Setup PhysiCell on Windows

Elmar Bucher, Ph.D.-Student

Intelligent Systems Engineering
Indiana University

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Overview

This document describes the PhysiCell installation on a Microsoft Windows machine.

- msys2 gcc make
- imagemagick ffmpeg unzip zip
- git
- PhysiCell

Minimum Setup

- Python3, iPython, pcdl
- PhysiCell Studio

Power User Setup

- VSCode

IDE Setup

Msys2 part I (Minimum Setup)

- Download and install msys2 x86_64.

  https://www.msys2.org/

- Open the UCRT64 (universal c runtime) terminal.

```
pacman -S mingw-w64-ucrt-x86_64-gcc make
pacman -S mingw-w64-ucrt-x86_64-imagemagick mingw-w64-ucrt-x86_64-ffmpeg
pacman -S unzip zip
pacman -S mingw-w64-ucrt-x86_64-ca-certificates
pacman -S git
```

- Additionally, we will generate a src folder in your Windows Home directory, where we later on will install PhysiCell and PhysiCell-Studio into it.

```
mkdir -p /c/Users/<username>/src
```

PhysiCell (Minimum Setup)

- Open the msys2 UCRT64 terminal, cd into the src directory and download PhysiCell.

```
cd /c/Users/<username>/src
git clone https://github.com/MathCancer/PhysiCell.git
```

- Test the installation with the template sample project.

```
cd PhysiCell
make data-cleanup clean reset
make template
make -j8
./project
make jpeg
make gif
make movie
```

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Python3 part I (Power User Setup)

We will **generate a python3 environment with the default Windows python installation**, where we will install all PhysiCell modelling related python libraries. We will name this Python3 environment **physienv**, and we install it in the **src** folder where just before have installed PhysiCell.
Here we demonstrate, how to generate the environment with the regular python. If you run mamba or conda, please adjust the commands accordingly.

- Open the **Windows PowerShell terminal**!
  The first command will let you know if you have python installed. If not, then please go to the Microsoft Store and install the latest release available from the Python Software Foundation.

```
Get-Command python.exe

cd ~

python.exe -m venv src/physienv
```

Python3 part II (Power User Setup)

Now, **we link the python executable in this physienv as the default python installation for the msys2 terminal**.

- Open the **msys2 UCRT64 terminal** to generate an alias for this environment for activation:

```
echo 'alias physienv="source /c/Users/<username>/src/physienv/Script/activate"' >>
~/.bash_profile

source ~/.bash_profile

physienv  # activate the environment

which python #  this should point to the python in the physienv/Scripts folder. if not, you made a mistake! please correct.

which pip #  this should point to the python in the physienv/Scripts folder. if not, you made a mistake! please correct.

cd /c/Users/<username>/src/physienv/Scripts

ln -s python.exe python3.exe

which python3 #  this should point to the python.exe file in the physienv/Scripts folder. if not, you made a mistake! please correct.

which pip3 #  this should point to the python.exe file in the physienv/Scripts folder.
```

Python3 part III (Power User Setup)

- Open the msys2 UCRT64 terminal and
  activate the physienv python environment using the alias generated before:

  ```
  physienv
  ```

- Install the iPython shell:

  ```
  pip3 install ipython
  ```

- Install the PhysiCell Data Loader:

  ```
  pip3 install pcdl
  ```

PhysiCell Studio part I (Power User Setup)

- Open the msys2 UCRT64 terminal, cd into the src directory and download PhysiCell Studio.

```
cd /c/Users/<username>/src
git clone https://github.com/PhysiCell-Tools/PhysiCell-Studio.git
```

- Put the studio under the `PATH`:

```
cd /c/Users/<username>/src/physienv/Scripts
echo 'python3 /c/Users/<username>/src/PhysiCell-Studio/bin/studio.py $*' > studio.exe
which studio   # this should point to the studio.exe file in the Scripts folder.
```

- Install the Qt library dependencies:

```
pip3 install pyqt5
```

PhysiCell Studio part II (Power User Setup)

- Test the installation with the template sample project:

```
cd /c/Users/<username>/src/PhysiCell
physienv
studio
```

PhysiCell Studio should open and load the template PhysiCell_settings.xml file.

- Please check out the official PhysiCell Studio manual:
  https://github.com/PhysiCell-Tools/Studio-Guide/tree/main

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MS Visual Studio Code part I (IDE Setup)

1. Install vs code, either from your operating system's app store or from https://code.visualstudio.com/

2. Generate a vs code profile for physicell:

```
File | New Window with Profile
Name: physicell
Icon: choose a cool one. e.g. 🔥.
Create
Add Folder: Home/src
click the profile icon (default is a gearwheel) on the left side bottom corner.
Profile > physicell
```

3. Open the Folder:

```
File | Open Folder… | src | Open
Yes, I trust the authors
```

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MS Visual Studio Code part II (IDE Setup)

1. Install the official python and C++ extensions into the profile:

   ```
   click the profile icon (default is a gearwheel) on the left side bottom corner.
   Profile > physicell
   Extension: Python Install
   Extension: C/C++ Install
   ```

2. Link physienv (the python environment we generated above):

   ```
   View | Command Palette… | Python: Select Interpreter |
   Enter interpreter path… | Find… | src/physienv
   ```

MS Visual Studio Code part III (IDE Setup)

1. Link msys2 as default terminal:

   `View | Command Palette… | Preferences: Open Workspace Settings (JSON)`

   copy the **msys2 configuration json for visual studio code** (not sublime text!) found at https://www.msys2.org/docs/ides-editors/#visual-studio-code and pasted it into the vs code settings.json .

   `close the settings.json tab` # a dialog window will pop up.

   `click Save`

   `Terminal| New Terminal` # a msys2 terminal integrated into the vs code IDE should open.

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