**Integration Option 1 (Working)**

Objective: Install Blender and make sure Blender recognizes Bertini\_real

1. **Make sure you’re using Python 3.7 (if not, install or update to the latest version)**  
   Installation:  
   MacOS: brew install python3  
   Linux: sudo apt install python3.7
2. **Install Blender 2.8 (latest version which uses Python 3.7 interpreter)**  
   Download and install Blender 2.8: <https://www.blender.org/2-8/>
3. **Add Blender to PATH**  
   Example:  
   MacOS: echo "alias blender=/Applications/blender2.8/blender.app" >> ~/.bashrc  
   Linux: export PATH:$PATH:/home/foongminwong/blender2.8/blender
4. **Install python packages required by Bertini\_real into Blender Python Modules Folder in your local terminal: (use the latest version pip for Python 3.7)**  
   Example:  
   MacOS: pip3 install -t /Applications/blender2.8/blender.app/Contents/Resources/2.80/scripts/modules <python-package-name> --upgrade

Linux: pip3 install -t /home/foongminwong/blender2.8/2.80/scripts/modules <python-package-name> --upgrade  
  
(If the commands don’t work, add option ‘--system’)

List of python package names:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| dill | matplotlib | sympy | scipy | numpy |
| algopy | mpmath | trimesh | shapely | cython |
| pyopengl | triangle | glumpy | pillow |  |

1. **To export video, you can run Blender in background with the Python automation script in your local terminal:**  
   Command: blender -b -P <python-script.py>

Example: blender -noaudio -b -P ~/bertini\_real/python/bertini\_real/anaglypy/rotate\_z.py

For more information about the Blender Python commands, check [this](https://docs.blender.org/manual/en/latest/advanced/command_line/arguments.html?highlight=python) out.

Or inside Blender Python console 3.7.0:

Command Example:

>>> filename = /home/foongminwong/bertini\_real/python/bertini\_real/anaglypy/rotate\_z.py #name of python script

>>> exec(compile(open(filename).read(),filename,’exec’))

**Extra: If errors come up, try the following:**

* Install & upgrade all aforementioned python packages in your own local system:  
  pip3 install <python-package-name> --upgrade
* For Linux, if you get error: “command 'x86\_64-linux-gnu-gcc' failed with exit status 1”,

try running this command: sudo apt-get install python3.7-dev or try [this](https://github.com/scrapy/scrapy/issues/2115)

* If you get errors such as “pickle.load – EOF Error: Ran out of input” related to pickle, try running “pip 3 install dill pillow --upgrade”
* If you get errors such as “DistutilsOptionError: can't combine user with prefix, exec\_prefix/home, or install\_(plat)base, try [this](https://stackoverflow.com/questions/4495120/combine-user-with-prefix-error-with-setup-py-install)

**Integration Option 2 (Not working for me)**

Objective: Install BlenderAsPyModule

1. **Make sure you’re using Python 3.7 (if not, install or update to the latest version)**

python version must align with the python version in blender

1. **Install bpy (from source)** – This will take some time. Use “sudo” when necessary.

Link: <https://archive.blender.org/wiki/index.php/User:Ideasman42/BlenderAsPyModule/>

Link: <https://wiki.blender.org/wiki/Building_Blender/Linux/Ubuntu>

1. **Install bpy (using pip)** – This doesn’t seem working. It only works for Windows for now.

Link: <https://pypi.org/project/bpy/>

1. **Use ‘anaglypy’ module** (if bpy is installed correctly in your machine, else you will get seg fault):

IPython:

>>> import bertini\_real

>>> bertini\_real.fata.gather() # if user hasn’t gathered yet

>>> bertini\_real.anaglypy. [option]

[1] rotate\_z()

[2] rotate\_xyz()

[3] multi\_rotate()