



Application Note #29

Anaconda3 environment for Stardist V4D 3.4 or latest versions only

How to :

«install the Anaconda3 setup for Stardist»

The application-note goal is to guide the user in the correct installation of the Anaconda3 Python package and all the Stardist modules.

Stardist is a cell/nuclei detection algorithm, based on the deep learning approach, for microscopy images with star-convex shape priors.

More information can be gathered from the following articles:

[Star-convex Polyhedra for 3D Object Detection and Segmentation in Microscopy.](#)
[Cell Detection with Star-convex Polygons.](#)

Warnings

Vision4D runs the deep learning applications (e.g. Stardist) using external and independent Python libraries and tools produced by third parts.

These tools must be installed by the user under its responsibility, strictly following the instruction on this document.

Arivis has tested the setup protocol on several computers, however, due to the different and not predictable hardware and software configuration of each computer, the results can be different case by case.

Therefore, arivis declines any responsibility concerning the correct tools installation and setup on the user computer.

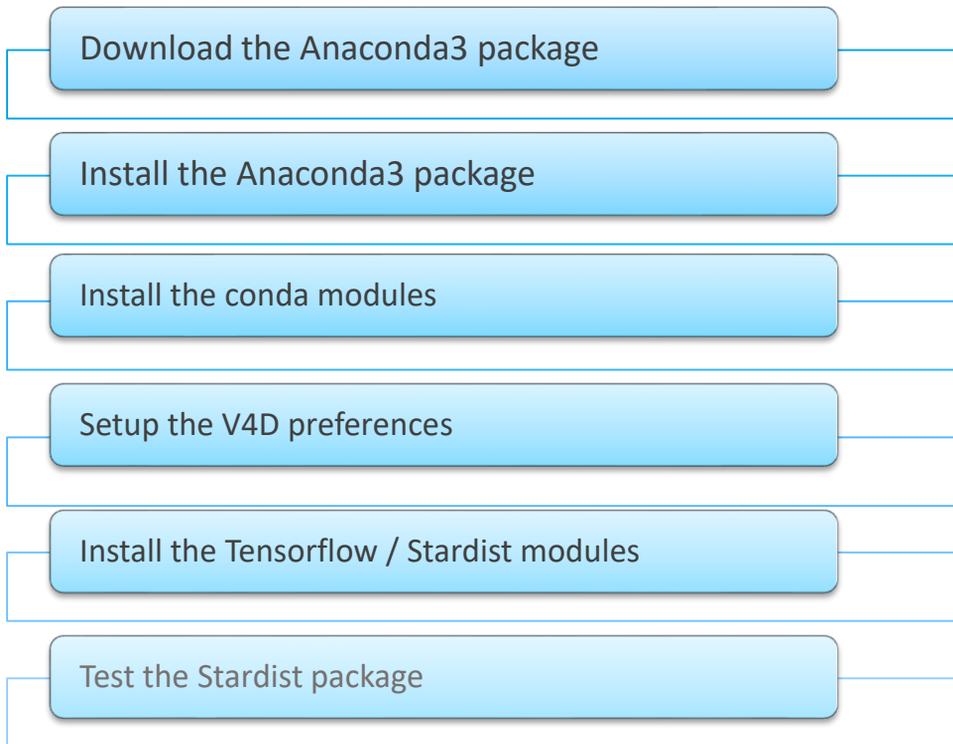
arivis cannot be blamed about any malfunctioning or failure of the deep learning environment setup.

Arivis will not give technical support on the setup task as well as on any deep learning application.

Both activities are totally on the user charge.

Arivis also declines any responsibility about the scientific results gathered from the deep learning application.

Application Flowchart



Index

1. Download the Anaconda Package
2. Install the Anaconda package
3. Install the conda modules
4. Setup the V4D preferences
5. Install the Tensorflow / Stardist modules
6. Test the Stardist package

Note :

V4D 3.4 Python environment is compatible with the Python 3.x version.

1. Download the Anaconda Package

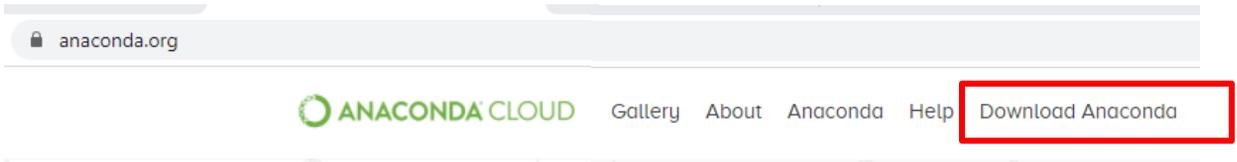
Step 1.1

Open the Anaconda web pages using the following link:

<https://anaconda.org>

Step 1.2

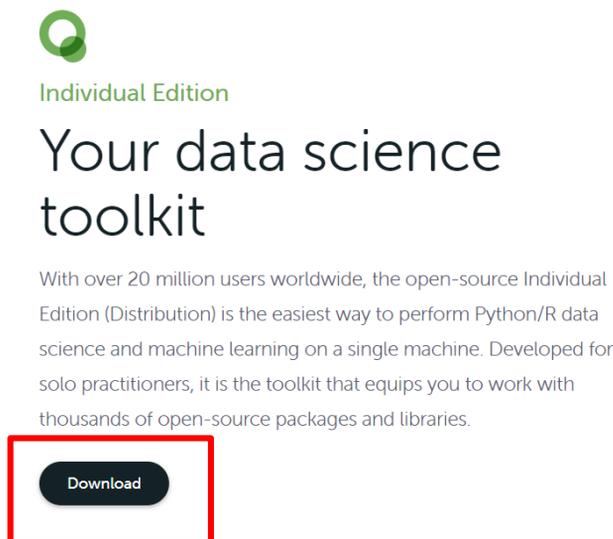
Select the Download Anaconda item.



Step 1.3

Click on Download

The Individual Edition is Open source and freely distributable



1. Download the Anaconda Package



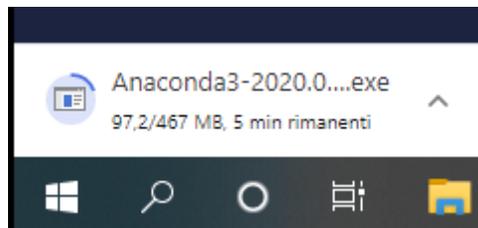
Anaconda Installers

Windows	MacOS	Linux
Python 3.8 64-Bit Graphical Installer (466 MB) 32-Bit Graphical Installer (397 MB)	Python 3.8 64-Bit Graphical Installer (462 MB) 64-Bit Command Line Installer (454 MB)	Python 3.8 64-Bit (x86) Installer (550 MB) 64-Bit (Power8 and Power9) Installer (290 MB)

Windows

Python 3.8
64-Bit Graphical Installer (466 MB)
32-Bit Graphical Installer (397 MB)

Click on **64-bit Graphical Installer**
The download task starts.



2. Install the Anaconda package

Step 2.1

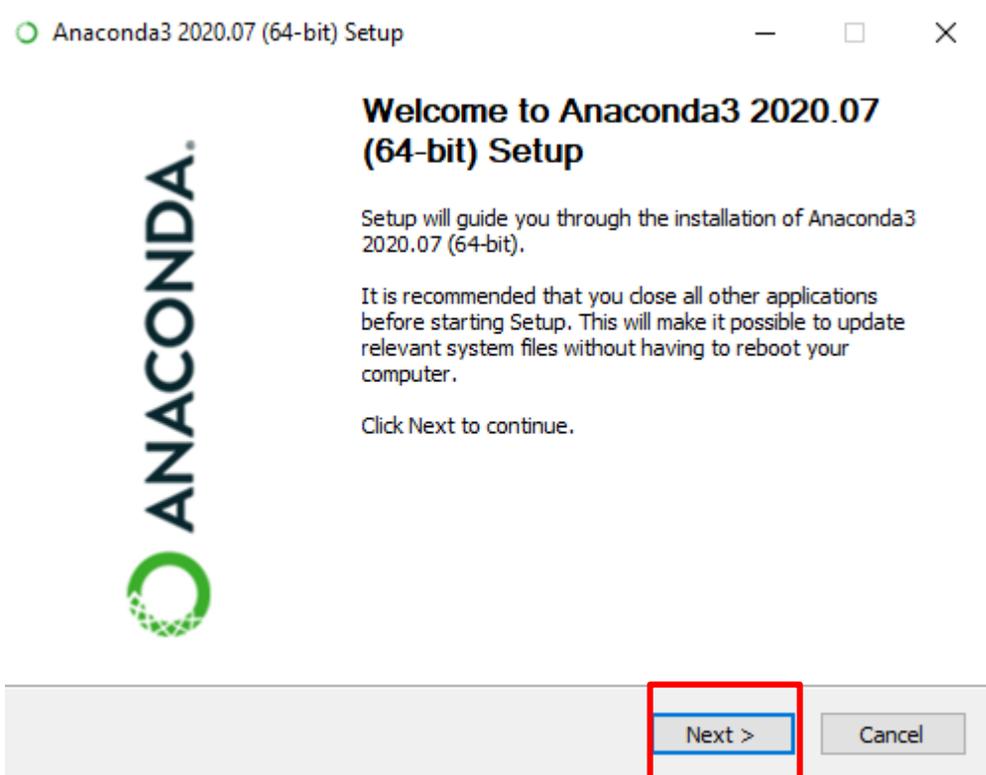
Open the [Download folder](#) and locate the Anaconda3 setup file.



Anaconda3-2020.07-Windows-x86_64.exe

Step 2.2

Run it and press the [Next](#) button on the setup dialog

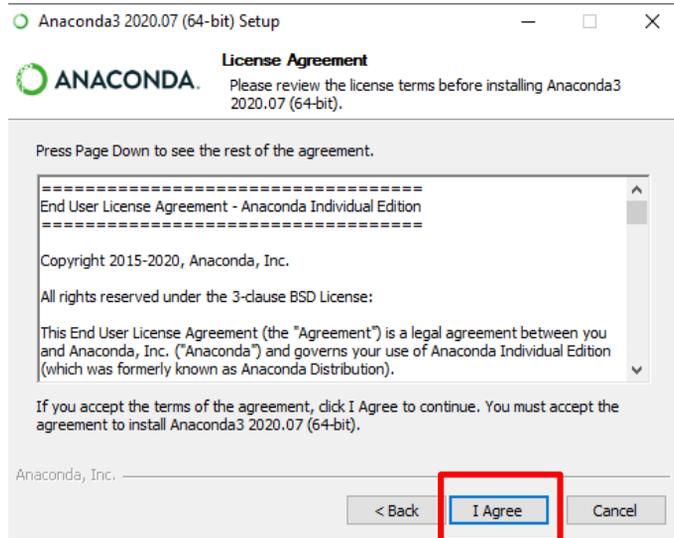


Note :
The Python release must be the 3.8.

2. Install the Anaconda package

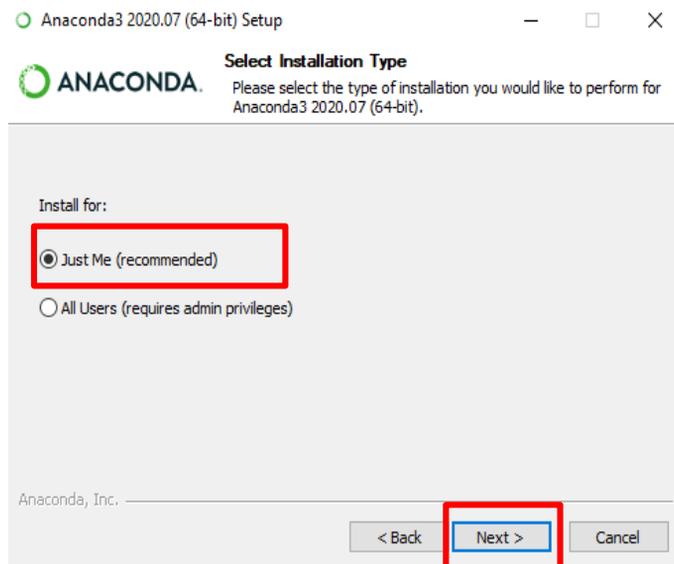
Step 2.3

Click on the „I Agree“ button to accept the License Agreement terms.



Step 2.4

Select the „Just Me“ option.



Step 2.5

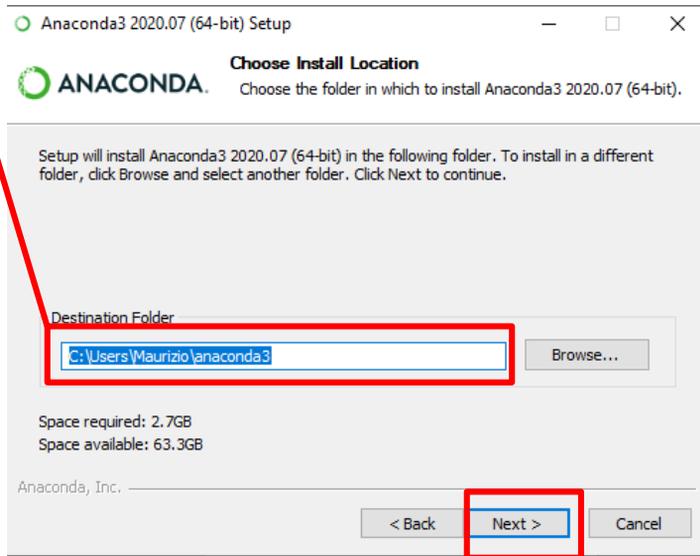
Press the „Next“ button to complete the installation.

2. Install the Anaconda package

Step 2.6

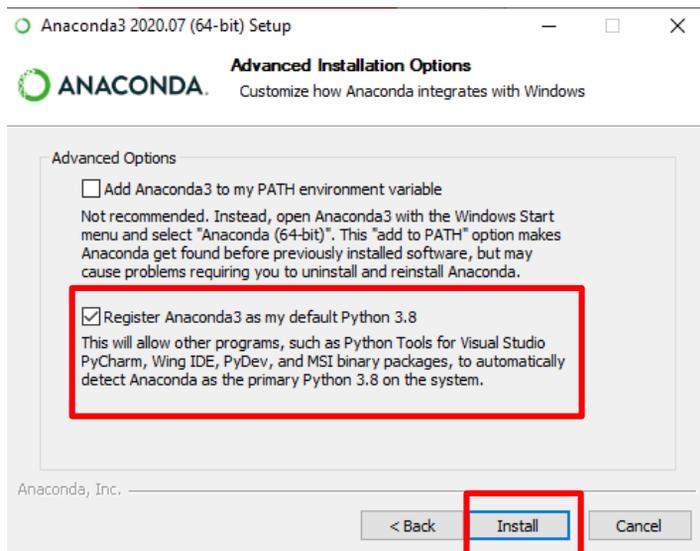
Leave the default install path. Usually it is located under the users directory

C:\Users\xxxxxx\Anaconda3



Step 2.7

Enable the option «Register Anaconda3 as my default Python 3.8» package. Press «**Install**» to start the installation.



3. Install the Anaconda modules

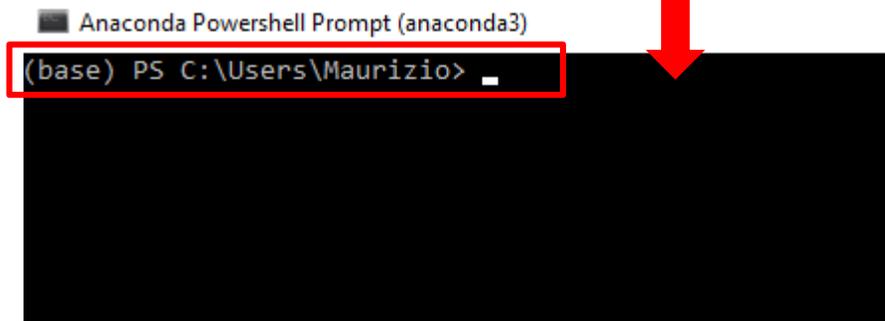
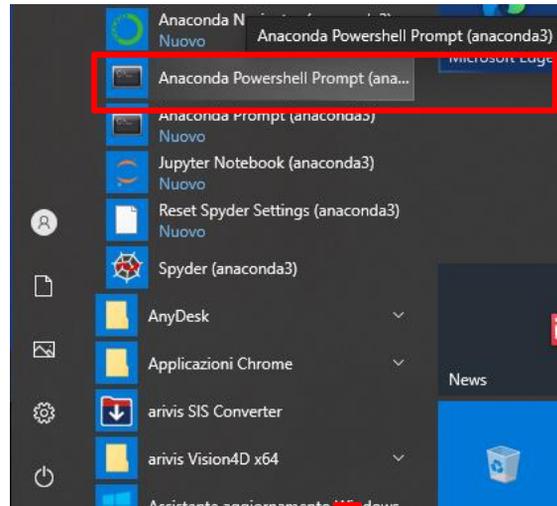
Step 3.1

Open the Anaconda console interface (Power Shell).
Click on the Window icon



Step 3.1.1

Click on the Window icon and
select the **Anaconda PowerShell**
Prompt item.

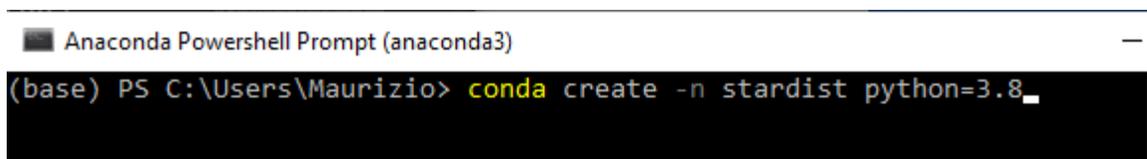


Step 3.2

Create the Stardist environment

Step 3.2.1

digit «**conda create -n stardist python=3.8**» and press **return**



Note :

To install the Anaconda modules, the computer must be connected to internet.

3. Install the Anaconda modules

Step 3.2.2

Activate the new environment (*stardist*)

digit «*conda activate stardist*» and press *return*.

The (stardist) environment name is now shown at the beginning of each row.

```
Anaconda Powershell Prompt (anaconda3)
(base) PS C:\Users\Maurizio> conda activate stardist
(stardist) PS C:\Users\Maurizio>
```

Step 3.3

Install the *numpy* module.

Step 3.3.1

digit «*conda install numpy*» and press *return*.

```
Anaconda Powershell Prompt (anaconda3)
(base) PS C:\Users\Maurizio> conda activate stardist
(stardist) PS C:\Users\Maurizio> conda install numpy
```

Press Yes (Y) to confirm the installation

Step 3.4

Install the *pywin32* module.

Step 3.4.1

digit «*conda install pywin32*» and press *return*.

```
Anaconda Powershell Prompt (anaconda3)
(stardist) PS C:\Users\Maurizio> conda install pywin32_
```

Press Yes (Y) to confirm the installation

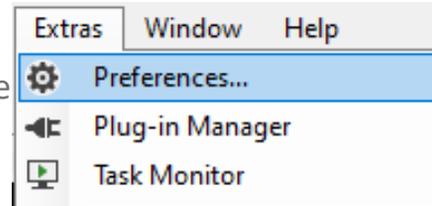
Note :

To install the Anaconda modules, the computer must be connected to internet.

4. V4D preferences setup

Step 4.1

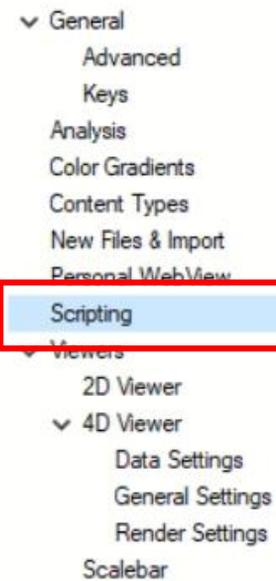
Run Vision4D (3.4 and next release) select the **Preferences** item from the **Extras** menu.



Step 4.2

On the left panel, click on the „**Scripting**“ item.

Preferences - Scripting

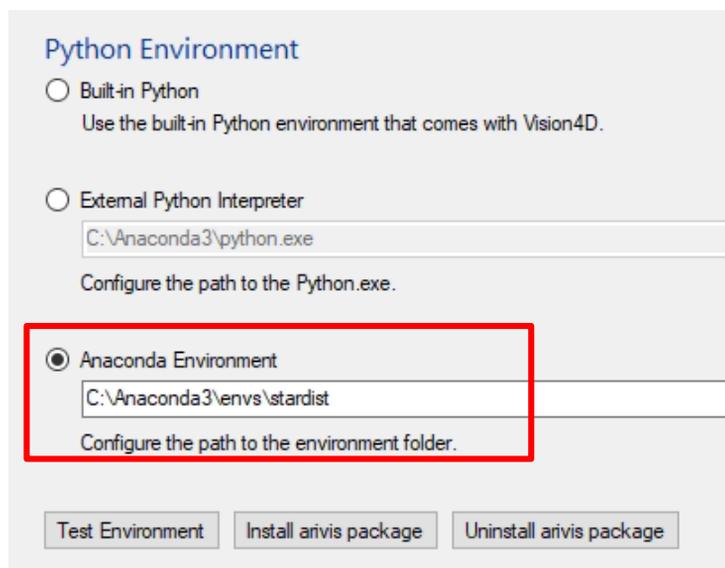


Step 4.3

Enable the “**Anaconda Enviroment**” option. Browse the Anaconda3 installation folder and select the **stardist** environment previously created.

By default, the new enviroments are stored under the `\envs` folder located in the Anaconda3 installation folder

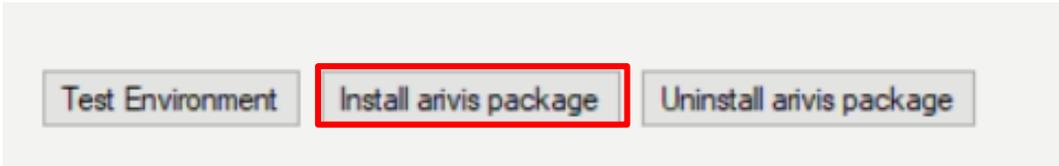
e.g. `C:\users\xxxxxx\Anaconda3\envs\stardist`.



4. V4D preferences setup

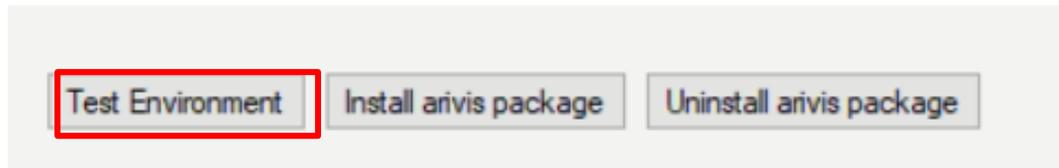
Step 4.4

Install the arivis package

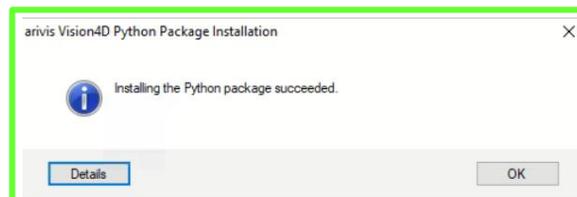
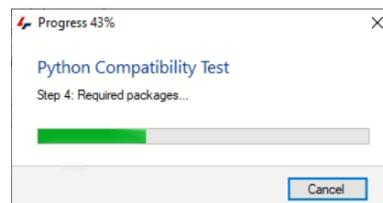


Step 4.5

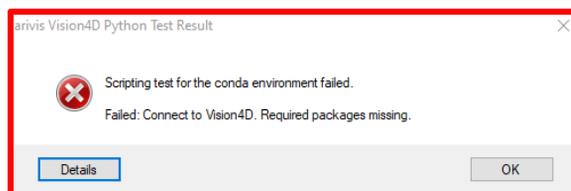
Run the Compatibility test



Test completed successfully



Test failed



Note :

If the left above error message is issued, try again to install the arivis python package.

Note :

Apply the settings and close the preferences panel.

5. Install the Stardist modules

Step 5.1

Stardist installation requires the Microsoft VisualStudio tool release 2014 or later.
The VisualStudio 2019 is strongly suggested.

Step 5.1.1

Open the Microsoft VisualStudio download page using the following link: <https://visualstudio.microsoft.com/en/downloads/>

Download the **Community** version

Tips :

Accordingly with the country from which you are downloading the VS2019, the correct web page language is applied.

Visual Studio 2019

Versione 16.8

[Note sulla versione >](#)

Community

IDE avanzato, gratuito per studenti, collaboratori open source e singole persone

Download gratuito



Step 5.1.2

Once the download is completed, click on the setup and follow the instructions.
Leave all the options as default.



vs_community_11....exe

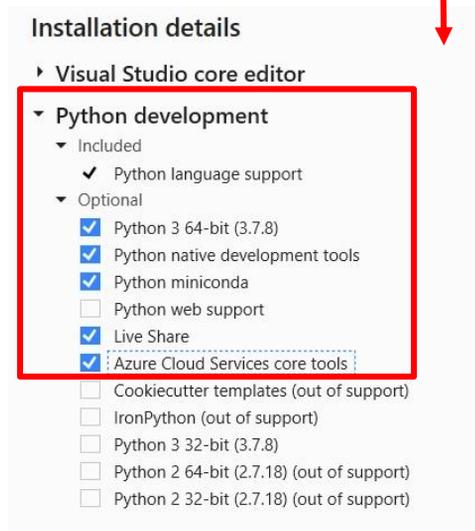
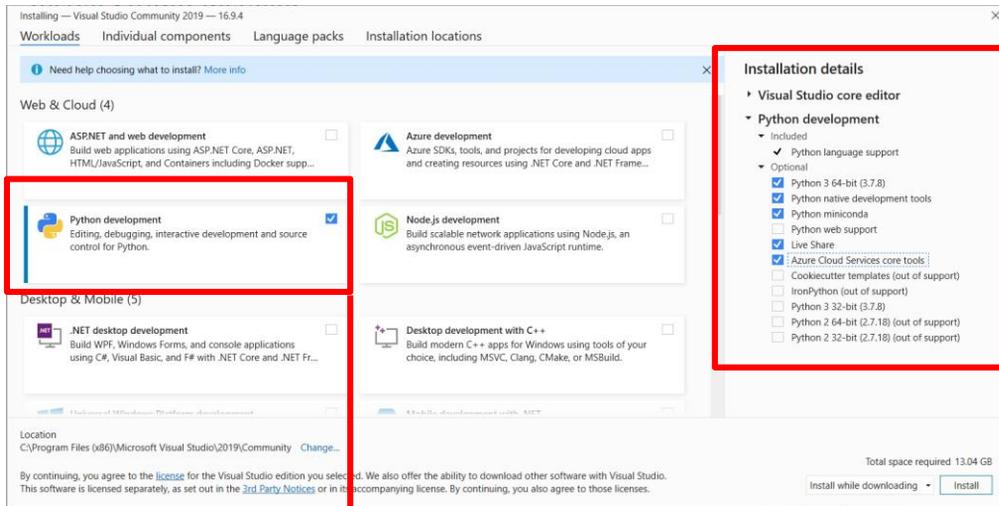
Note :

To install the VisualStudio 2019, the computer must be connected to internet.

5. Install the Stardist modules

Step 5.1.3

During the installation setup, the following options must be set to install the required VS support for python.



Note :

Restart the PC after installing the VisualStudio 2019 Community

5. Install the Stardist modules

Step 5.2

Using the Anaconda console interface (Power Shell), execute the following instructions. Be sure to be in the Stardist environment. Install the *tensorflow* module.

Step 5.2.1

digit «*pip install tensorflow==2.2.0*» and press *return*.

```
Anaconda Powershell Prompt (anaconda3)  
(stardist) PS C:\Users\Maurizio> pip install tensorflow==2.2.0_
```

Press Yes (Y) to confirm the installation

Step 5.2.2

digit «*pip install flowdec==1.1.0*» and press *return*

```
Anaconda Powershell Prompt (anaconda3)  
(stardist) PS C:\Users\Maurizio> pip install flowdec==1.1.0_
```

Press Yes (Y) to confirm the installation

Step 5.2.3

digit «*pip install csbdeep==0.6.1*» and press *return*

```
Anaconda Powershell Prompt (anaconda3)  
(stardist) PS C:\Users\Maurizio> pip install csbdeep==0.6.1_
```

Press Yes (Y) to confirm the installation

Note :

To install the Anaconda modules, the computer must be connected to internet.

5. Install the Stardist modules

Step 5.2.4

digit «**pip install stardist==0.6.1**» and press *return*.

```
Anaconda Powershell Prompt (anaconda3)  
(stardist) PS C:\Users\Maurizio> pip install stardist==0.6.1
```

Press Yes (Y) to confirm the installation

Tips :

*To install the Stardist modules, the **PIP** command must be used.*

*Don't use the **CONDA** statement*

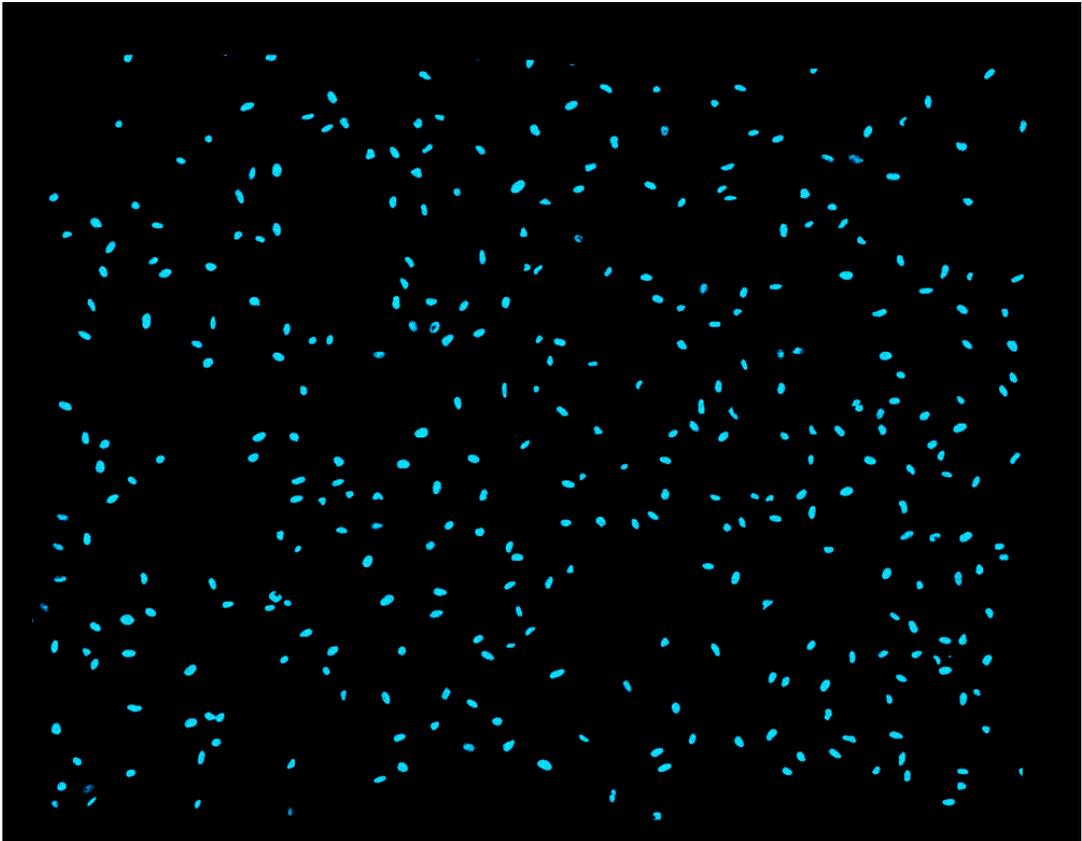
If any error is issued during the modules installation, please stop the setup.

Note :

To install the Anaconda modules, the computer must be connected to internet.

6. Test the Stardist package

In order to test the script, a dataset must be opened in V4D. We suggest a simple 2D, single channel image with a XY resolution of about 1000x 1000 pixels.

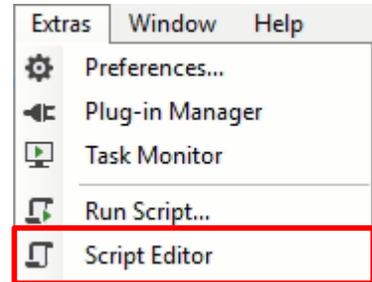


Small, roundish objects must be present in the image (e.g. Nuclei stained with DAPI)

6. Test the Stardist package

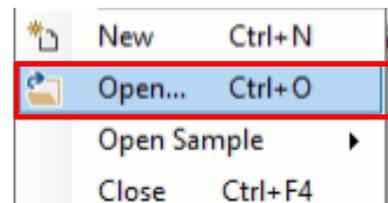
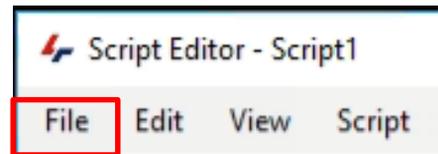
Step 6.1

Open Python Script Editor.
From the «*Extra*» menu, select the «*Script Editor*» item.



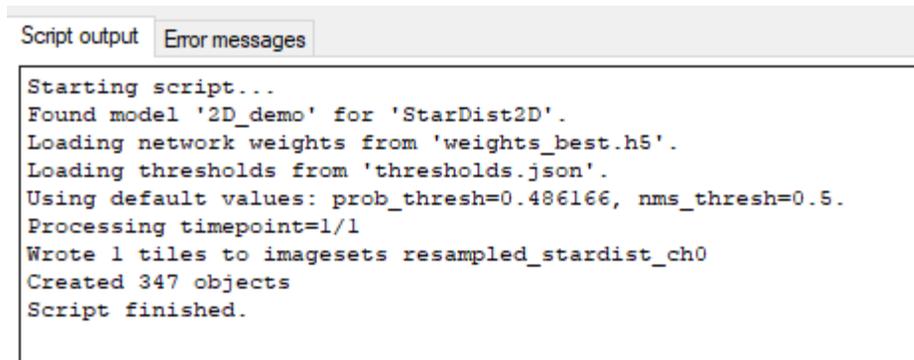
Step 6.2

Open the
Stardist_run_vision3.4_standalone.py.



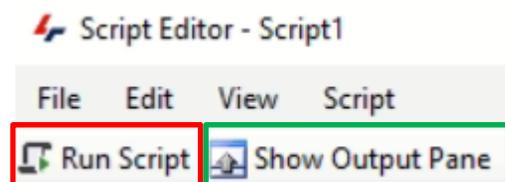
Step 6.3

Press "*Run Script*" (F5) and check the output message area.

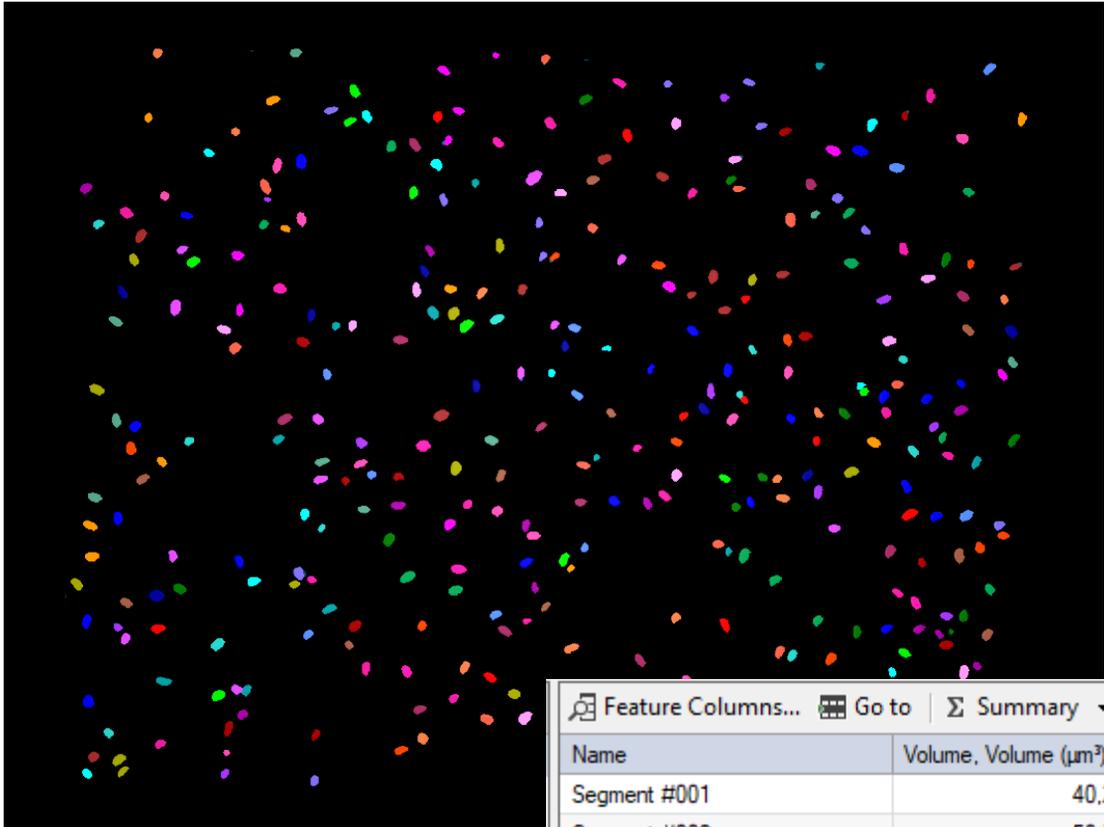


Once the script is successfully completed, the here above message is shown

Note:
The output message area is shown pressing the "*Show Output Panel*" command.



6. Result of the Stardist test



Name	Volume, Volume (μm^3)
Segment #001	40,291
Segment #002	50,524
Segment #003	26,861
Segment #004	39,012
Segment #005	75,466
Segment #006	106,164
Segment #007	84,420
Segment #008	39,652
Segment #009	77,385
Segment #010	53,722
Segment #011	122,153
Segment #012	89,536
Segment #013	115,118
Segment #014	52,443
Segment #015	68,431
Segment #016	69,710
Segment #017	94,652



**A startup package, including the python script, the technical instructions and the test image is available on request
Contact the arivis local area sales manager to get more information about how to get the python script mentioned here.**

Contact the arivis application support to receive additional technical details about the topic described in the application note, or how to adapt the application workflow to your requirements.

“The quantitative analysis of the images represents the art of transforming a visual sensation into its schematic and discrete form allowing its univocal description, classification and mathematical and logical interpretation of its spatial and temporal components”

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