

Prerequisite Packages Installation

International Training Workshop
Climate Variability and Predictions
(15ITWCVP)

Accra, Ghana, 11 – 20 September 2023

1. System Requirements

- **HARDWARE:** Windows (64 bit, Updated version of Windows 10 or above)
- **MEMORY:** 4GB or more (if possible)
- **Free DISK SPACE:** 50GB or more
- **Internet Connection**
- **SOFTWARE (to be installed):**
 - WSL (ubuntu)
 - xming
 - Anaconda
 - xcast
 - GNU precision calculator (bc),
 - wget
 - curl
 - Image Magick
 - GrADS
 - R

2. PowerShell Installation

- Check if you have PowerShell on your machine (by typing PowerShell on the Windows search bar)
 - If PowerShell is already available on your system, please proceed to the next slide.
- If you don't have Windows Powershell on your machine, follow the steps below to install it:
- Install Microsoft Powershell
 - Search and Open Windows command prompt (type **cmd** on your Windows search bar and open)
 - Install PowerShell using:


```
winget install --id Microsoft.Powershell --source winget
```
- After successful installation of the **PowerShell**, close the Command window

3. Prerequisite for Windows Subsystem for Linux (WSL) installation

- Prepare environment for WSL installation
 - Search and Open Windows Powershell (type **Windows PowerShell** on your Windows search bar)
- Run PowerShell as **Administrator: (Start menu > PowerShell > right-click > Run as Administrator)** and type the one line command below to enable the "Windows Subsystem for Linux" :

```
dism.exe /online /enable-feature /featurename:Microsoft-Windows-Subsystem-Linux /all /norestart
```

- Enable Virtual Machine feature using the one line command below:

```
dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart
```

4. WSL Installation

- Use the command below to install

```
wsl -- install
```

- Wait until the WSL and Ubuntu installation is complete
- Reboot your computer
- Create a username and password when prompted

5. xming Installation (cont.)

- Download the xming installation file from:
<https://sourceforge.net/projects/xming/files/latest/download>
- Double-click the xming installation file (in your Downloads folder) to initiate the installation.
 - Choose the default settings
- When the installation completes, search for xming and double-click to open it.

6. Install Additional Linux Libraries

- Search and open ubuntu using your Windows search window (bottom left)
- Use your ubuntu terminal to type the commands below and install the libraries
- Run Updates

```
sudo apt-get update
```

(you may need to enter your password)

— Install gnu precision calculator (bc)

```
sudo apt-get install bc
```

— Install ImageMagick

```
sudo apt-get install imagemagick
```

— Install firefox

```
sudo apt-get install firefox --fix-missing
```

7. OpenGrADS Installation

- Using your ubuntu terminal change your directory to /usr/local/bin, by typing
`cd /usr/local/bin`

- Download grads package using:

```
sudo wget
```

```
https://sourceforge.net/projects/opengrads/files/grads2/2.0.2.oga.2/Linux/grads-2.0.2.oga.2-bundle-x86\_64-unknown-linux-gnu.tar.gz
```

- Unpack the package using:

```
sudo tar -xzvf grads-2.0.2.oga.2-bundle-x86_64-unknown-linux-gnu.tar.gz
```

- Copy GrADS binaries and associated files to the current folder:

```
sudo cp -rf grads-2.0.2.oga.2/Contents/* .
```

- You may remove the unwanted files and folders:

```
sudo rm -rf grads-2.0.2.oga.2
```

```
sudo rm -rf grads-2.0.2.oga.2-bundle-x86_64-unknown-linux-gnu.tar.gz
```

- Test your GrADS installation:

- Close and reopen the terminal and type `grads -p`
- your installation is successful, if GrADS runs without an error message

7. OpenGrADS Installation (cont)

- But, you may receive an error message that indicate missing libraries. Follow the steps below to fix the issue:

```
cd /usr/local/bin/Linux/Versions/2.0.2.oga.2/x86_64/gex
```

```
sudo cp ../libs/libXaw.so.7
```

```
sudo cp ../libs/libXpm.so.4
```

```
sudo cp ../libs/libXmu.so.6
```

```
sudo cp ../libs/libXt.so.6
```

```
sudo cp ../libs/libSM.so.6
```

```
sudo cp ../libs/libICE.so.6
```

- Then, run GrADS using **grads -p**

8. Check the Installed packages

- Go to your Linux terminal to check the installed packages as follows:
 - Type **which bc** to get **/usr/bin/bc**
 - Type **which curl** to get **/usr/bin/curl**
 - Type **which wget** to get **/usr/bin/wget**
 - Type **which convert** to get **/usr/bin/convert**
- **For GrADS**
 - Type **grads -p** to see if GrADS is installed properly

9. Anaconda Installation

- Close and reopen your Ubuntu terminal
- Type the command below to download the Anaconda installation file:

wget https://repo.anaconda.com/archive/Anaconda3-2023.07-1-Linux-x86_64.sh

- Type the command below to initiate the installation:

bash [Anaconda3-2023.07-1-Linux-x86_64.sh](https://repo.anaconda.com/archive/Anaconda3-2023.07-1-Linux-x86_64.sh)

- Follow the prompts on the installer screens.
- When the installation is complete close and reopen the ubuntu terminal

10. XCast Installation

- Xcast requires its own conda environment.
- Type the command below on your ubuntu terminal to install XCast

```
conda create -n xcast_env -c conda-forge -c hallkjc01 xcast xarray netcdf4 jupyter ipykernel
```

- Activate your XCast conda environment by typing:

```
conda activate xcast_env
```

11. Install, R, NCL, and eccodes (for grib handling of ECCO data)

1. Create an r environment

`conda create -n renv`

2. Activate renv environment

`conda activate renv`

3. Install R, ncl, and eccodes under renv

`conda install -n renv -c conda-forge eccodes ncl r-ncdf4 r-rnetcdf`

4. To deactivate

`conda deactivate`

5. To work under **renv** activate it using step 2 above and when done using it deactivate it using step 4

12. QGIS installation

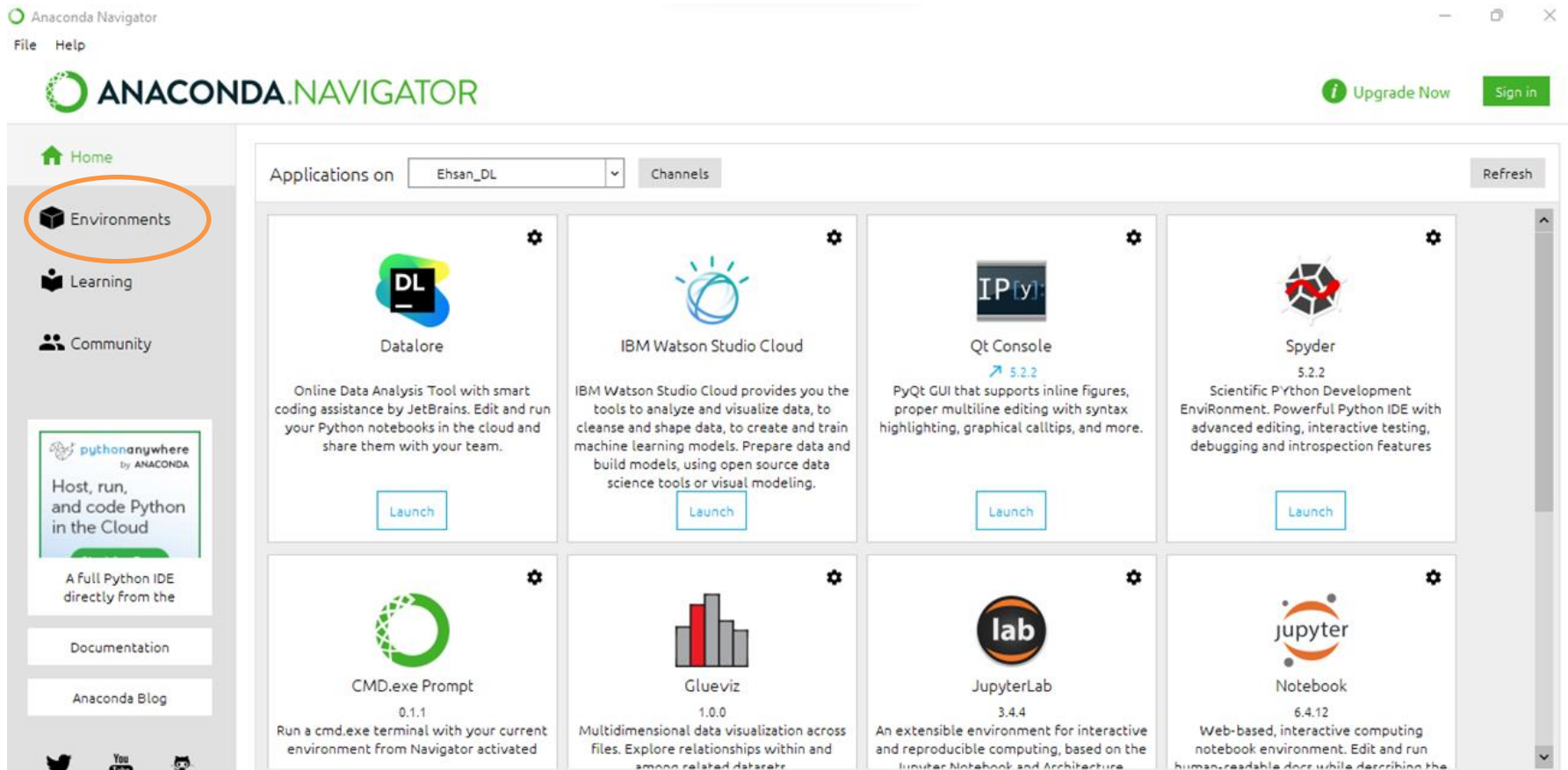
- The most stable version of QGIS is 3.18.3, based on users review, so we'll use this version
- Download and install QGIS from the link below
https://download.qgis.org/downloads/windows/3/3.18/QGIS-OSGeo4W-3.18.3-1-Setup-x86_64.exe
- During the installation process, if asked, choose not to download the tutorial data
- Have a **MOUSE** – you will need it for easy drawing

13. Artificial intelligence installation

- Go to the website: <https://www.anaconda.com/download/>
- You can install from our shared folder (**Anaconda3-2020.11-Windows-x86_64.exe**) (i.e., Windows preferred)
- Either 32 bits or 64 bits, depending on the architecture of your machine
- Extract and install the file. Upon termination of the installation process, the Anaconda Navigator should appear among your applications

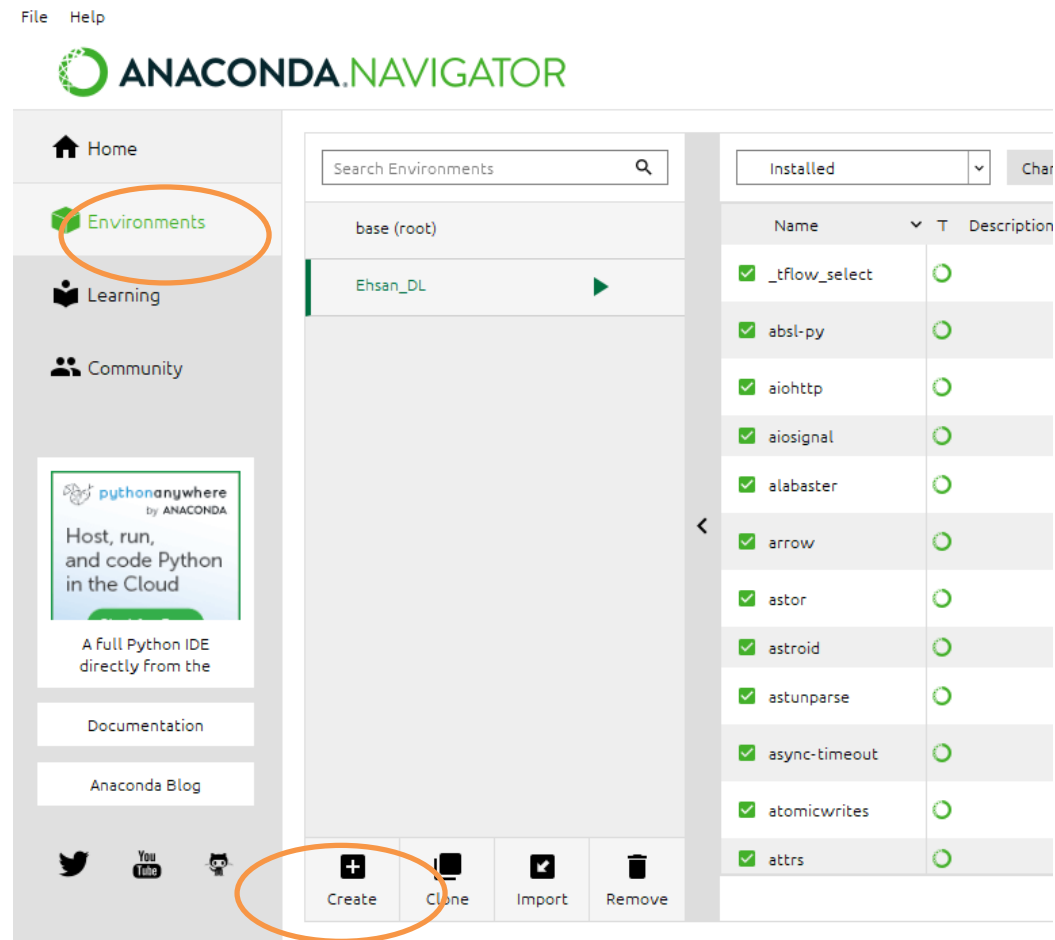
13. Anaconda Navigator

- Open Anaconda Navigator. A screen like here should appear



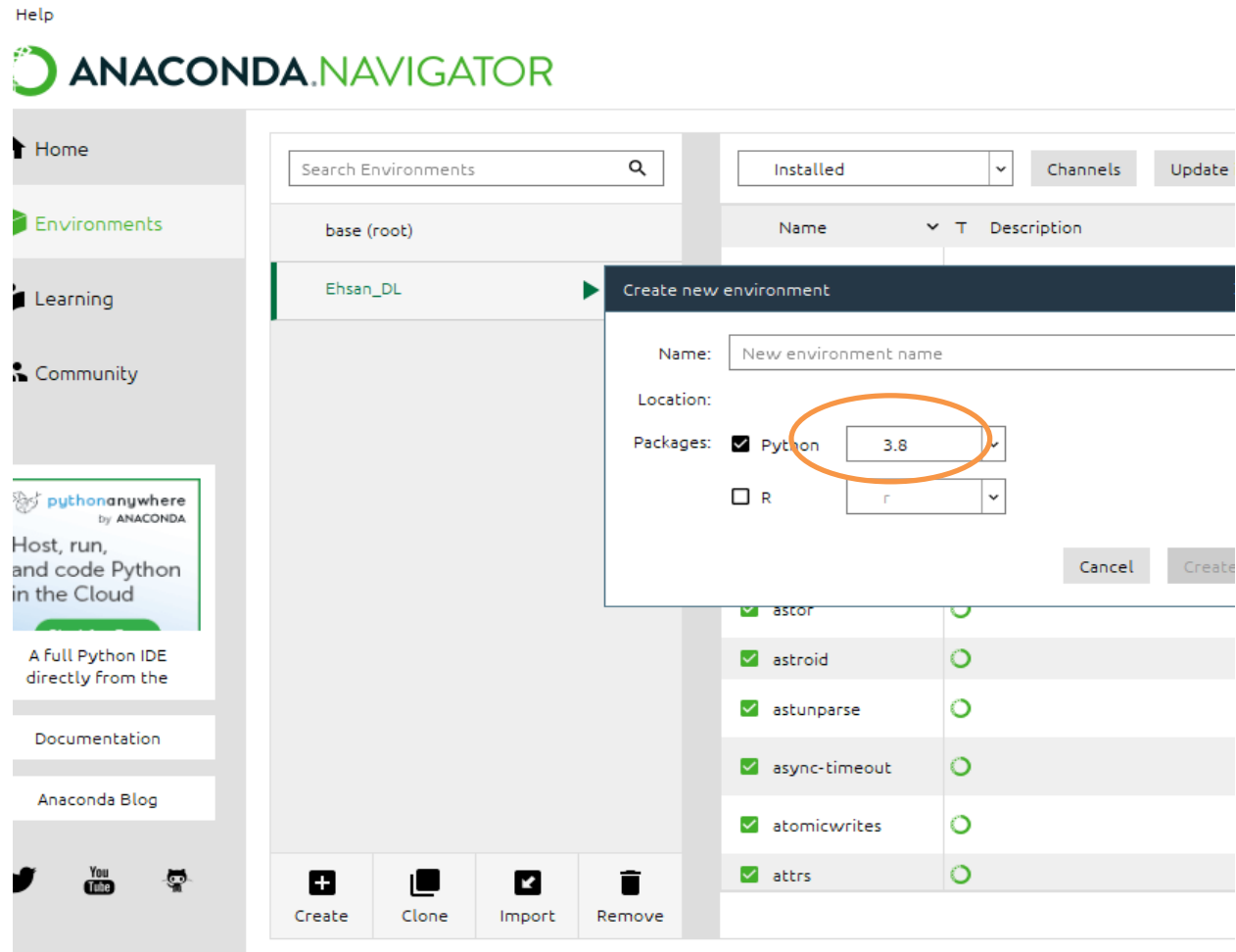
14. Environment Setup

- Choose the Environment menu (red circle in the figure below) and create a new environment for this exercise.
- An environment can be created by clicking on the tab “+Create



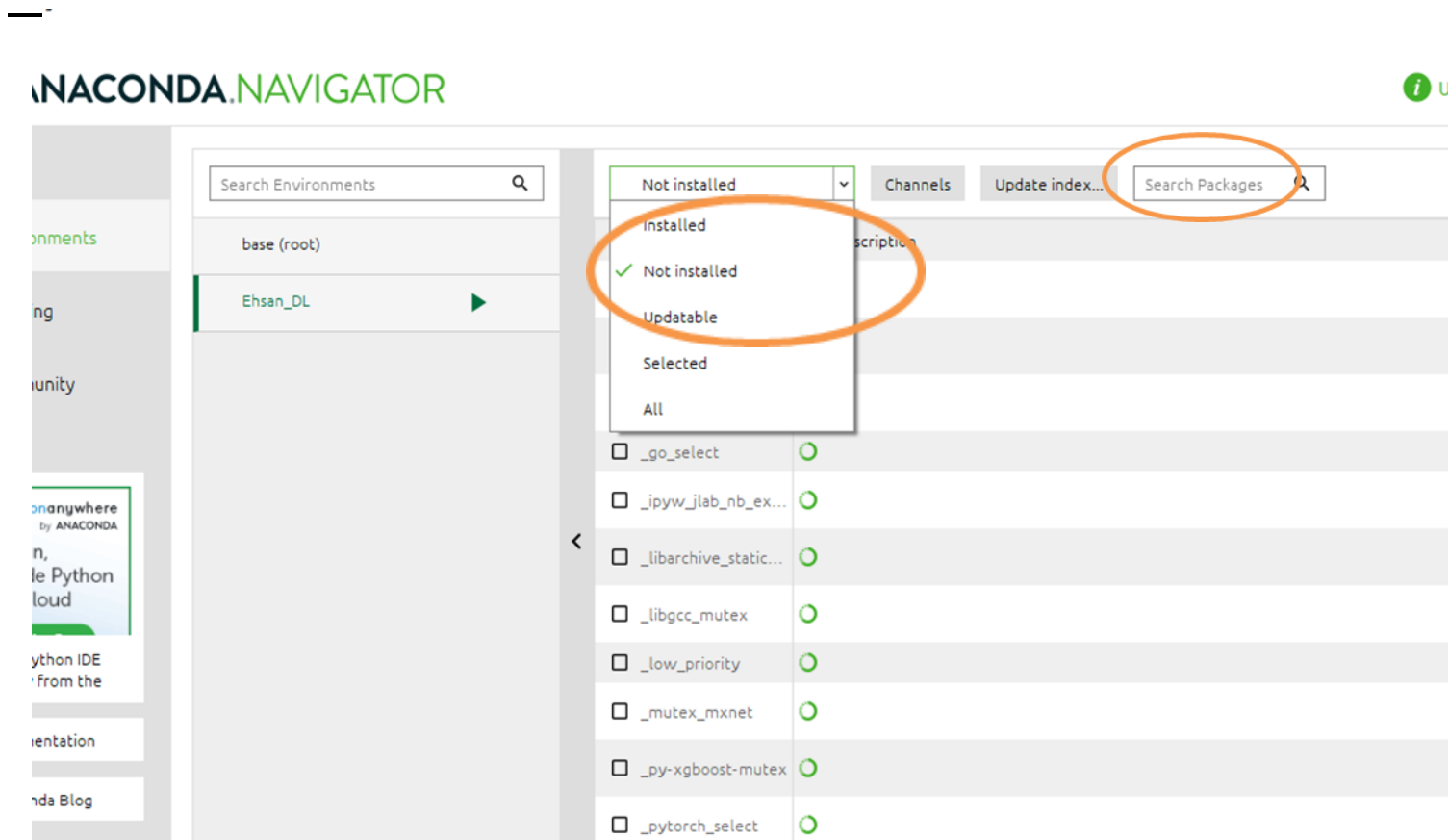
14. Environment Setup (cont.)

- A mask will pop up asking for a name and package for the new environment. Use “Python 3.8” as package of election. See image below.



15. Packages Installation

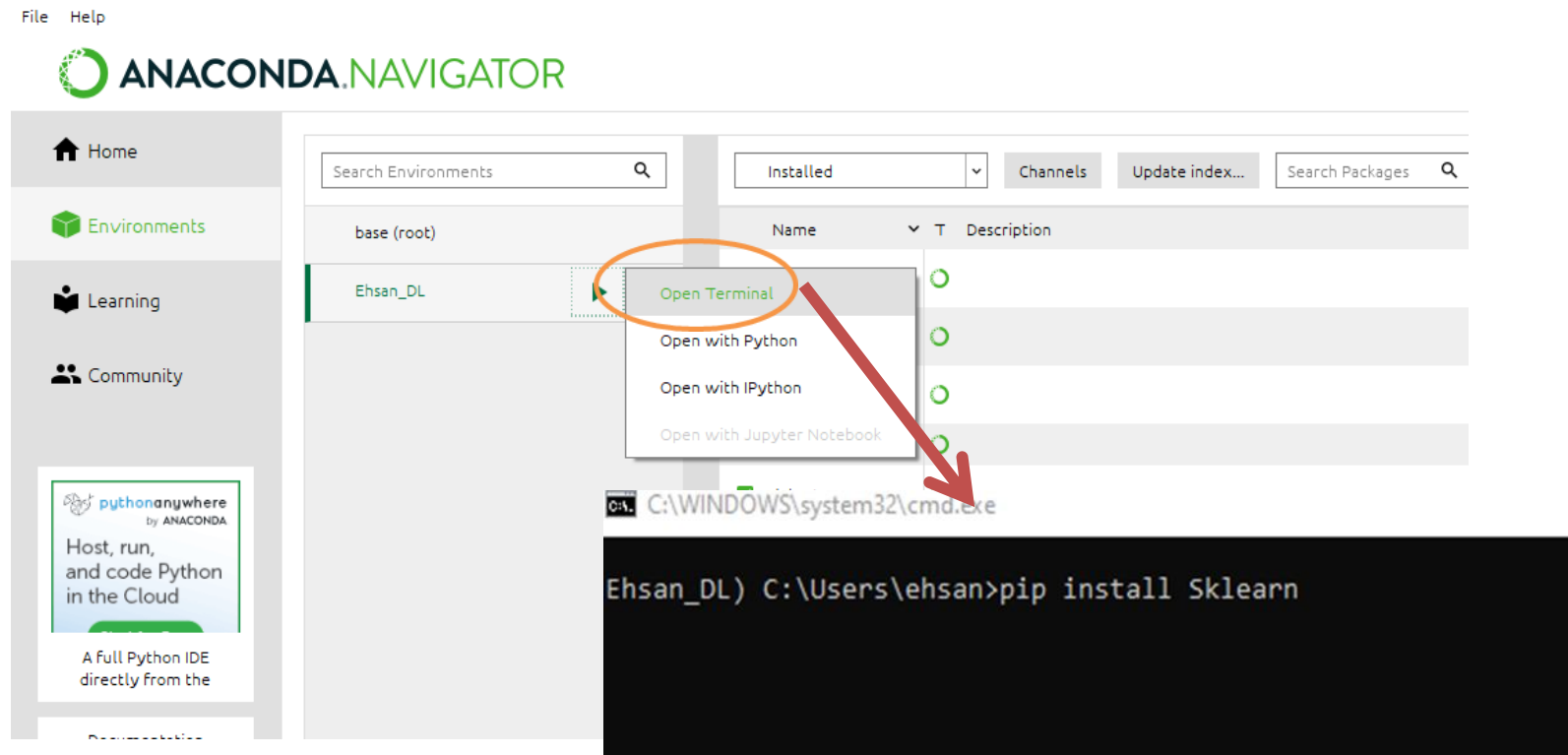
You can search available packages (**NumPY, Keras, Tensorflow etc**) from the tab (red circle in the figure: search packages)



15. Packages Installation (cont.)

If all packages are not available(eg Matplotlib, Sklearn etc.) , please open terminal by clicking on the tab

- pip install matplotlib
- pip install -U scikit-learn



The screenshot displays the Anaconda Navigator application interface. On the left sidebar, the 'Environments' tab is selected. The main panel shows a list of environments, with 'Ehsan_DL' highlighted. A context menu is open over 'Ehsan_DL', and the 'Open Terminal' option is circled in orange. A red arrow points from this option to a terminal window in the foreground. The terminal window shows the command `pip install Sklearn` being executed in the 'Ehsan_DL' environment.

File Help

ANACONDA.NAVIGATOR

Home

Environments

Learning

Community

pythonanywhere by ANACONDA

Host, run, and code Python in the Cloud

A Full Python IDE directly from the

base (root)

Ehsan_DL

Search Environments

Installed

Channels

Update index...

Search Packages

Name

Description

Open Terminal

Open with Python

Open with IPython

Open with Jupyter Notebook

C:\WINDOWS\system32\cmd.exe

```
Ehsan_DL) C:\Users\ehsan>pip install Sklearn
```

15. Packages Installation (cont.)

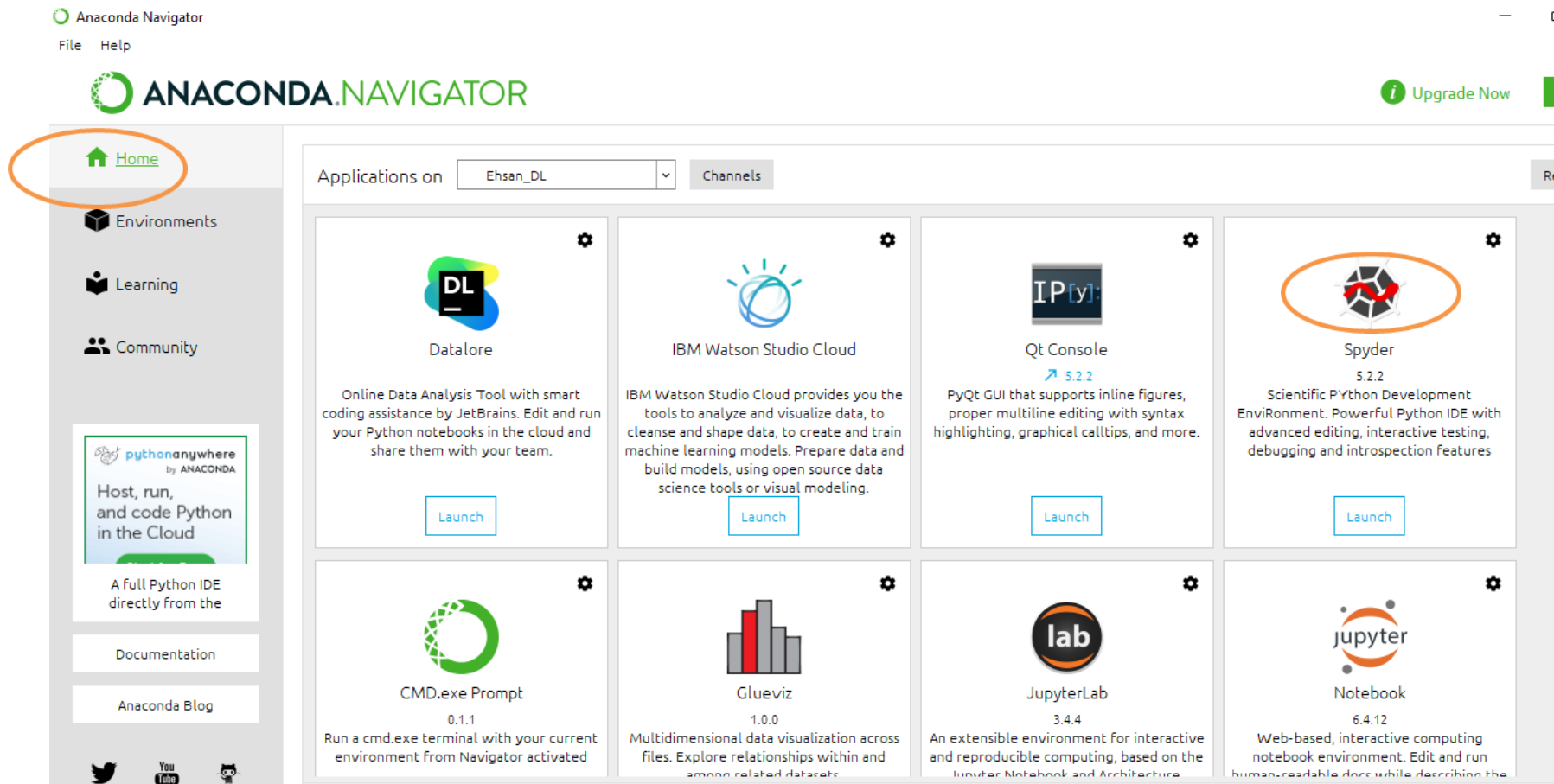
- Your new environment will show all the pre-loaded software packages in the right panel of the menu. Double check that the following packages are installed.

All the required packages:

- NumPY (pip install NumPY)
- Matplotlib (pip install Matplotlib)
- Sklearn (pip install -U scikit-learn)
- Pandas (pip install Pandas)
- Tensorflow (pip install Tensorflow)
- Keras (pip install Keras)
- netCDF4 (pip install netCDF4)
- xarray (pip install xarray)
- folium (pip install folium) create map object
- cartopy (conda install -c conda-forge cartopy)

16. Spyder Installation

Go back to the “Home” menu and install the package “Spyder”.
See image below



16. Spyder Installation (cont.)

- Make sure that the “Application on” tab is tuned on your new environment (check image below).
- After installation, launch “Spyder” by clicking on the tab “Launch” (check image above).

