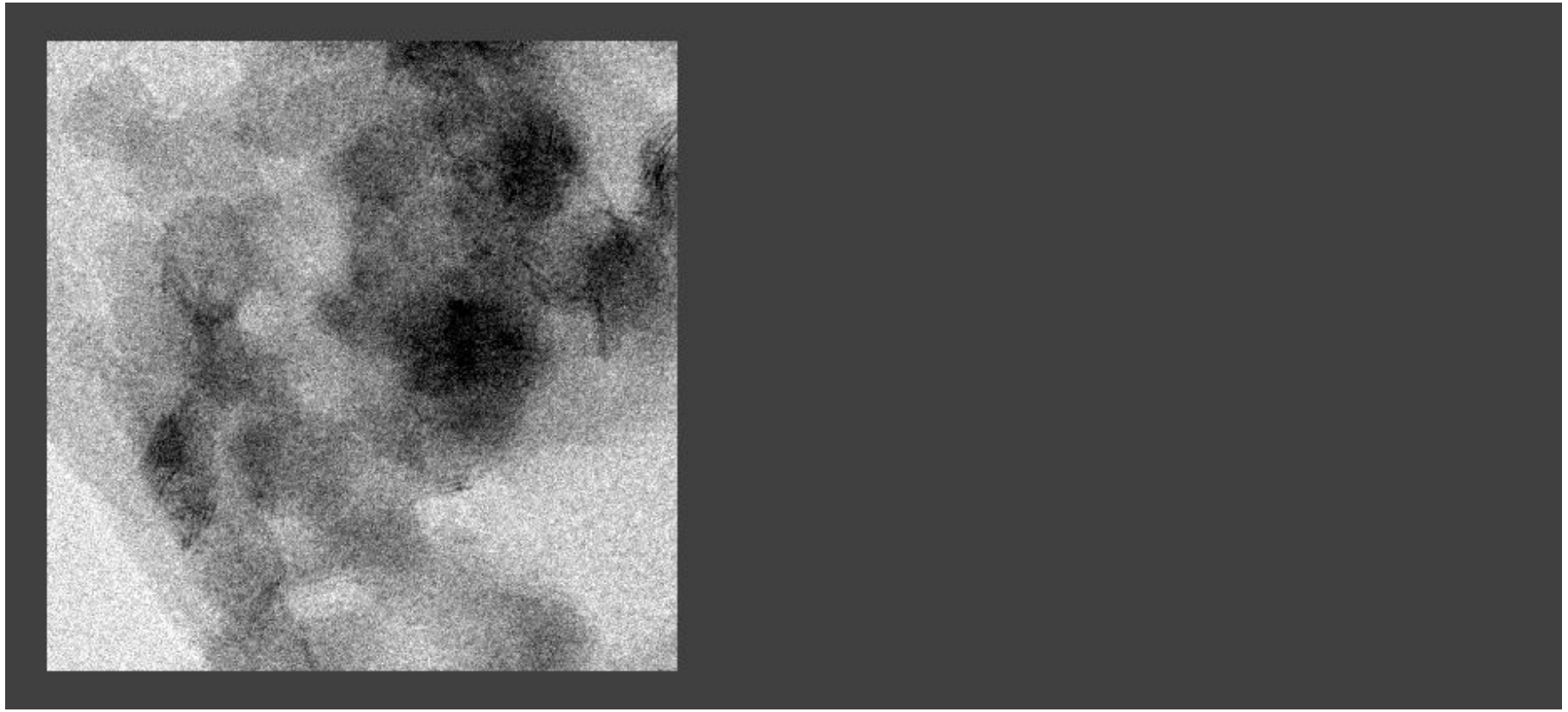
Noise reduction with deep learning, a comprehensive tutorial with plug im!

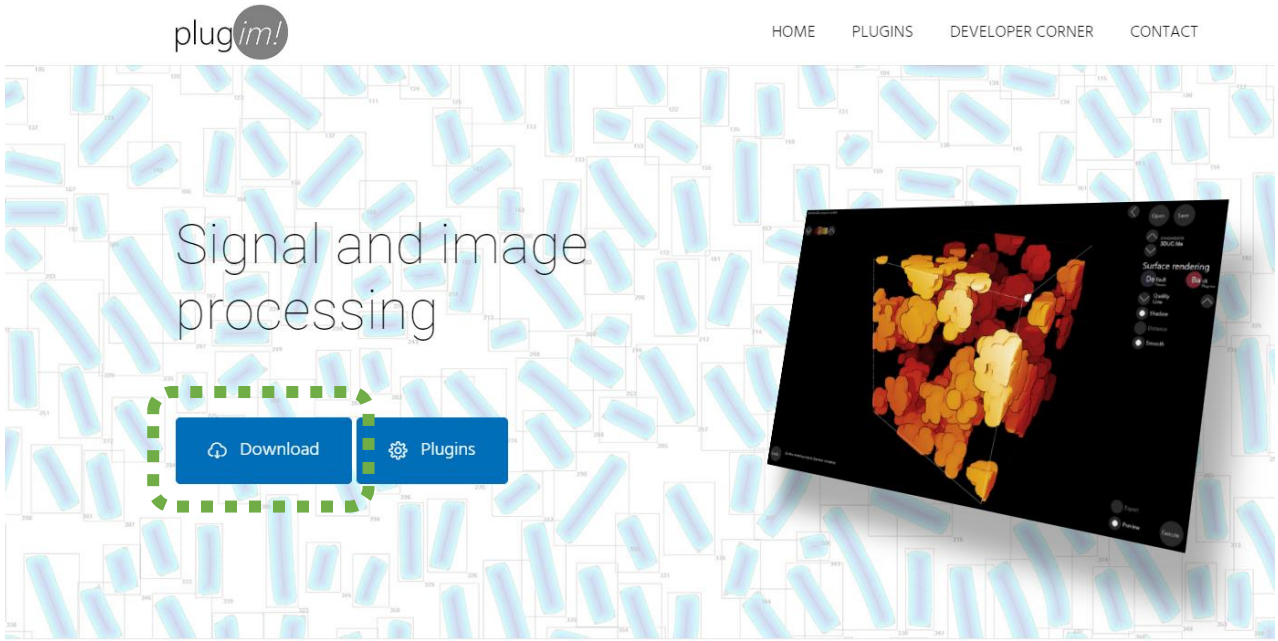


plug im!

ifp Energies nouvelles

Download and install plug im software

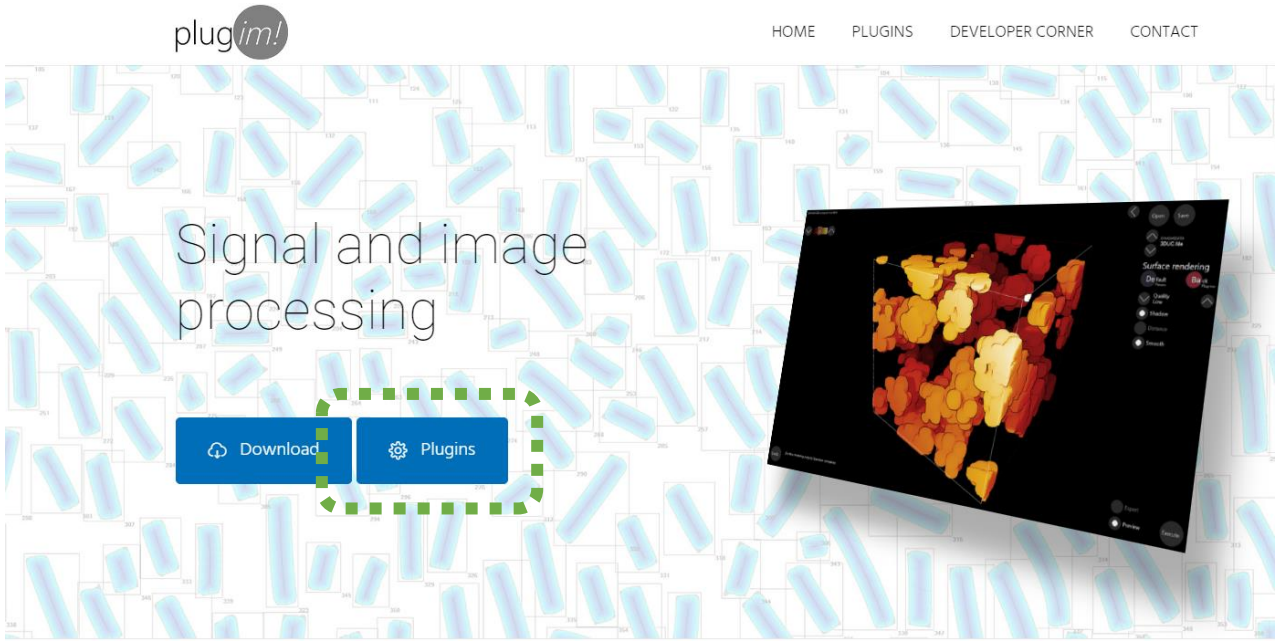
- www.plugim.fr



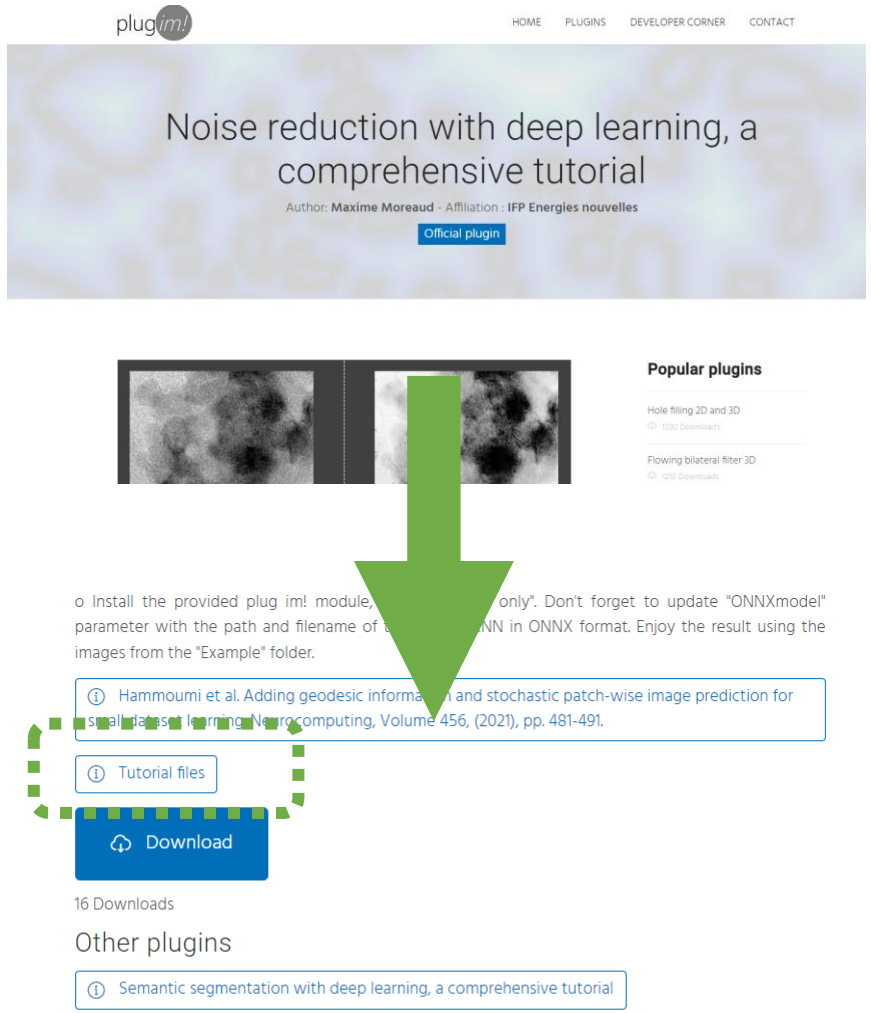
- Follow installation procedure

Download “Noise reduction” Package (1/2)

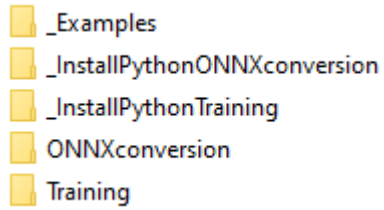
- www.plugim.fr



Download "Noise reduction" Package (2/2)



- Package :



https://www.plugim.fr/plugin/119

Tutorial steps

- Training
  - Miniconda installation
  - Python environnement installation
  - Jupyter Notebook
- ONNX conversion
  - Python environnement installation
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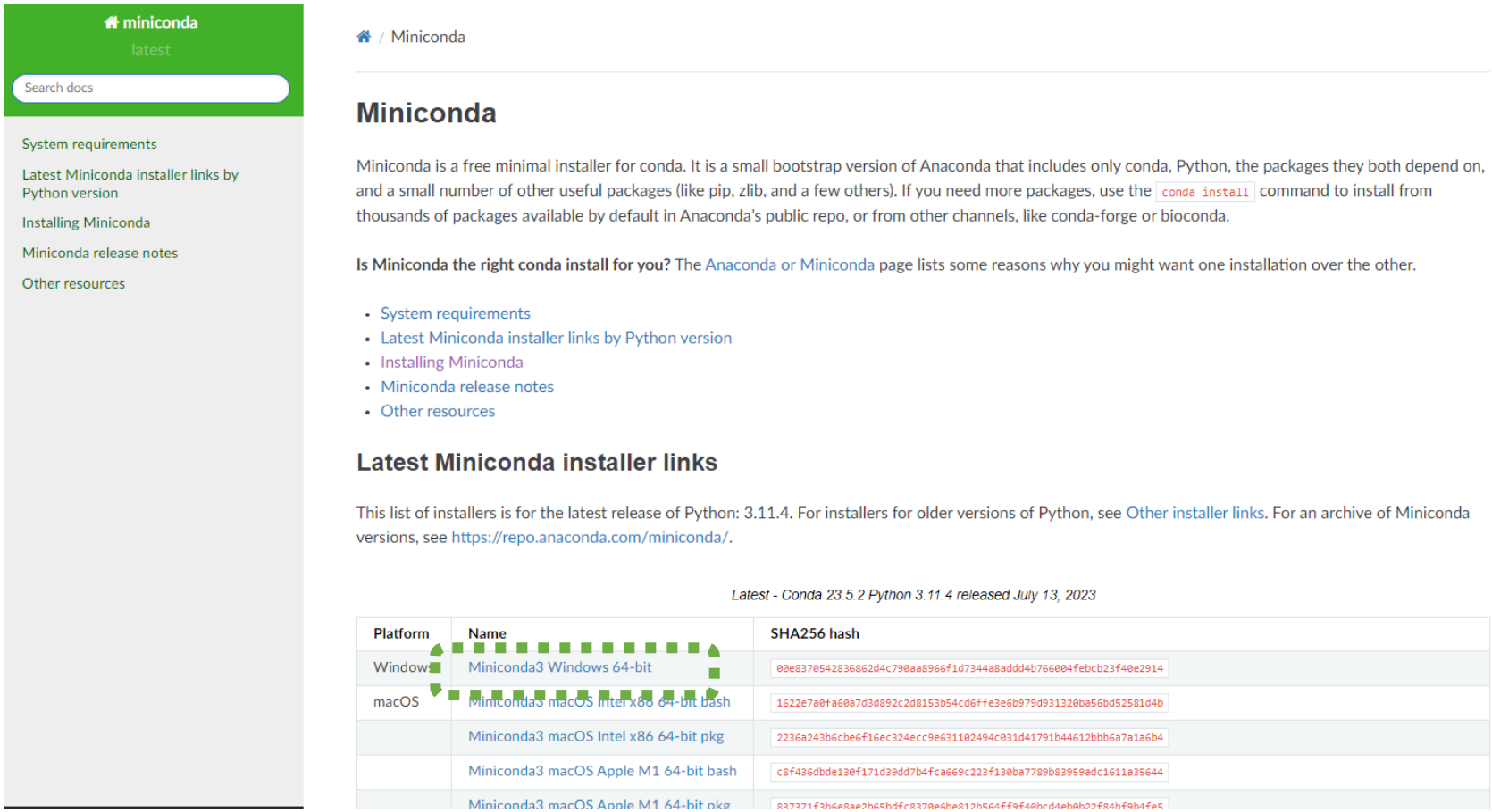
  - Plugin installation

Training / Miniconda installation

- Install Miniconda3 for Windows 64-bit with default instructions
- https://docs.conda.io/projects/miniconda/en/latest/index.html



miniconda
latest

Search docs

System requirements
Latest Miniconda installer links by Python version
Installing Miniconda
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Other resources

/ Miniconda

Miniconda

Miniconda is a free minimal installer for conda. It is a small bootstrap version of Anaconda that includes only conda, Python, the packages they both depend on, and a small number of other useful packages (like pip, zlib, and a few others). If you need more packages, use the `conda install` command to install from thousands of packages available by default in Anaconda's public repo, or from other channels, like conda-forge or bioconda.

Is Miniconda the right conda install for you? The Anaconda or Miniconda page lists some reasons why you might want one installation over the other.

- System requirements
- Latest Miniconda installer links by Python version
- Installing Miniconda
- Miniconda release notes
- Other resources

Latest Miniconda installer links

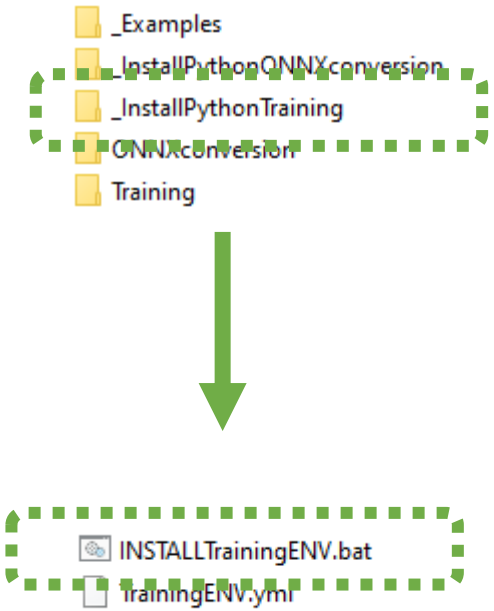
This list of installers is for the latest release of Python: 3.11.4. For installers for older versions of Python, see Other installer links. For an archive of Miniconda versions, see https://repo.anaconda.com/miniconda/.

Latest - Conda 23.5.2 Python 3.11.4 released July 13, 2023

Platform	Name	SHA256 hash
Windows	Miniconda3 Windows 64-bit	00e8370542836862d4c790aa8966f1d7344a8addd4b766004febcb23f40e2914
macOS	Miniconda3 macOS Intel x86 64-bit bash	1622e7a0fa60a7d3d892c2d8153b54cd6ffe3e6b979d931320ba56bd52581d4b
	Miniconda3 macOS Intel x86 64-bit pkg	2236a243b6cbe6f16ec324ecc9e631102494c031d41791b44612bbb6a7a1a6b4
	Miniconda3 macOS Apple M1 64-bit bash	c8f436dbde130f171d39dd7b4fca669c223f130ba7789b83959adc1611a35644
	Miniconda3 macOS Apple M1 64-bit pkg	837371f3b6e8ae2b65bdfc8370e6be812b564ff9f40bcd4eb0b22f84bf9b4fe5

Training / Python environment installation

- Update _InstallPythonTraining / INSTALLTrainingENV.bat



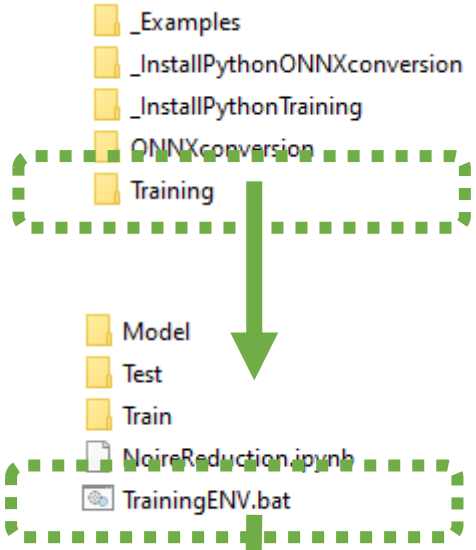
notepad

```
1  set root=C:\Users\REPLACE_WITH_USER_LOCATION\AppData\Local\miniconda3
2
3  call %root%\Scripts\activate.bat %root%
4
5  call conda env create --name TrainingENV --file TrainingENV.yml
6
7  call conda activate TrainingENV
8
9  call python -m ipykernel install --user --name TrainingENV --display-name "TrainingENV"
10
11 pause
```

- Double click on INSTALLTrainingENV.bat

Training / Jupyter notebook (1/2)

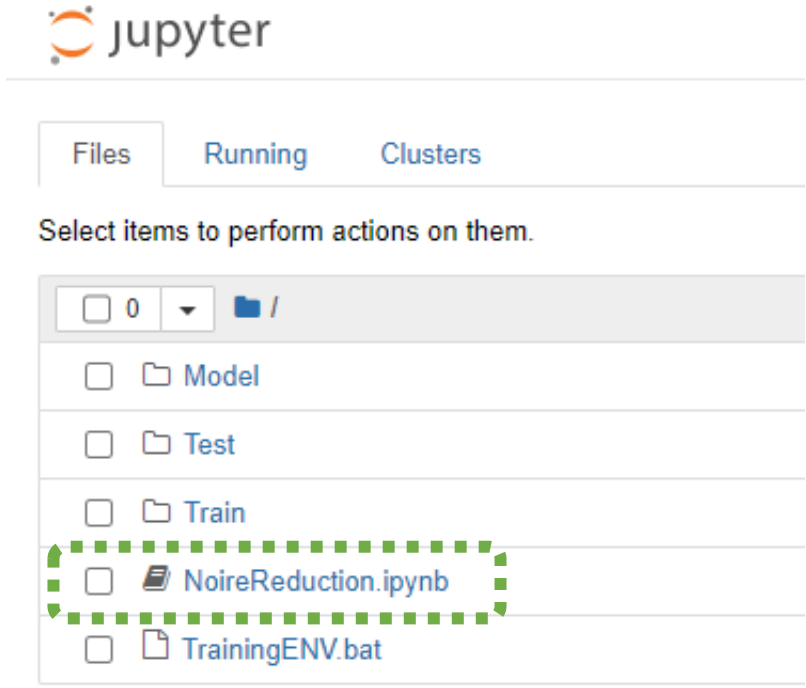
- Update Training / TrainingENV.bat



notepad

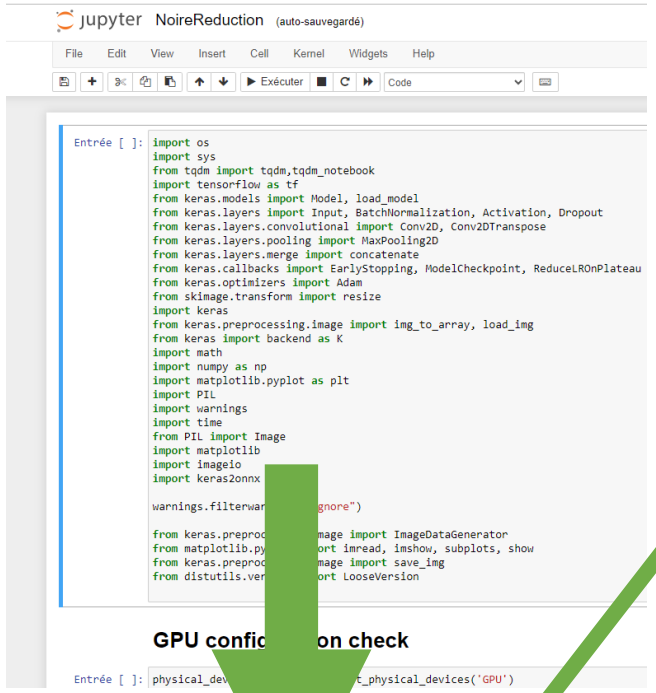
```
set root=C:\Users\REPLACE_WITH_USER_LOCATION\AppData\Local\Continuum\anaconda3

call %root%\Scripts\activate.bat %root%

call conda activate TrainingENV

call jupyter notebook

pause
```

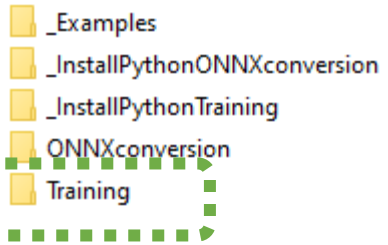
- Double click on TrainingENV.bat



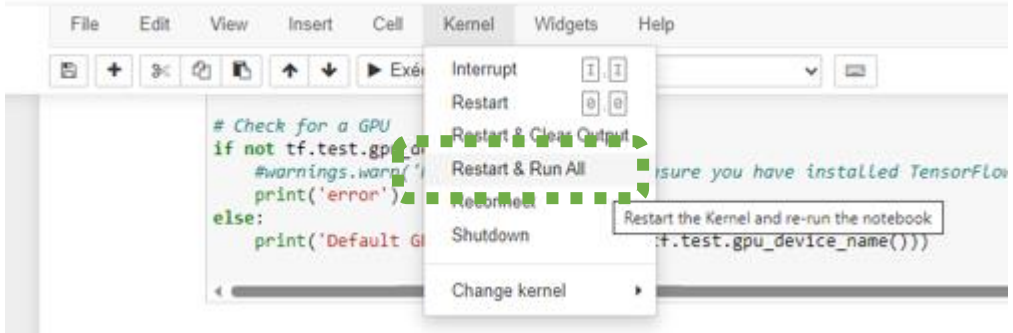
Training / Jupyter notebook (2/2)

- Update Notebook





- Execute Notebook



File parameters

Entrée [ ]:

```
vardir=r"C:\REPLACE_WITH_CORRECT_DESTINATION/
Train_images = os.path.join(vardir+"\Train\image/")
Train_mask = os.path.join(vardir+"\Train\label/")
Val_images = os.path.join(vardir+"\Test\image/")
Val_mask = os.path.join(vardir+"\Test\label/")
Model_path = os.path.join(vardir+"\Model/")
Model_name = r"Denoise.h5"

#Names of all images in training and validation paths
ids = next(os.walk(Train_images))[2]
ids_validation = next(os.walk(Val_images))[2]

#parameters
patch_size = 128
pas = 64
```

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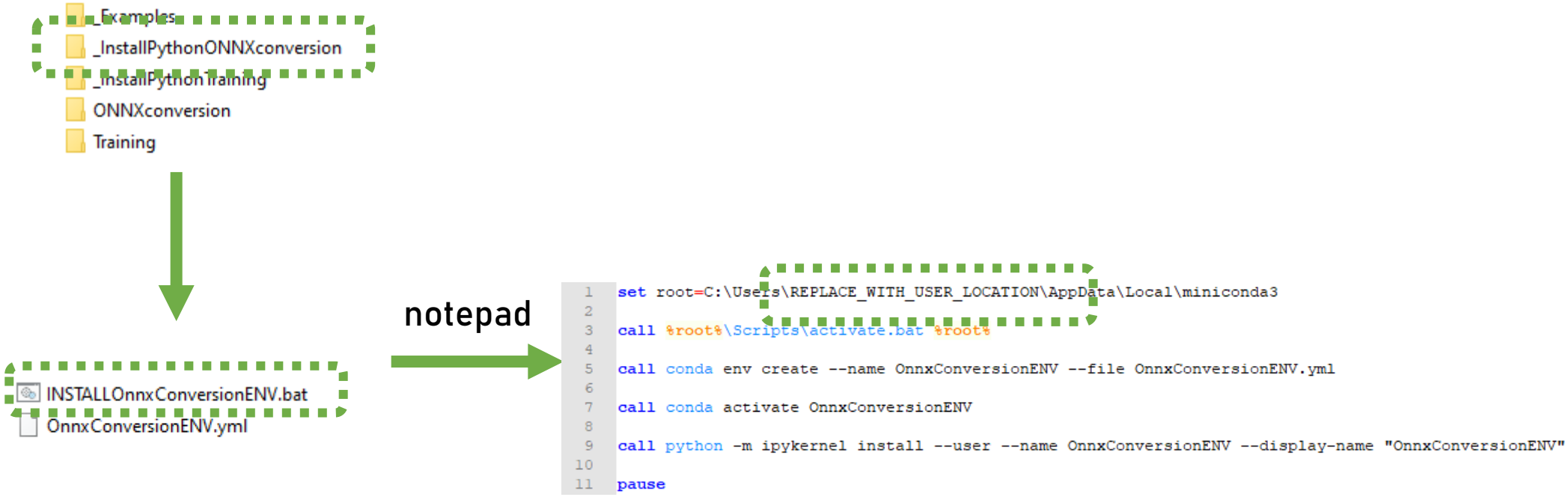
ONNX conversion / Python environment installation

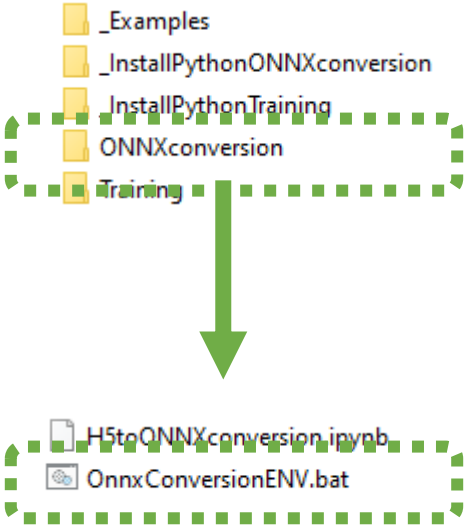
- Update _InstallPythonONNXconversion / _INSTALLOnnxConversionENV.bat



- Double click on INSTALLOnnxConversionENV.bat

ONNX conversion / Jupyter notebook (1/2)

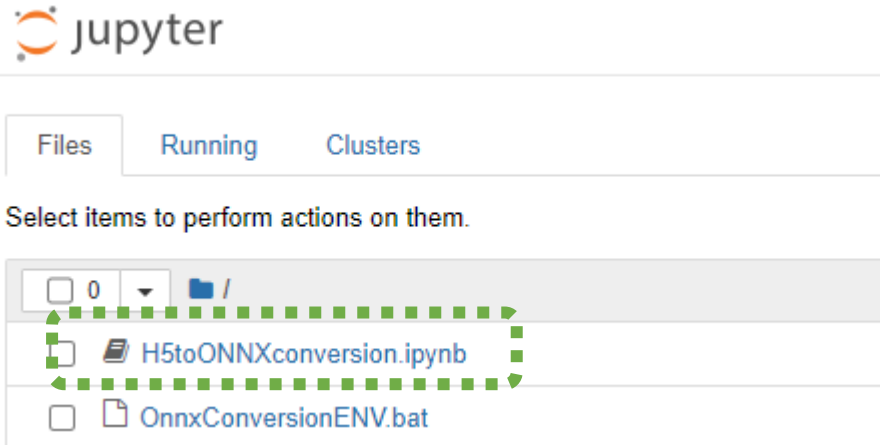
- Update ONNXconversion / OnnxConversion.bat



notepad

```
set root=C:\Users\REPLACE_WITH_USER_LOCATION\AppData\Local\miniconda3

call %root%\Scripts\activate.bat %root%

call conda activate OnnxConversionENV

call jupyter notebook

pause
```

- Double click on OnnxConvertionENV.bat



ONNX conversion / Jupyter notebook (2/2)

Update Notebook

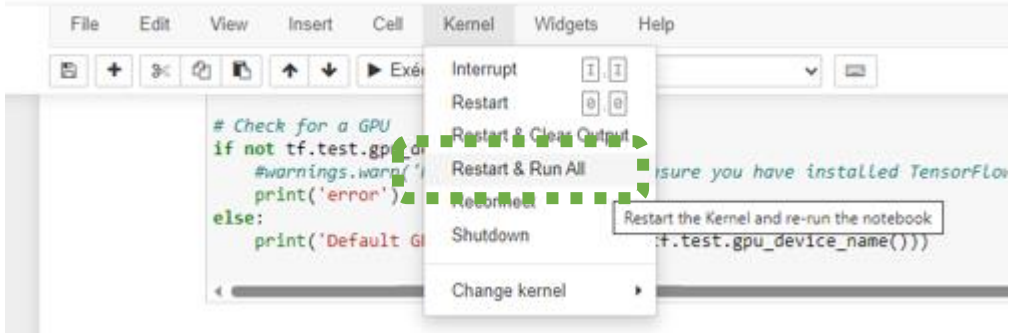
jupyter H5toONNXconversion (auto-sauvegardé)

File Edit View Insert Cell Kernel Widgets Help

▶ Exécuter Code

Entrée [ ]:
```
import os
os.environ['TF_KERAS'] = '1'
import onnx
import tensorflow as tf
import keras2onnx

model = tf.keras.models.load_model("D:\\Regp128Unet.h5",compile=False)

onnx_model= keras2onnx.convert_keras(model, model.name)
file = open("D:\\Regp128Unet.onnx", "wb")
file.write(onnx_model.SerializeToString())
file.close()
```

Execute Notebook



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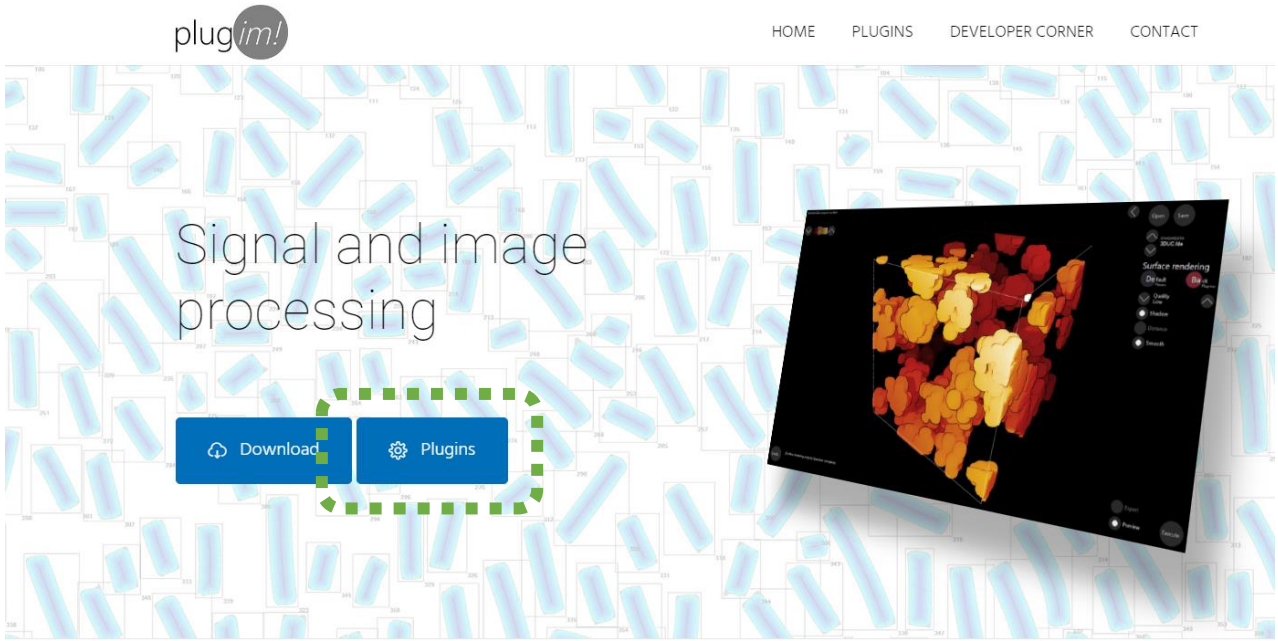
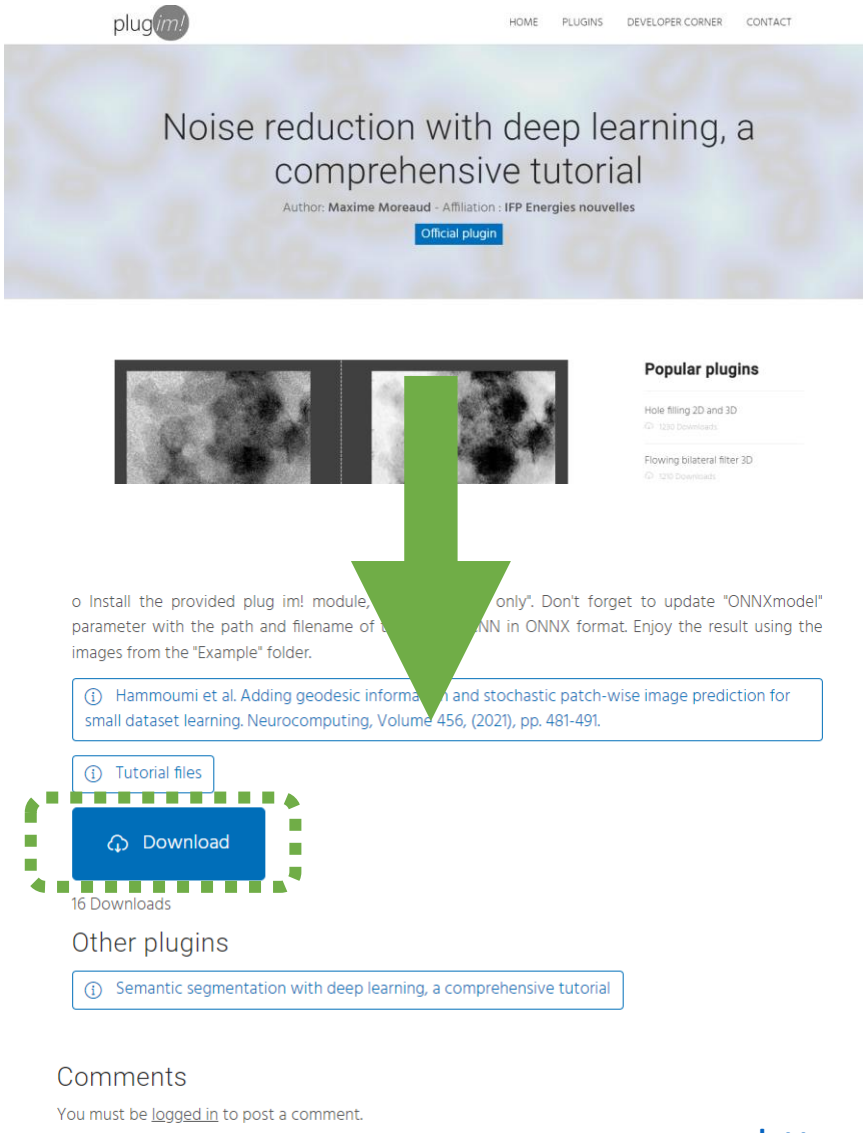
Download “Noise reduction” plugin

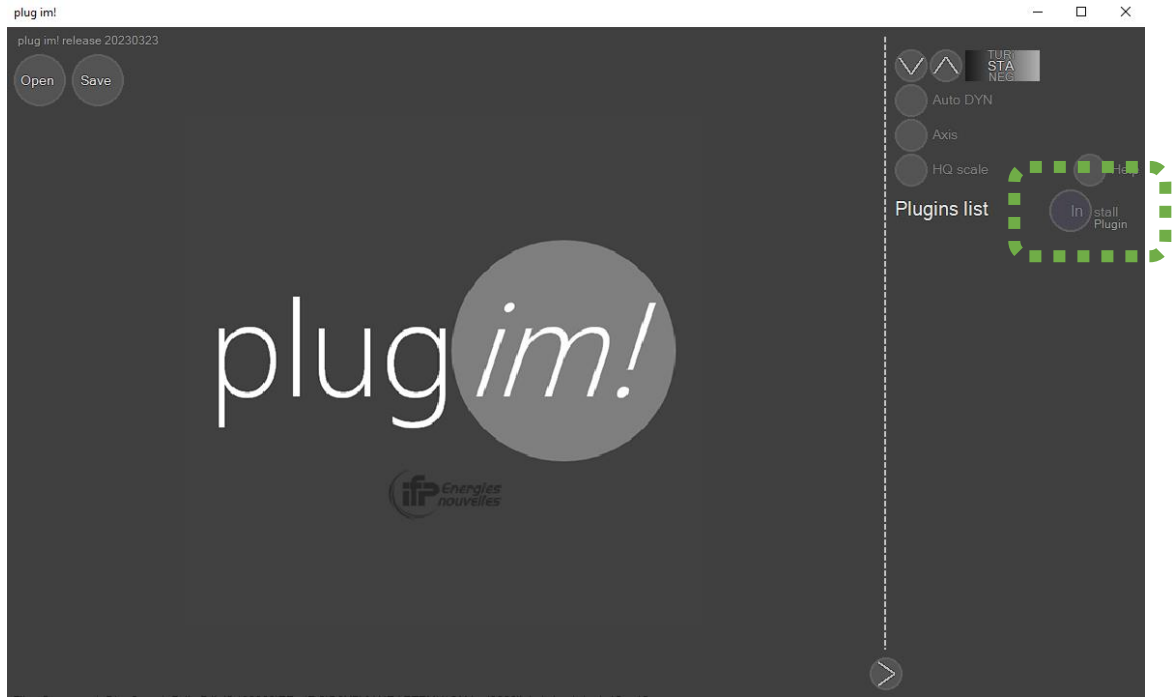
- www.plugim.fr



Download "Noise reduction" plugin



- Install downloaded zip file inside plug im!



https://www.plugim.fr/plugin/119

Try Noise reduction

- Load an image from _Examples
- Update ONNX model file parameter
- Enjoy!