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<https://github.com/physicell-training/ws2023>

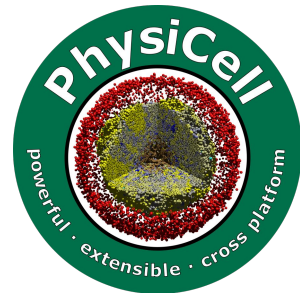
# Setting up PhysiCell on Linux

Elmar Bucher

 @MathCancer

## PhysiCell Project

May 2024



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SCHOOL OF INFORMATICS, COMPUTING, AND ENGINEERING

PhysiCell Project

**PhysiCell.org**

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# Overview

This document describes the PhysiCell installation on a Debian Linux distribution. If you run on another flavor, please adjust accordingly.

- GCC
- ImageMagick, FFmpeg
- Git (optional)
- PhysiCell

Minimum  
Setup

- 
- Python3 (conda), iPython, pcdl
  - Jupyter (optional)
  - PhysiCell Studio

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- Copasi

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# GCC (Minimum Setup)

- Check if GCC (the gnu compiler collection) is already installed.  
`g++ --version`
- If not:  
`sudo apt install build-essential`
- OpenMP (open multi processing) is a feature, used by PhysiCell, that is implemented in GCC.



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# ImageMagick (Minimum Setup)

ImageMagick is used for making jpeg and gif images from PhysiCell svg image output.

- Check if ImageMagick is already installed.  
`magick --version`
  - If ok: **you have >= version 7 installed**. You are all set! You can move to the next page.
  - If you receive: Command 'magick' not found, try:  
`convert --version`  
if ok: **you have most probably a version 6 installed** (like the most of us)!
- If both of these commands not worked:  
`sudo apt install imagemagick`

**The PhysiCell Makefile is written for ImageMagick >= version 7**, which requires a `magick` command in front of each ImageMagick command (e.g. `magick convert` instead of `convert`).

**If you have <= version 6 installed**, you can follow the instruction below to generate a `magick` command that simply passes everything to the next command. This will make the PhysiCell Makefiles work for you too.

```
cd to the folder where you have your manual installed binaries. e.g. ~/.local/bin/  
echo '$*' > magick  
chmod 775  
which magick
```

# FFmpeg (Minimum Setup)

FFmpeg is used for making mp4 movies out of jpeg images.

- Check if FFmpeg is already installed.  
`ffmpeg -version`
- If not:  
`sudo apt install ffmpeg`

# Git (optional, Minimum Setup)

git is an alternative way to install the PhysiCell and the Studio source code. The common way is to use `wget`.

- Check if git is already installed  
`git --version`
- If not:  
`sudo apt install git`

# wget & unzip

Check if you have wget and unzip installed.

- `wget --version`  
if not:  
`sudo apt install wget`
- `unzip`  
if not:  
`sudo apt install unzip`

# PhysiCell (Minimum Setup)

Download PhysiCell and place it where you want to work with this source code.

- Git:  
`git clone git@github.com:MathCancer/PhysiCell.git`
- Wget:  
`wget https://github.com/MathCancer/PhysiCell/releases/download/1.13.1/PhysiCell\_V.1.13.1.zip`  
`unzip PhysiCell_V.n.n.n.zip`

Test the installation with the biorobots sample project.

```
cd PhysiCell
make biorobots-sample
make
./biorobots
make jpeg
make movie
```



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# Python3 part I (Modeler Setup)

It is up to you to use the python3 that ships with the distribution. The mamba python3 distribution comes in handy, when you want to run somewhere python3 where you have no root rights. [https://mamba.readthedocs.io/en/latest/user\\_guide/mamba.html](https://mamba.readthedocs.io/en/latest/user_guide/mamba.html)

- `cd` to the folder where you have your manual installed programs.  
e.g. `~/local/lib/`
- Adjust the download according to your CPU architecture (here x86\_64)!  
<https://github.com/conda-forge/miniforge>
- `wget https://github.com/conda-forge/miniforge/releases/latest/download/Miniforge3-Linux-x86_64.sh`  
`chmod 775 Miniforge3-Linux-x86_64.sh`  
`./Miniforge3-Linux-x86_64.sh`
- Adjust the installation location to where your manual installed programs are.  
e.g. `home/<user>/local/lib/miniforge3`
- You wish the installer to initialize mamba!  
`yes`  
`source ~/.bashrc` (or log out and in again).
- You can now generate virtual python environment with the command below.  
Beware: You have at least to list one package (e.g. `ipython`) to successfully generate an environment!  
`mamba create -n nameofmyenv ipython`

# Python3 part II (Modeler Setup)

- The environment should now be activated.  
Check if the python and pip paths point to the installed location:  
`which python`  
`which pip`
- Install the iPython shell:  
`pip install ipython`
- Install the PhysiCell DataLoader:  
`pip install pcdl`
- Optional: install Jupyter:  
`pip install jupyterlab`

# PhysiCell Studio (Modeler Setup)

Download the studio and place it where you want to work with this source code.

- Git:  
`git clone git@github.com:PhysiCell-Tools/PhysiCell-Studio.git`
- Wget:  
`wget https://github.com/PhysiCell-Tools/PhysiCell-Studio/archive/refs/tags/v2.37.9.zip`  
`unzip vn.n.n.zip`

Put the studio under the PATH:

```
cd to the folder where you have your manual installed binaries. e.g. ~/.local/bin/  
echo 'python /absolute/path/to/PhysiCell-Studio/bin/studio.py $*' > studio  
chmod 775  
which studio
```

Install the Qt library dependencies:

```
sudo apt install qtbase5-dev  
pip install PyQt5
```

Test the installation with the biorobots sample project.

```
cd to wherever you have PhysiCell installed. Inside the PhysiCell folder:  
studio
```

PhysiCell Studio should open, loaded with the biorobots settings file.

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# Copasi (Hackathon Setup)

- The detailed instructions can be found here:  
<https://copasi.org/Support/Installation/Linux/>
- cd to the folder where you have your manual installed programs. e.g. ~/.local/lib/
- download copasi:  
wget  
<https://github.com/copasi/COPASI/releases/download/Build-288/COPASI-4.43.288-Linux-64bit.sh>
- Install copasi:  
chmod 775 COPASI-n.n.n-Linux-64bit.sh  
./COPASI-n.n.n-Linux-64bit.sh  
Thereby change the installation directory setting to where you right now are.
- Put copasi under the PATH  
cd to the folder where you have your manual installed binaries. e.g. ~/.local/bin/  
ln -s /absolute/path/to/installed/CopasiSE  
ln -s /absolute/path/to/installed/CopasiUI

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  - Jupyter (optional, local installation only)
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# 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, 1818187)

## Training materials:

- Administrative supplement to NCI U01CA232137 (Year 2)

## Other Funding:

- NCI / DOE / Frederick National Lab for Cancer Research (21X126F)
- DOD / Defense Threat Reduction Agency (HDTRA12110015)
- NIH Common Fund (3OT2OD026671-01S4)