

# **Working with SMORE's Deterministic Model and Interdisciplinarity Analysis**

## **Guide to work with Jupyter Notebook**

## Before you start

The deterministic model and the interdisciplinarity analysis is written in a language called Python.

To be precise, we used Python in an environment called Jupyter Notebook (also known as IPython). You may think of Jupyter Notebook as a way to contain the Python programme, so it doesn't cause unneeded changes to your computer. Moreover, the data visualization in Jupyter Notebook is friendlier to first-time Python users.

We are here to guide you to work with our model and analysis. If you only wish to view the code, you may use the links we provided on the SMORE iGEM wiki.

This will require the download of two software, they are: Python 2.7 and Miniconda. This is easier than you think it is.

## Step 1: Install Python

Firstly, we will install Python – the programming language. If you already have Python 2.7+ installed, you may skip this step.

1. Go to <https://www.python.org/downloads/>
2. Download python 2.7.14. The website detects your operating system and will suggest the suitable option for you.  
(Python 3.6.3 is also suggested, but this is not compatible with our program)
3. Follow the installation process to install Python. The default configuration is sufficient.

## Step 2: Install Miniconda

Great! Now let's install Miniconda. This allows you to use Jupyter Notebook. If you have Miniconda or Anaconda installed, you may skip this step.

1. Go to <https://conda.io/miniconda.html>
2. Download the version that supports Python 2.7 (not Python 3.6), according to your operating system.  
(32-bit or 64-bit does not make a difference)
3. Follow the installation process to install Python. The default configuration is sufficient.

## Step 3: Open Jupyter Notebook

You have done the preparation! Now we can download the file and read it in Jupyter Notebook.

1. Download the ipynb code files from SMORE's page.
2. Save them and them only (for security concerns) into a directory you like to work in.

A directory is simply a place in your computer. For example, a folder in Documents or Downloads.

3. Open your terminal (also known as command prompt in Windows).
4. Now, we use miniconda to set up the Notebook. Enter **exactly**:  
“conda create -n dModel python=2”

After that, lines of codes would appear. Type “y” if it asks you to.

5. If you have Mac OS X or Linux, Enter **exactly**:  
“source activate dModel”

If you have Windows, Enter **exactly**:  
“activate dModel”

*(You need to repeat step 5 to activate the environment every time you wish to work with the files. The point of setting up this environment is to separate it from the rest of your computer. since it's written in Python 2.7, if you ever update your Python to higher version, or if some functions being used in our code files are modified/updated by Python, our code might not work anymore properly anymore.)*

6. To install the required Python packages, Enter **exactly**:  
“conda install numpy scipy matplotlib jupyter”

To free up disk space from package tarballs, Enter **exactly**:  
“conda clean -t”

7. To go to the directory where you saved the code files, Enter:  
“cd ~/PathToDirectory”

, where ~/PathToDirectory is the location of your directory that contains SMORE's code file, e.g. Users/Name/Documents in Windows.

To open the files with Jupyter Notebook, Enter **exactly**:  
“jupyter notebook”

8. Great! The terminal will open your default web browser to view the code files. Do not close the terminal while you are working with the files.
9. To quit Jupyter Notebook, close windows in browser, go to your terminal, hit ctrl+c twice to quit.

If you have any questions or difficulties, contact us at [igem2017edinburgh@gmail.com](mailto:igem2017edinburgh@gmail.com)