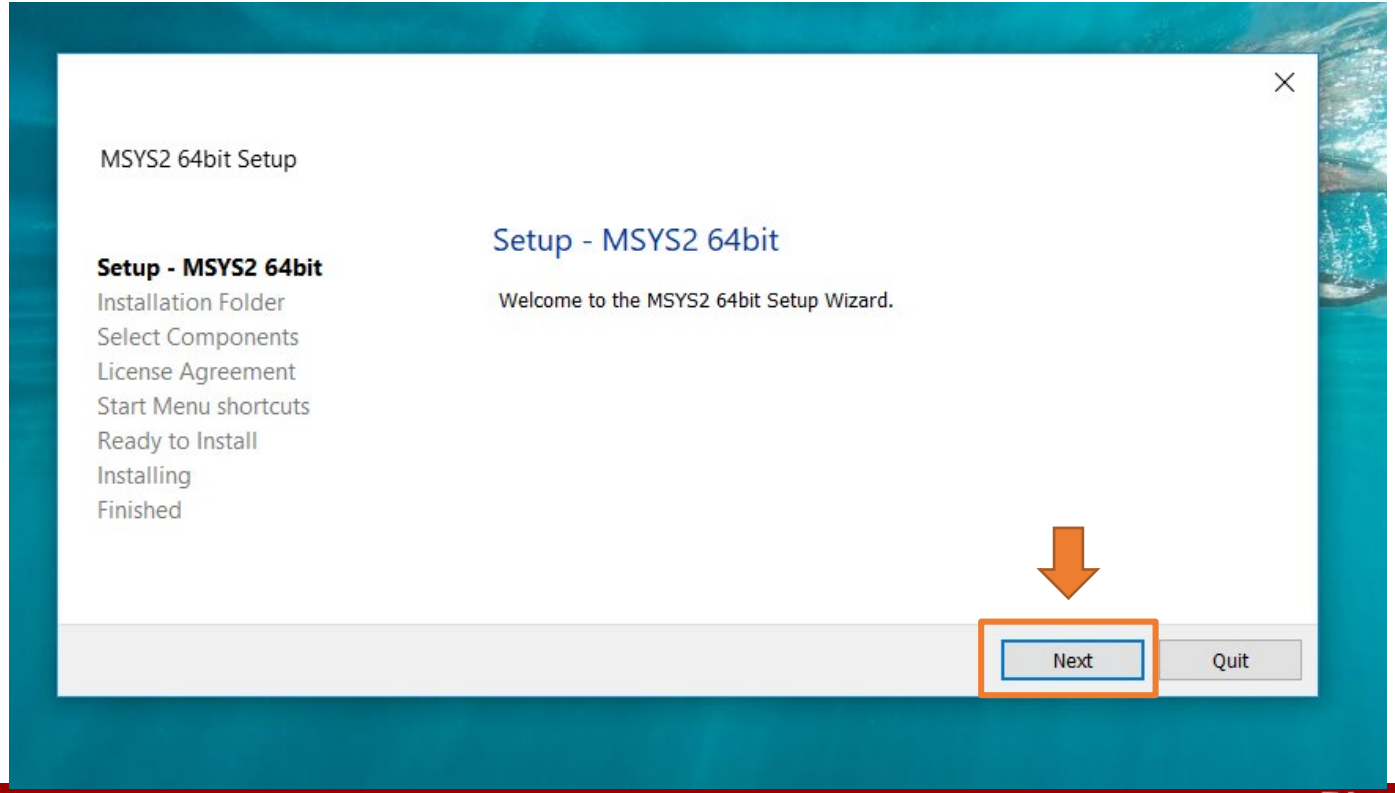
MSYS 2

- Please proceed following link: https://www.msys2.org/

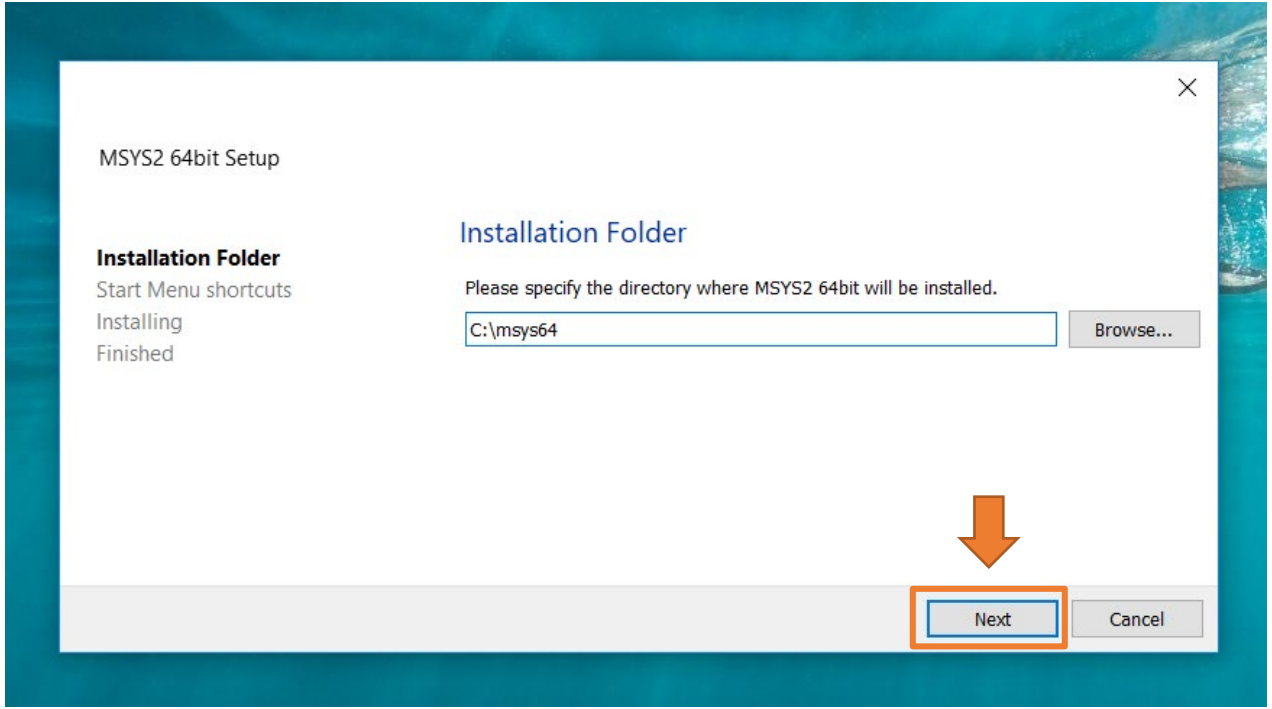


- Please, click “msys-x64_64-202XXX.exe” button at bottom.
- It should download installer.
- Open it with double-clicking the installer.

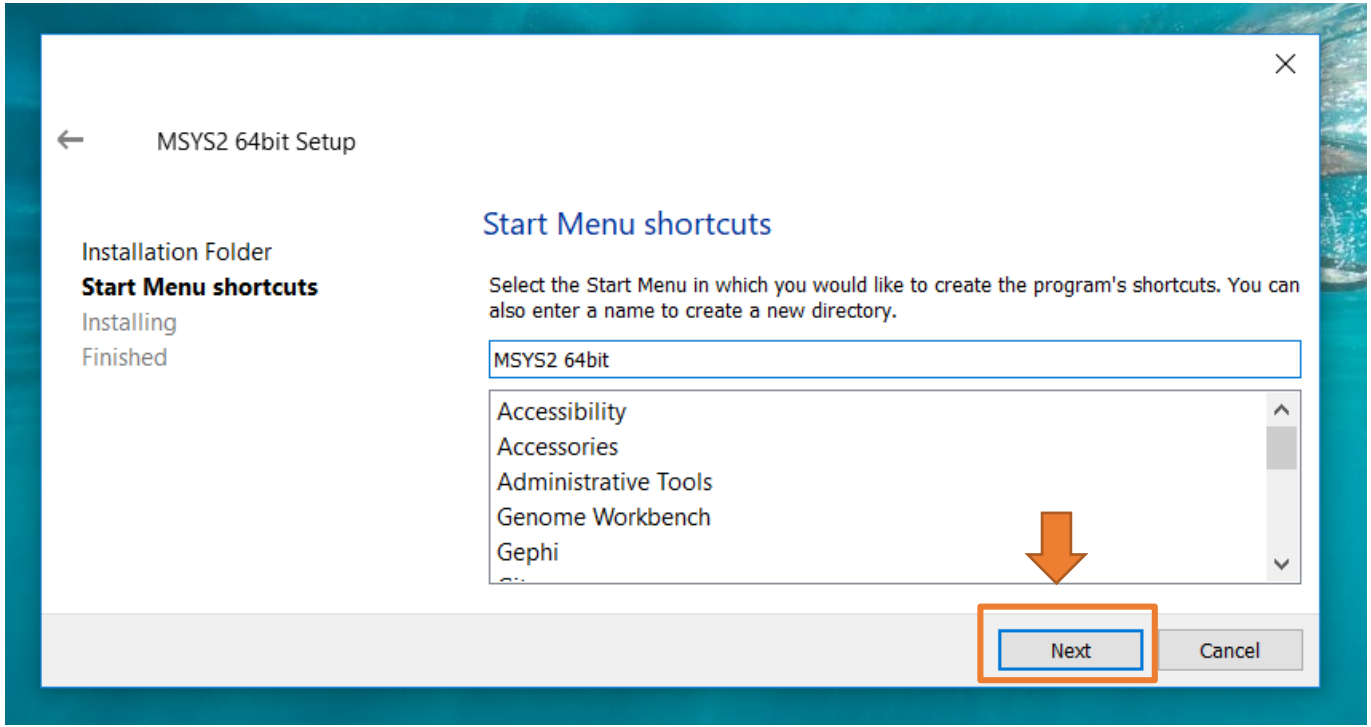
MSYS 2


MSYS2 64bit Setup
Setup - MSYS2 64bit
Setup - MSYS2 64bit
Installation Folder
Select Components
License Agreement
Start Menu shortcuts
Ready to Install
Installing
Finished
Welcome to the MSYS2 64bit Setup Wizard.
Next
Quit

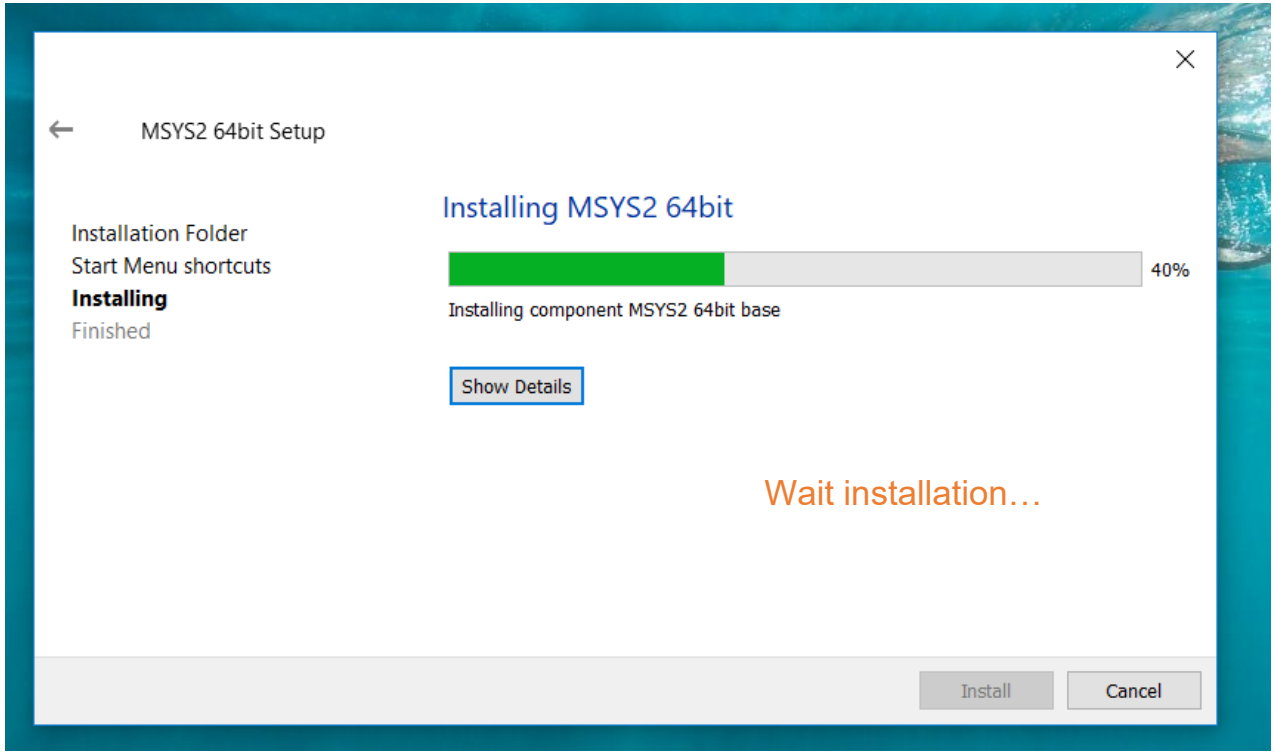
MSYS 2


MSYS2 64bit Setup
Installation Folder
Start Menu shortcuts
Installing
Finished
Installation Folder
Please specify the directory where MSYS2 64bit will be installed.
C:\msys64
Browse...
Next
Cancel

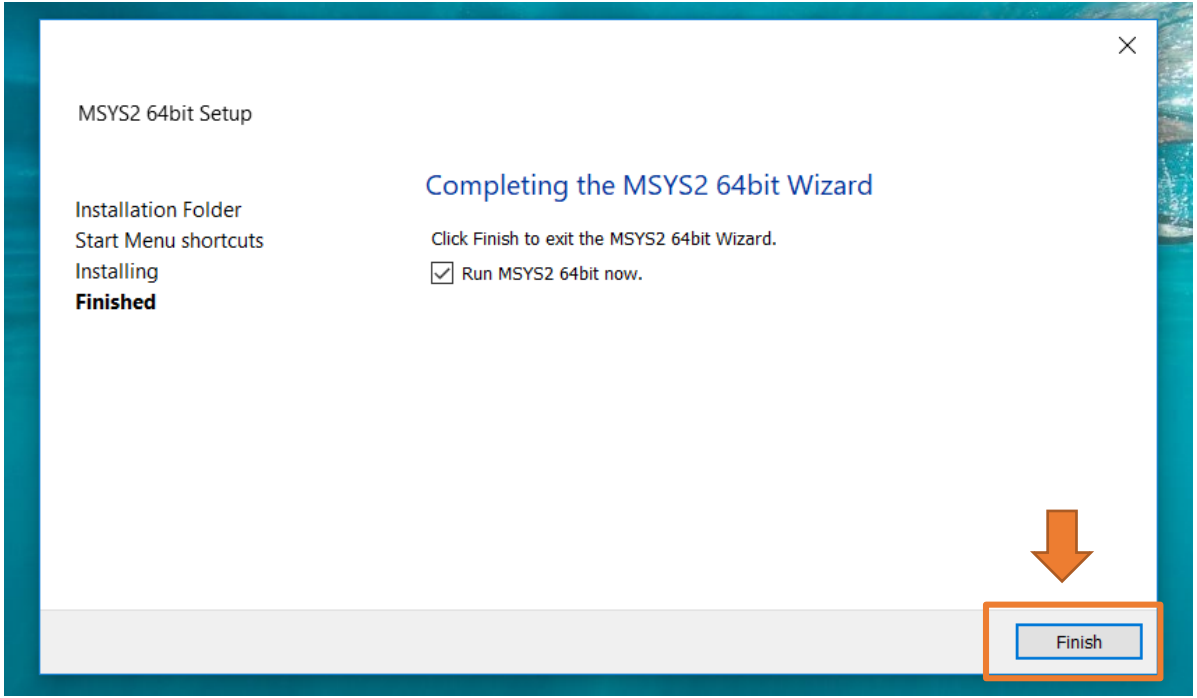
MSYS 2


MSYS2 64bit Setup
Installation Folder
Start Menu shortcuts
Installing
Finished
Start Menu shortcuts
Select the Start Menu in which you would like to create the program's shortcuts. You can also enter a name to create a new directory.
MSYS2 64bit
Accessibility
Accessories
Administrative Tools
Genome Workbench
Gephi
Next
Cancel

MSYS 2


MSYS2 64bit Setup
Installing MSYS2 64bit
Installation Folder
Start Menu shortcuts
Installing
Finished
40%
Installing component MSYS2 64bit base
Show Details
Wait installation…
Install
Cancel

MSYS 2

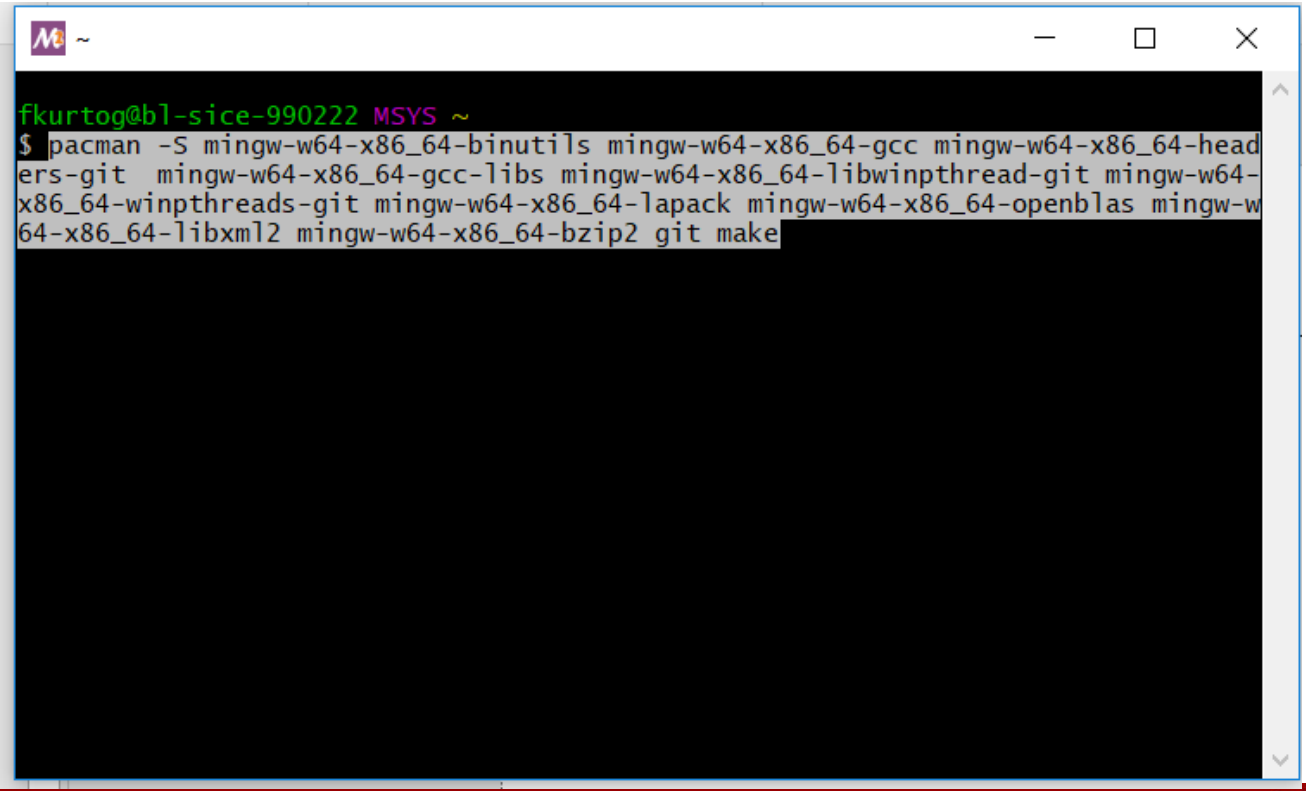

MSYS2 64bit Setup
Installation Folder
Start Menu shortcuts
Installing
Finished
Completing the MSYS2 64bit Wizard
Click Finish to exit the MSYS2 64bit Wizard.
Run MSYS2 64bit now.
Finish

MSYS 2

- After MSYS2 command prompt is opened, please copy and paste following line. Then, press enter.

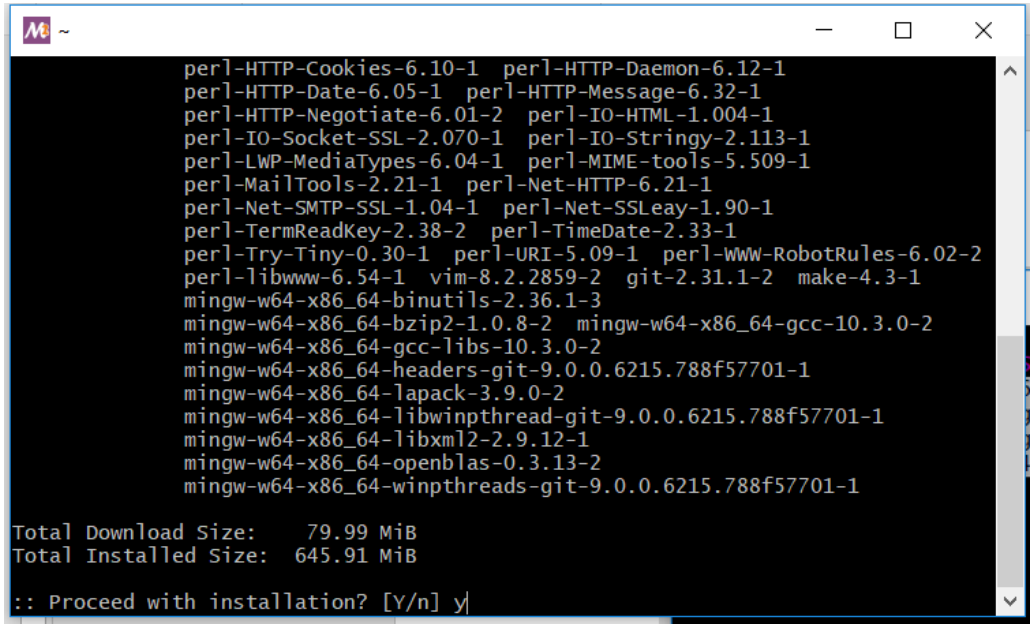
```
pacman -S mingw-w64-x86_64-binutils mingw-w64-x86_64-gcc mingw-w64-x86_64-headers-
git  mingw-w64-x86_64-gcc-libs mingw-w64-x86_64-libwinpthread-git mingw-w64-
x86_64-winpthreads-git mingw-w64-x86_64-lapack mingw-w64-x86_64-openblas mingw-
w64-x86_64-libxml2 mingw-w64-x86_64-bzip2 git make
```

MSYS 2


~
fkurtog@bl-sice-990222 MSYS ~
$ pacman -S mingw-w64-x86_64-binutils mingw-w64-x86_64-gcc mingw-w64-x86_64-headers-git mingw-w64-x86_64-gcc-libs mingw-w64-x86_64-libwinpthread-git mingw-w64-x86_64-winpthreads-git mingw-w64-x86_64-lapack mingw-w64-x86_64-openblas mingw-w64-x86_64-libxml2 mingw-w64-x86_64-bzip2 git make

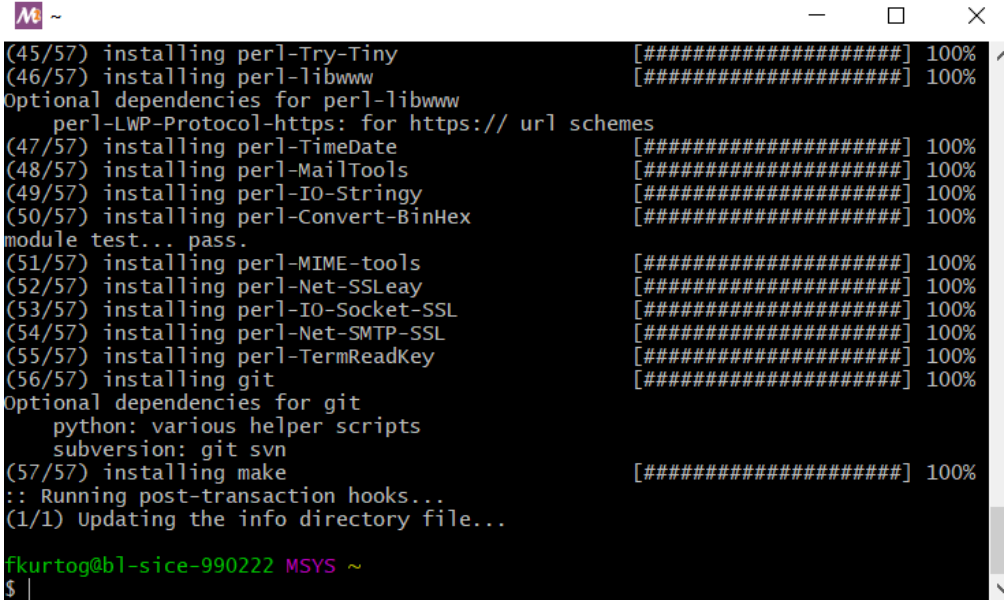
MSYS 2

- Give “y” (yes) answer to the msys2. Press enter…



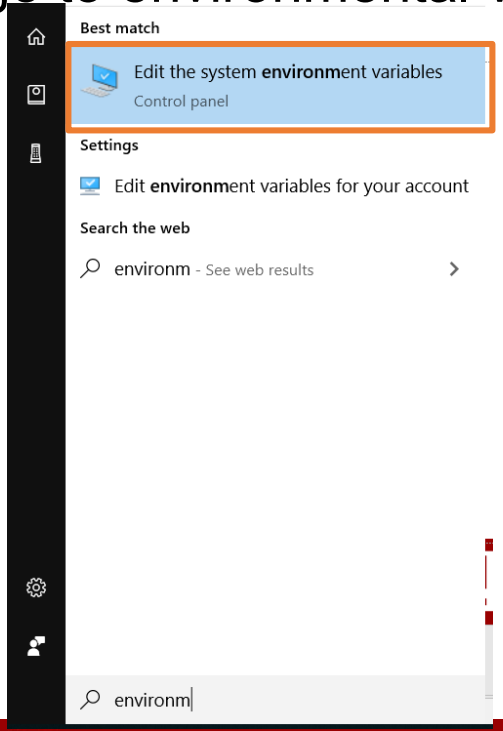
MSYS 2

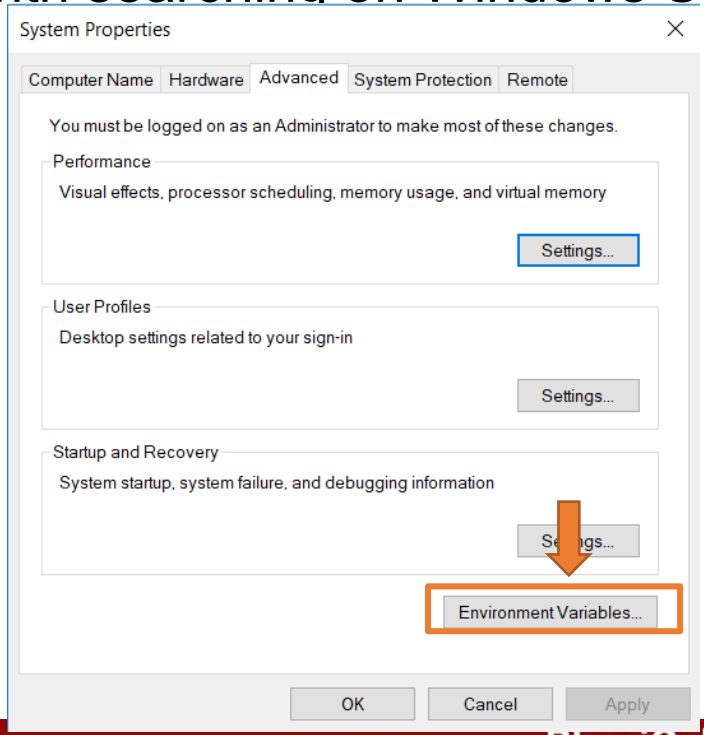
- It will take some time to install all required libraries. But in the end, you should not see any errors.



Adding directories to PATH

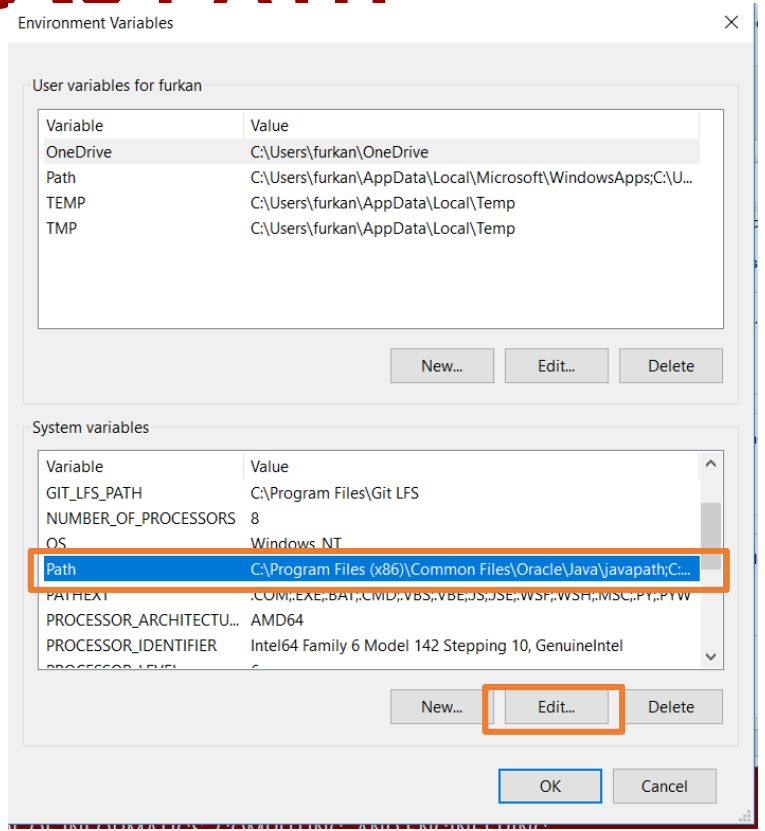
- Please go to environmental variables with searching on Windows Start Menu.





Adding directories to PATH

- Please select to SYSTEM PATH and press “Edit…”



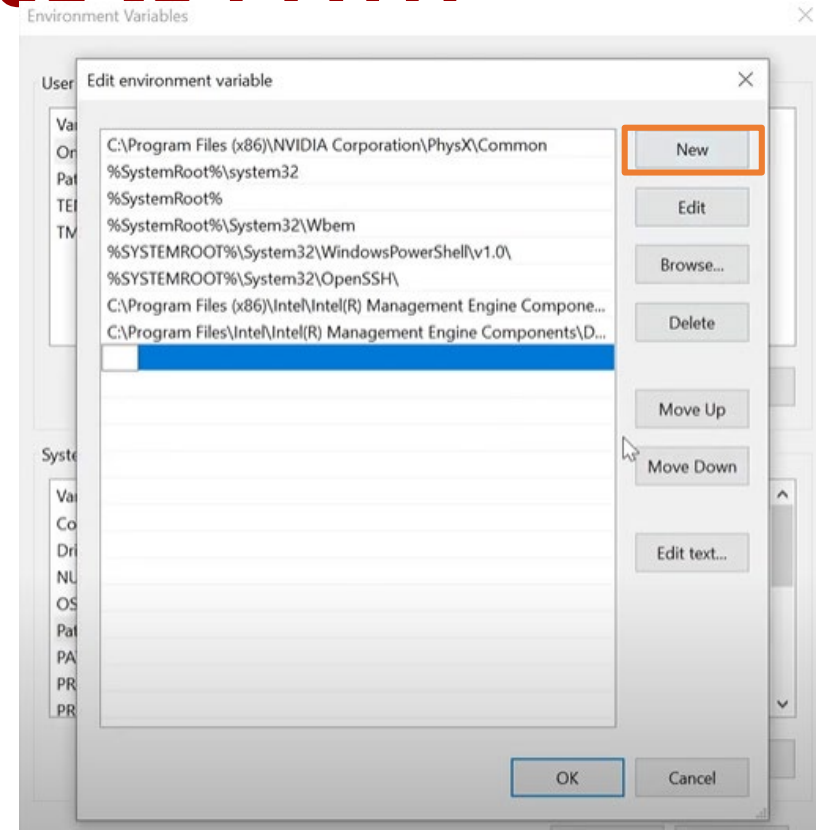
Adding directories to PATH

- Please press “New”. And add following paths to there:

C:\msys64\mingw64\bin

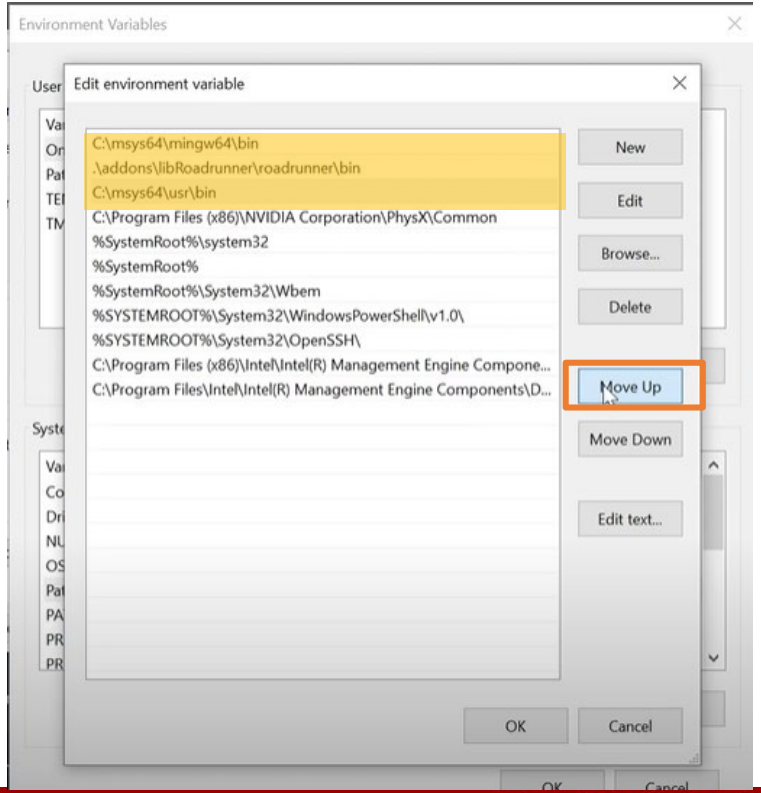
C:\msys64\usr\bin

.\addons\libRoadrunner\roadrunner\bin



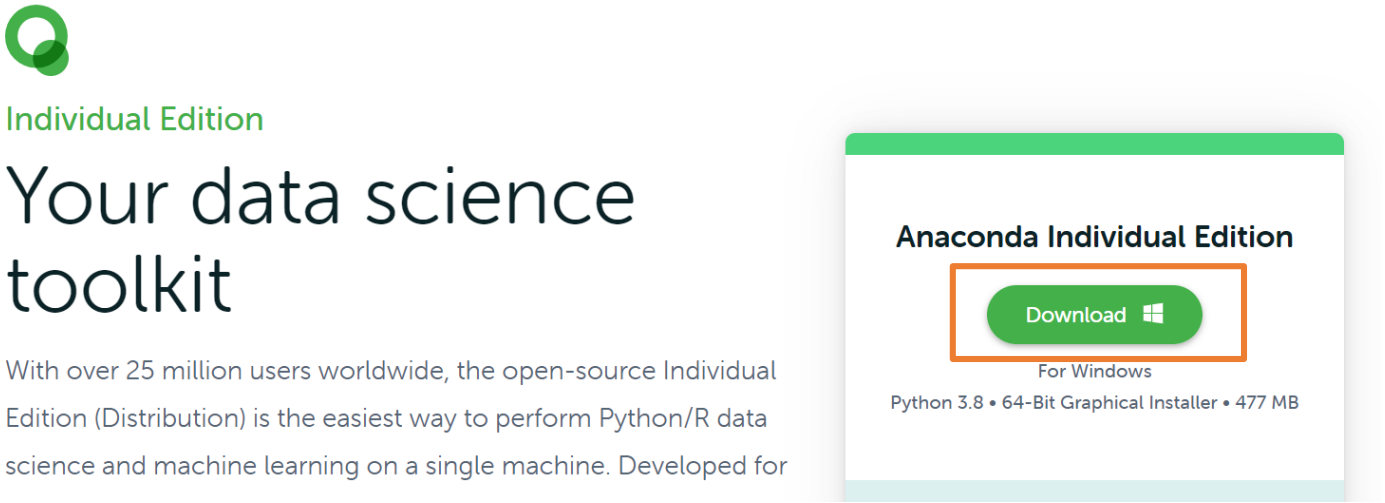
Adding directories to PATH

- Then please “MOVE UP”, newly added three paths.
- The list should like the following image.



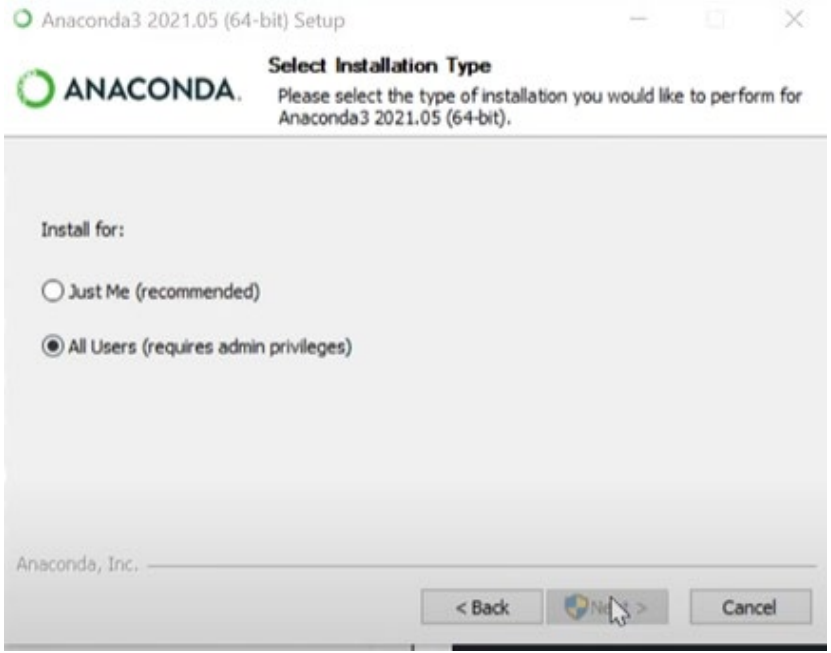
Anaconda

- Please proceed following link: https://www.anaconda.com/products/individual



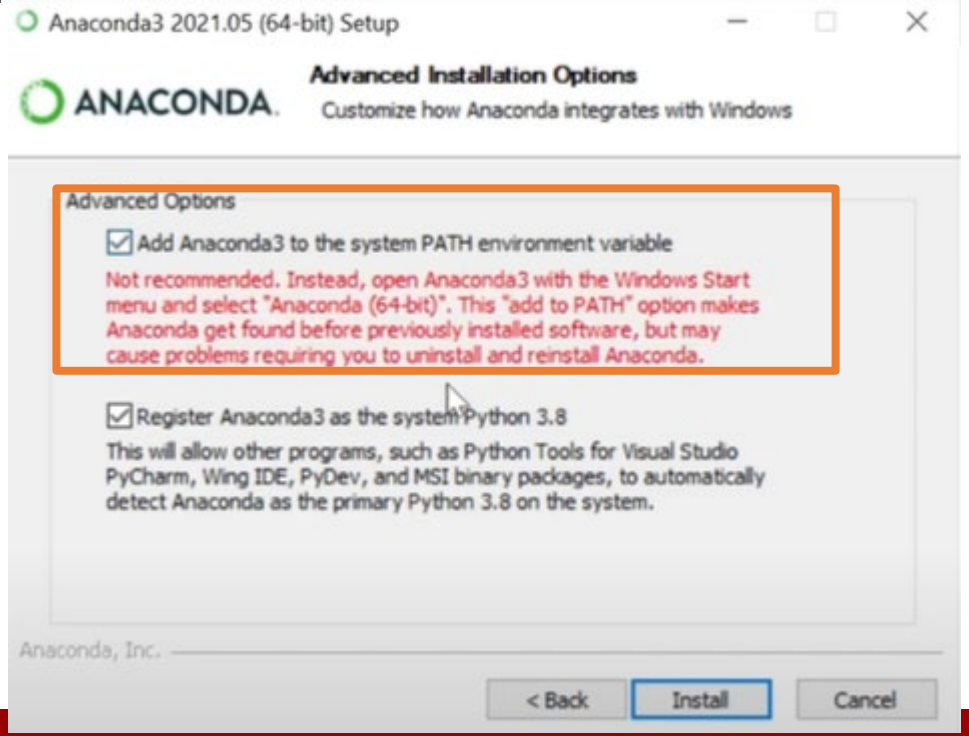
Anaconda

- Please install for all users. (This is step is required for msys2 path priorities)
- If you cannot install for all users. Please add msys2 paths for current user in the environmental variables. (Instead of systems variables, please use upper user variables)



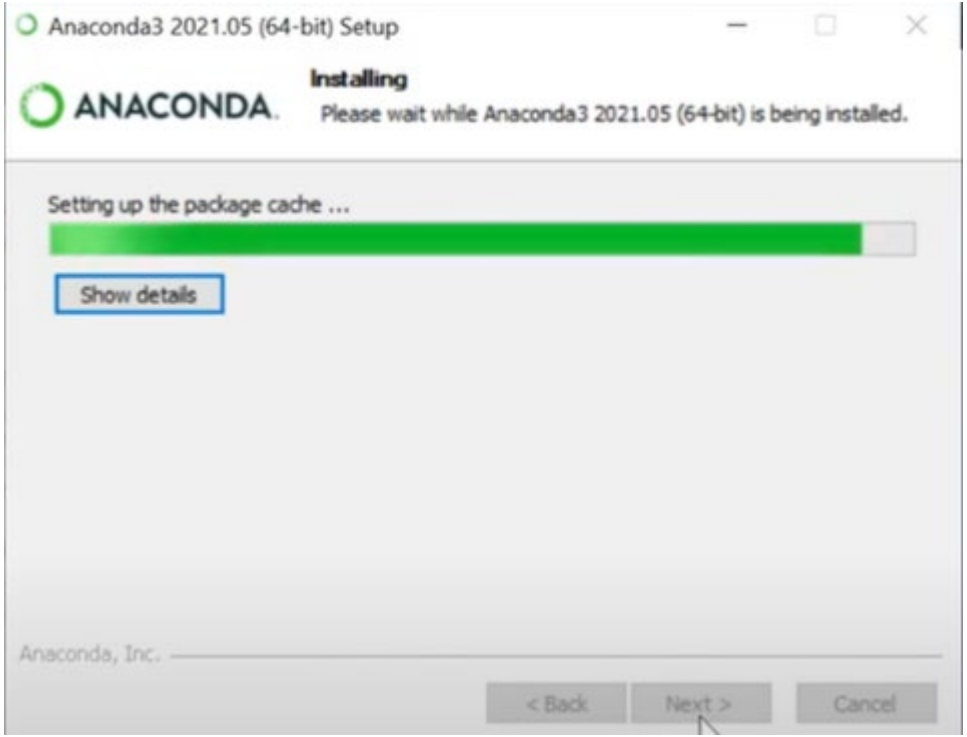
Anaconda

- Please select option for adding Anaconda to the path.



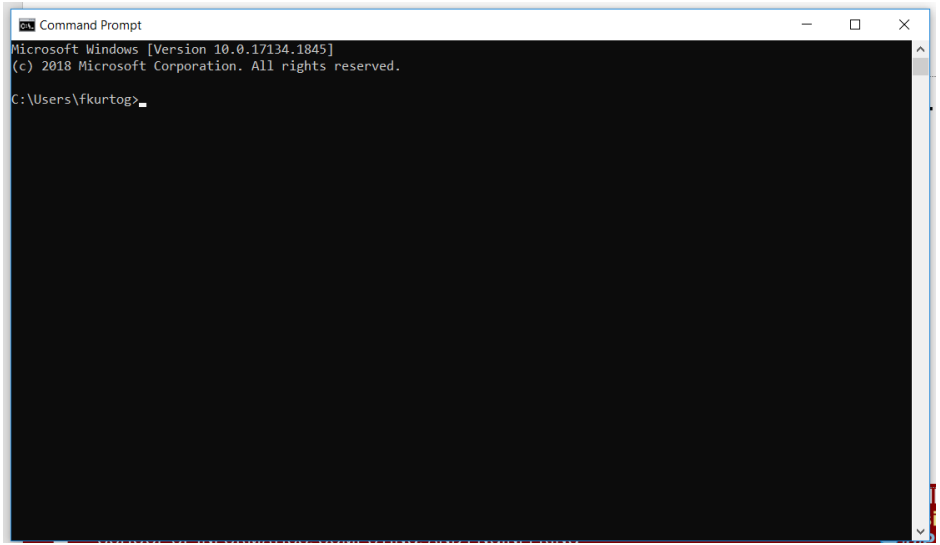
Anaconda

- Installation…



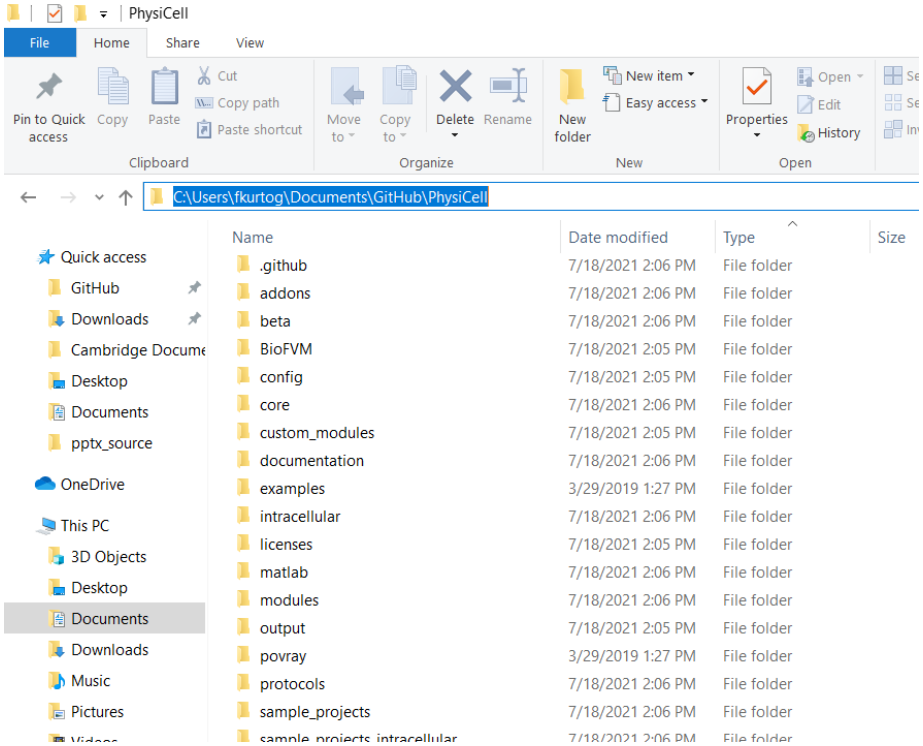
Test Module : “biorobots”

- At this moment PhysiCell is ready to work. Let’s try “biorobots”, first.
- Open command prompt from Start menu with typing “cmd”.



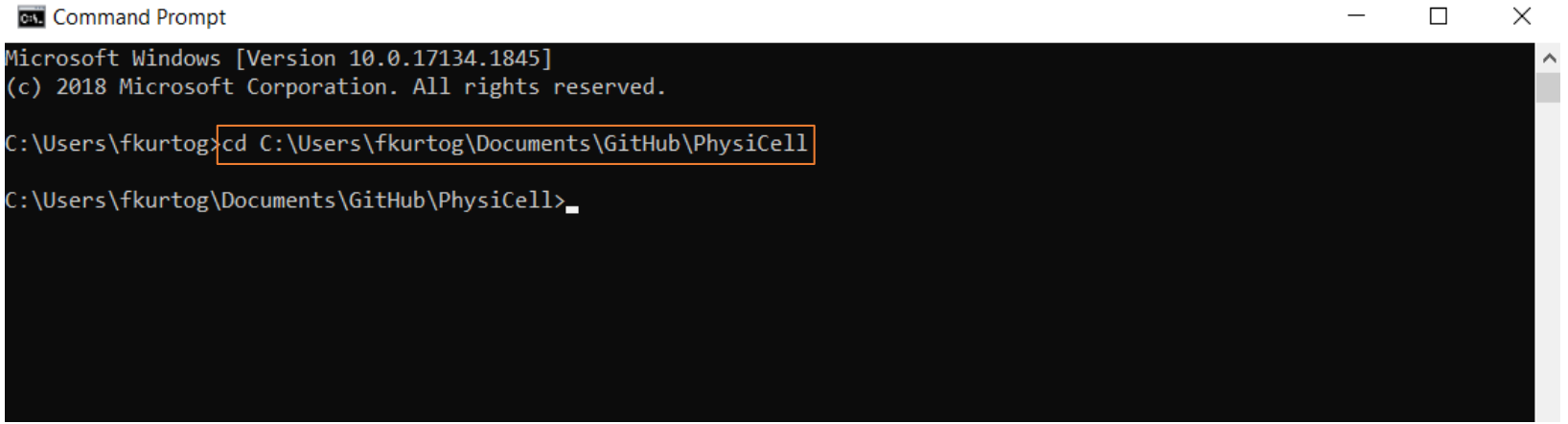
Going to PhysiCell folder

- Proceed to the PhysiCell folder at File Browser.
- Click to the directory address from top.
- Copy it



Going to PhysiCell folder

- Type “cd” and paste the copied directory with space between them.



Testing Modules (biorobots)

- Let's compile "biorobots" sample project first.
- Please run following commands in the command prompt.

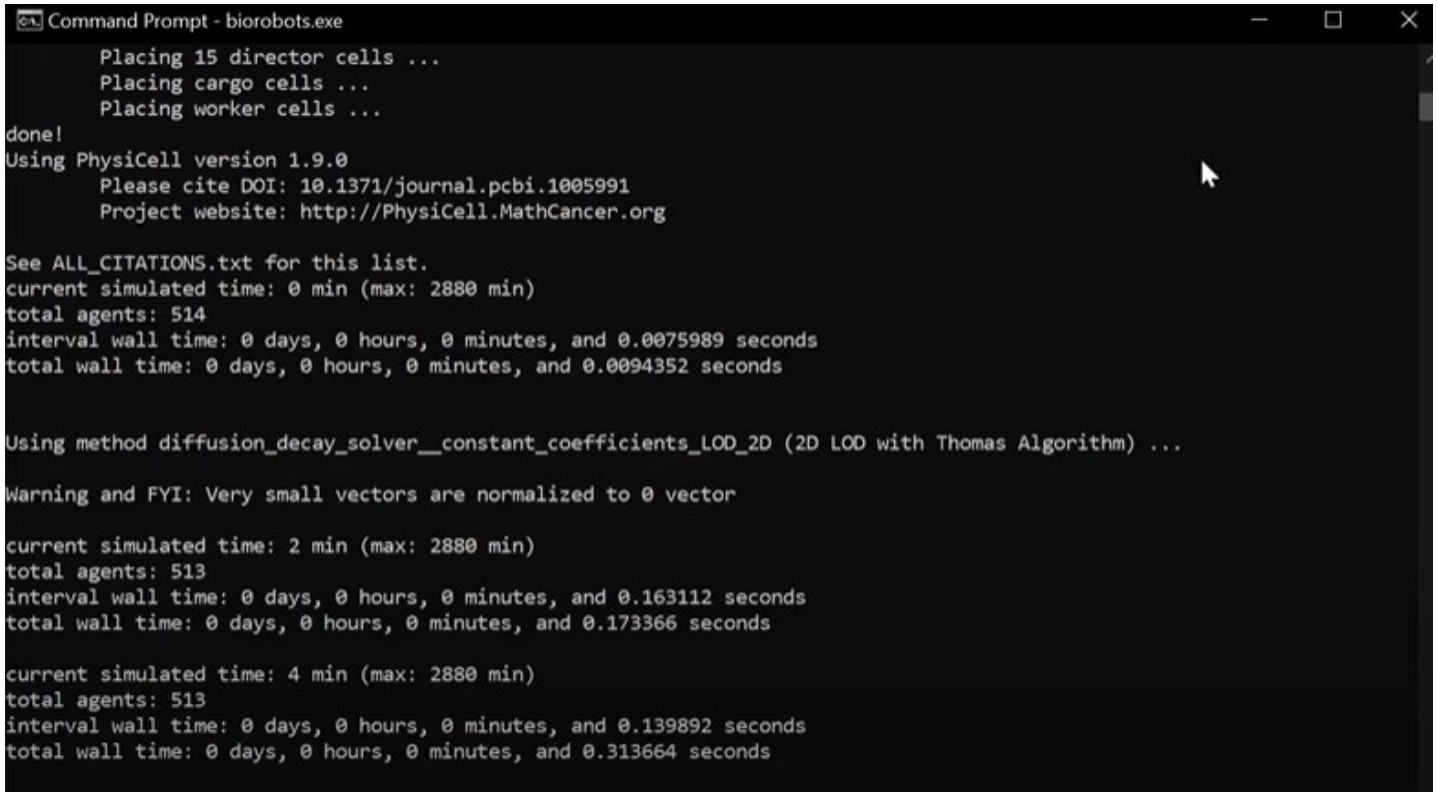
```
make biorobots-sample
```

```
make
```

- This should successfully compiles biorobots sample project that ready to run with following command.

```
./biorobots.exe
```

First simulation…



Testing Modules (ode-energy-sample)

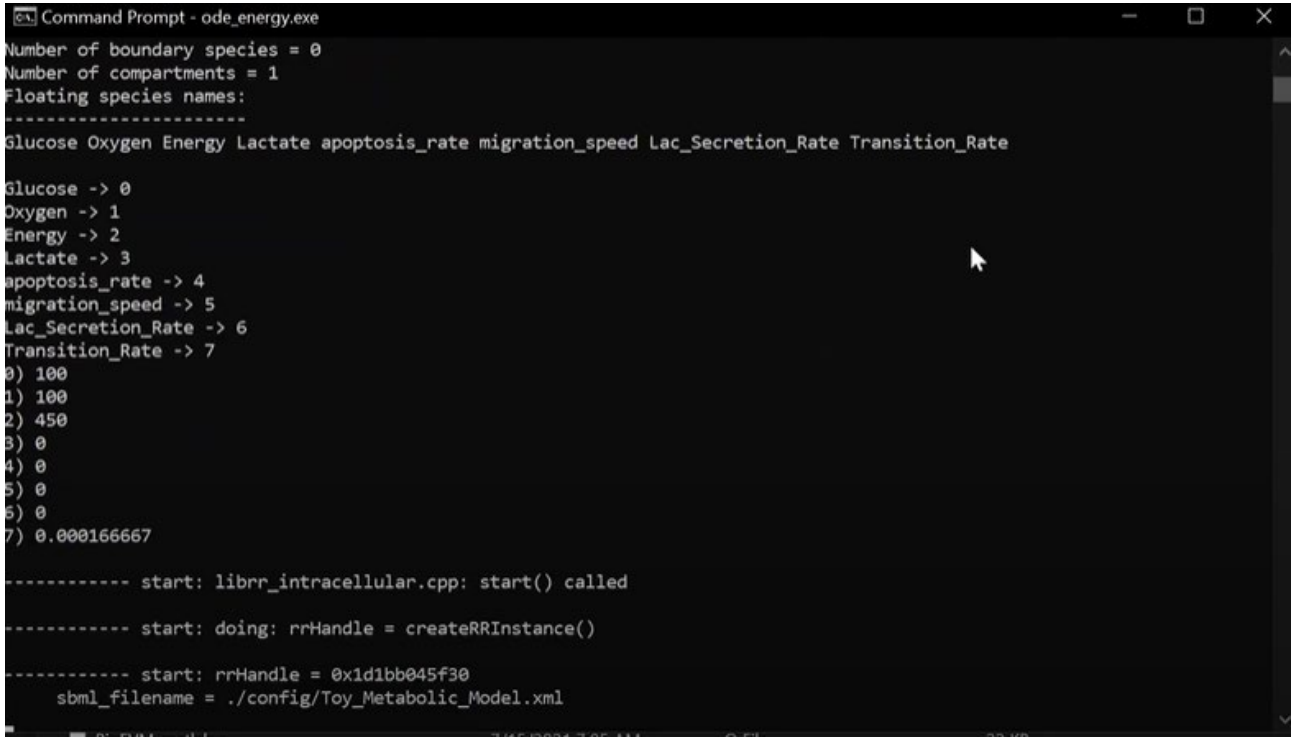
- If the first test is successfully created .mat and .xml files in the output folder. Let's try "ode-sample" sample project. To do that:

```
make ode-energy-sample
make
```

- While compilation, you should see "libroadrunner" installation. After the compilation, please use following command to run simulation.

```
./ode_energy.exe
```

Second simulation… (ode-energy-sample)



Overview

We have finished the minimal setup. Following slides will show traditional setup.

- PhysiCell
- MSYS 2
- Adding them to path
- Anaconda
- Test modules “biorobots” and “ode-energy-sample”

Minimal setup

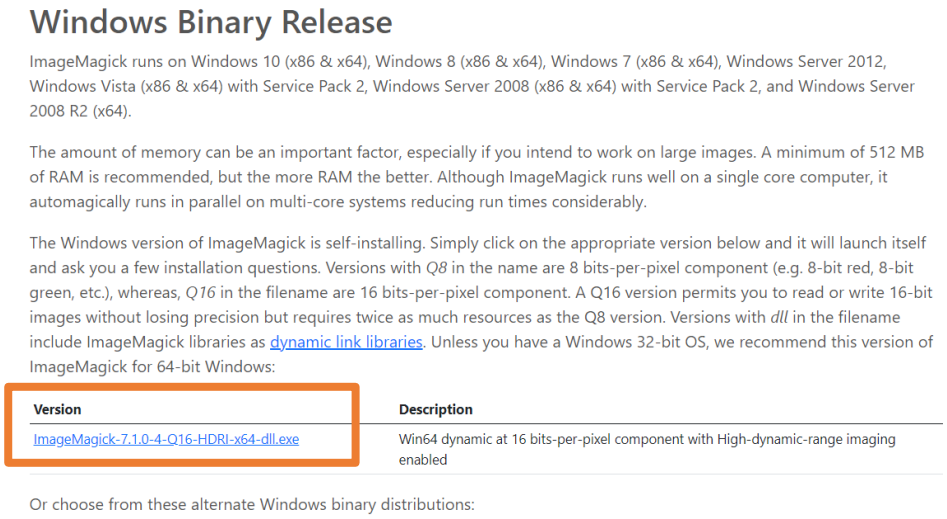
- ImageMagick
- COPASI
- PhysiCell Model Builder

Traditional* setup

*Traditional setup includes optional tools that helps for pre-simulation edits and pro-simulation analysis

ImageMagick

- Please proceed the following link: https://imagemagick.org/script/download.php
- And go below for “Windows Binary Release” and click there to download.



Windows Binary Release

ImageMagick runs on Windows 10 (x86 & x64), Windows 8 (x86 & x64), Windows 7 (x86 & x64), Windows Server 2012, Windows Vista (x86 & x64) with Service Pack 2, Windows Server 2008 (x86 & x64) with Service Pack 2, and Windows Server 2008 R2 (x64).

The amount of memory can be an important factor, especially if you intend to work on large images. A minimum of 512 MB of RAM is recommended, but the more RAM the better. Although ImageMagick runs well on a single core computer, it automagically runs in parallel on multi-core systems reducing run times considerably.

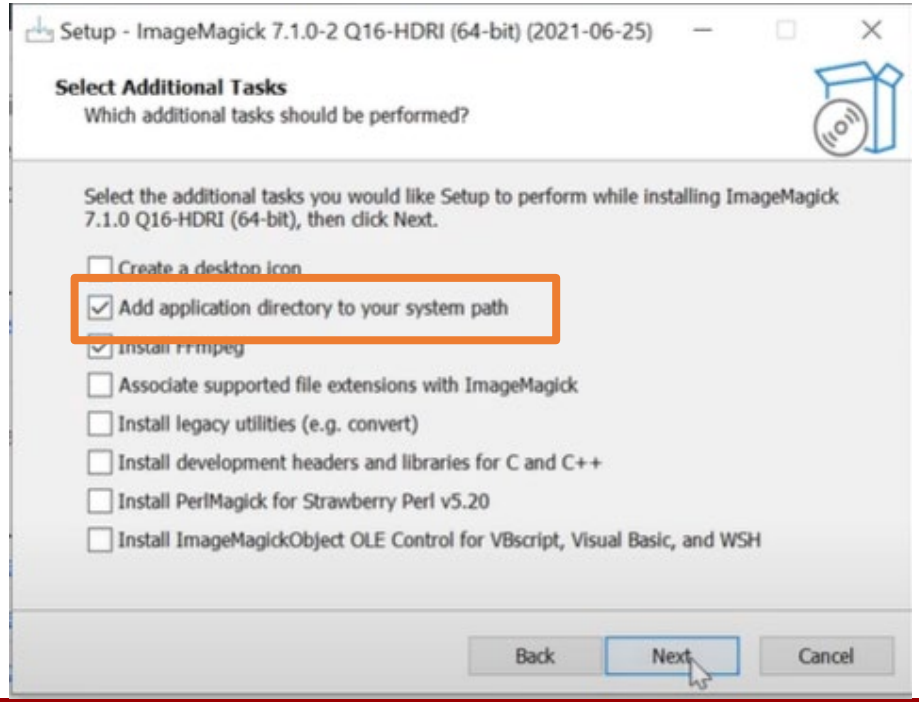
The Windows version of ImageMagick is self-installing. Simply click on the appropriate version below and it will launch itself and ask you a few installation questions. Versions with *Q8* in the name are 8 bits-per-pixel component (e.g. 8-bit red, 8-bit green, etc.), whereas, *Q16* in the filename are 16 bits-per-pixel component. A Q16 version permits you to read or write 16-bit images without losing precision but requires twice as much resources as the Q8 version. Versions with *dll* in the filename include ImageMagick libraries as dynamic link libraries. Unless you have a Windows 32-bit OS, we recommend this version of ImageMagick for 64-bit Windows:

Version	Description
ImageMagick-7.1.0-4-Q16-HDRI-x64-dll.exe	Win64 dynamic at 16 bits-per-pixel component with High-dynamic-range imaging enabled

Or choose from these alternate Windows binary distributions:

ImageMagick

- Please be sure the option for adding directory to path is selected.



COPASI

- Please proceed following link to download COPASI

http://copasi.org/

- Install regularly

PhysiCell Model Builder (1)

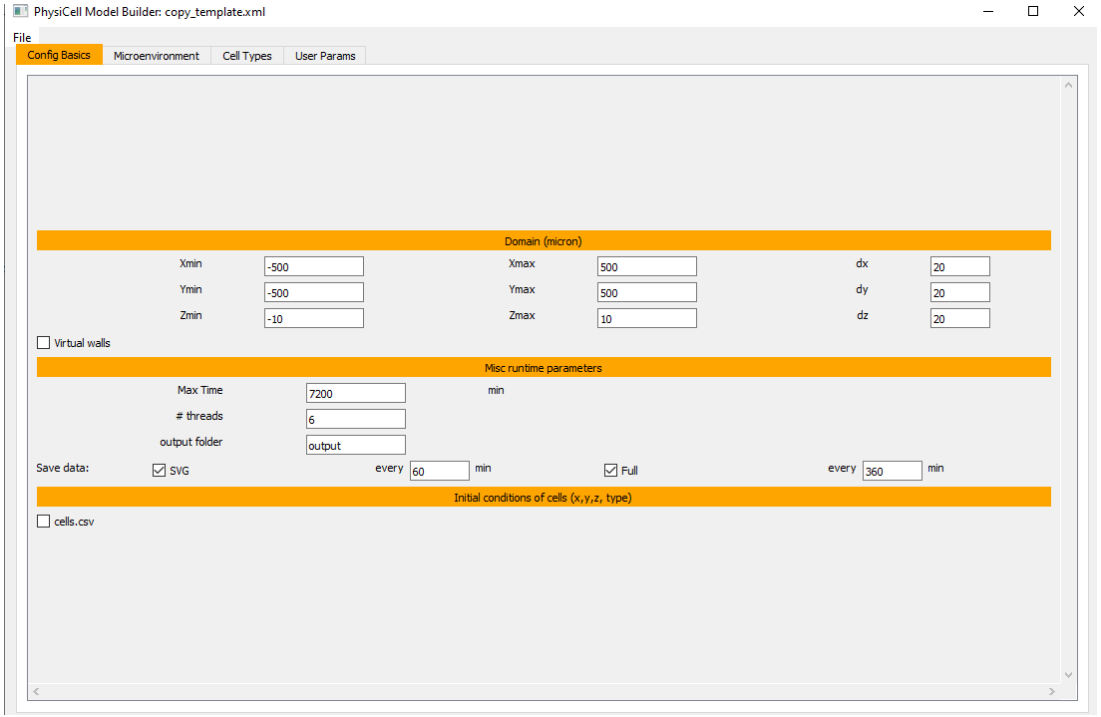
- The Model Builder is a GUI to let you create/edit a .xml configuration file that defines (nearly all of) a PhysiCell model.
- Download the latest release at:
  https://github.com/PhysiCell-Tools/PhysiCell-model-builder/releases
- Uncompress the .zip, change directory into it, and run it:

```
$ unzip PhysiCell-model-builder-2.5.0.zip
$ cd PhysiCell-model-builder-2.5.0
$ python bin/gui4xml.py
```

This should display the GUI (next page):

Note that if your setup automatically unzips files after downloading, this command will not work. INSTEAD, ***skip*** the unzip command and go directly to the second command

PhysiCell Model Builder (2)



A User Guide for the Model Builder is still be written.

It is a tool that is still considered “beta”, so your feedback will be very valuable.

Funding Acknowledgements

PhysiCell Development:

- Breast Cancer Research Foundation
- Jayne Koskinas Ted Giovanis Foundation for Health and Policy
- National Cancer Institute (U01CA232137)
- National Science Foundation (1720625)

Training Materials:

- Administrative supplement to NCI U01CA232137 (Year 2)