# Workspace setup

The research group will use a shared workspace consisting of a storage space, a Math typesetting tool, and programming tools. There are many good choices for each component. With the purpose of simplifying the workflow, we will use

- Google Drive as the main storage space,
- Overleaf as the Math typesetting tool,
- Python and Mathematica as the programming languages,
- JupyterLab and Google Colab as coding environments for Python.

Once the environment is set up, you can work online as well as offline. As a student of BYUH, you automatically have a Library account, which you will use to access books, ebooks, and journal articles necessary for your research.

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## Set up Google Drive for Desktop

Because BYUH doesn't use Google as the email platform, you don't automatically have a Google Drive account through your @go.byuh.edu email. You may already have Google Drive through your personal email @gmail.com. However, I recommend that you create a free Google Drive account using your BYUH email to maximize the storage space (15 GB) and to distinguish the work storage space from your personal storage space. You can do so by:

1. Go to https://myaccount.google.com
2. Click **Create account**. If you don't see this option, you are probably logged in under a different Google account. In this case, click on the circular icon on the top right corner

and choose **Add another account**. Then you will see **Create account** option. If it asks you for your purpose (work/personal), choose **For my personal use**.
3. Enter your name.
4. Click **Use my current email address instead**.
5. Enter your current email address (@go.byuh.edu email). Your password doesn't have to be the same as your BYUH email account.
6. Click **Next**.
7. Verify your email address with the code sent to your BYUH email.
8. Click **Verify**.

Once you have obtained a Google Drive account, go to
https://www.google.com/drive/download
to download the app **Google Drive for Desktop**. This app is to sync your Google Drive storage to a local folder of your choice. After installing the app, right click on the app icon on the task bar and go to Setting → Preferences. You will see an option to stream files (by default) and an option to mirror files. If you choose to mirror files, all files on your Google Drive will sync to your computer and you will be able to access them even without the Internet. Otherwise, you can still access all files on your Google Drive from a local folder as long as you have the Internet.

## Set up Overleaf

Simply go to https://www.overleaf.com and sign up for a free account. The easiest way to sign up is probably to choose **Sign up with Google** and use your @go.byuh.edu Google account that you just created. Overleaf is a powerful online tool using LaTeX, a typesetting method, to compile Math formula and produce nice-looking reports, manuscripts, and presentations.

## Set up Mathematica

As a student of BYUH, you can request a license to use Wolfram Mathematica. Feel free to skip this section if you already had a Mathematica license. If you haven't had one yet, you first need to create a Wolfram account by going to
https://account.wolfram.com/login/oauth2/sign-in
Click on ``Create one". Make sure to use your BYUH email (@go.byuh.edu), not your personal email account. Once you have had a Wolfram account, go to
https://www.wolfram.com/siteinfo
Enter your Wolfram ID (your BYUH email address). Then proceed as directed. You will be asked to choose between the following licenses:
- Get Mathematica Online
- Get Mathematica Desktop

The first license is to get a license for Mathematica Online (also called Wolfram Cloud). If you choose this option, you don't need to install anything on your local computer. It takes only a few seconds to be licensed. Then you can start using Mathematica immediately by going to
https://www.wolframcloud.com
The second license is to get a license for Mathematica Desktop license so that you can install Mathematica on your local computer. It will take several gigabytes on your local disk. But the

advantage is that you can work on Mathematica even without an Internet connection. You will receive an email from Wolfram Customer Support saying that you have been assigned a license. Then go to

https://user.wolfram.com/portal/myProducts.html

and click on ``Mathematica for Sites'' to download Mathematica installer to your computer.

## Set up Python

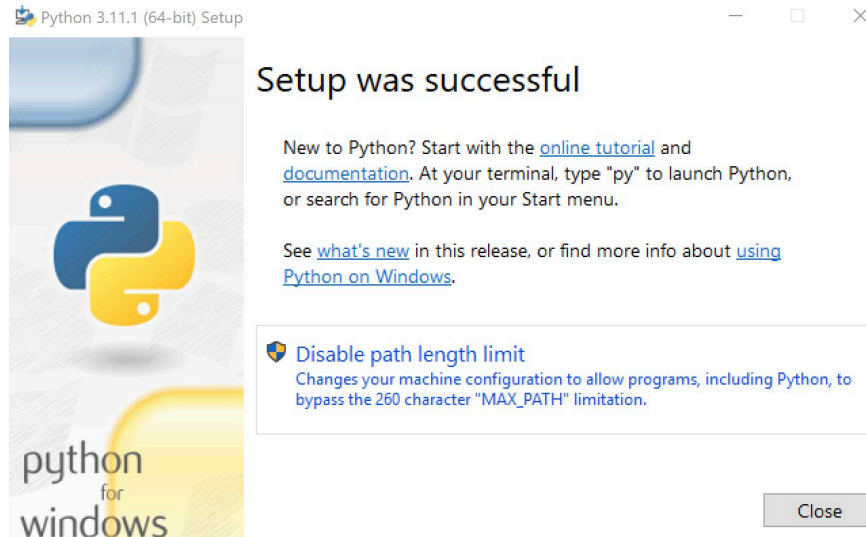Download the latest version of Python from https://www.python.org/downloads/

### On Windows

Open the .exe file that was downloaded. Check "Add python.exe to PATH". Then press Install Now and continue the installation.
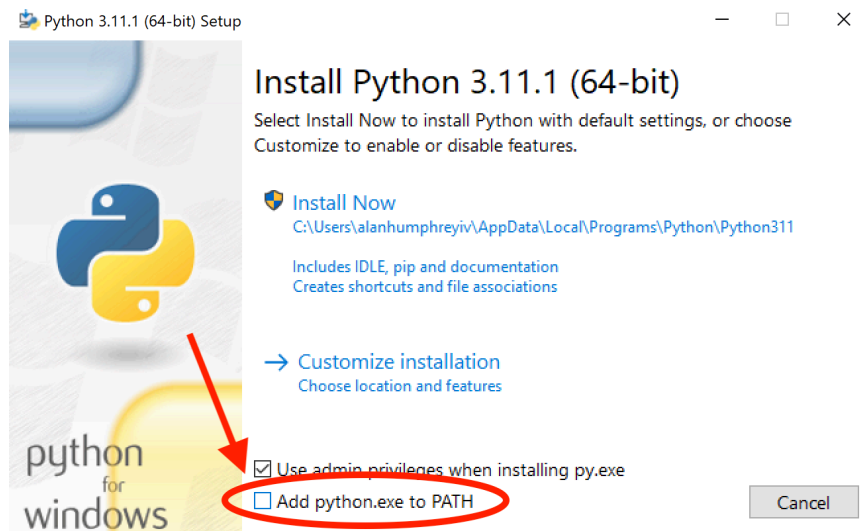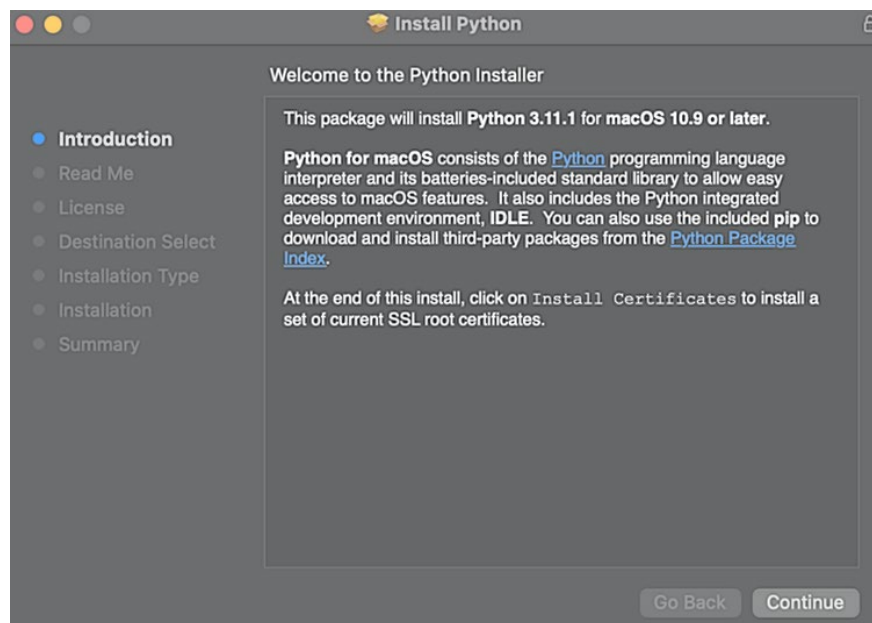
Before closing the installer, make sure to click on "Disable PATH length limit" and agree to the changes.
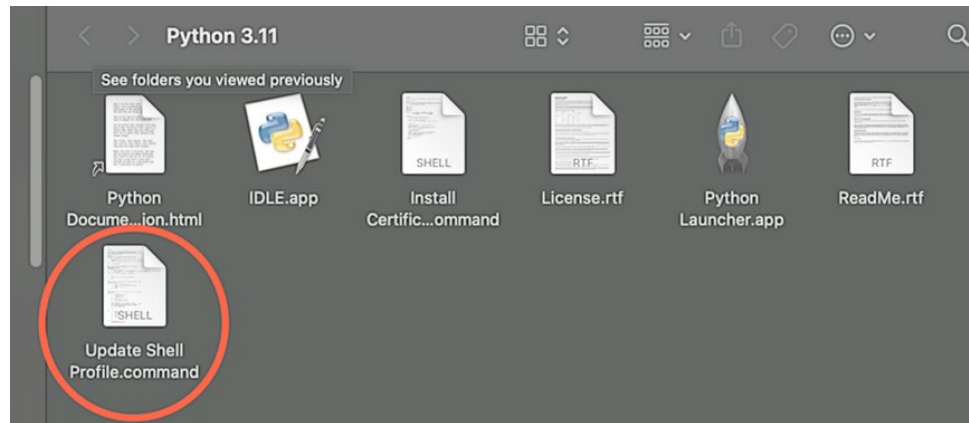
## On Mac

Open the .pkg file that was downloaded and go through the Installation prompts. All default options should be fine.
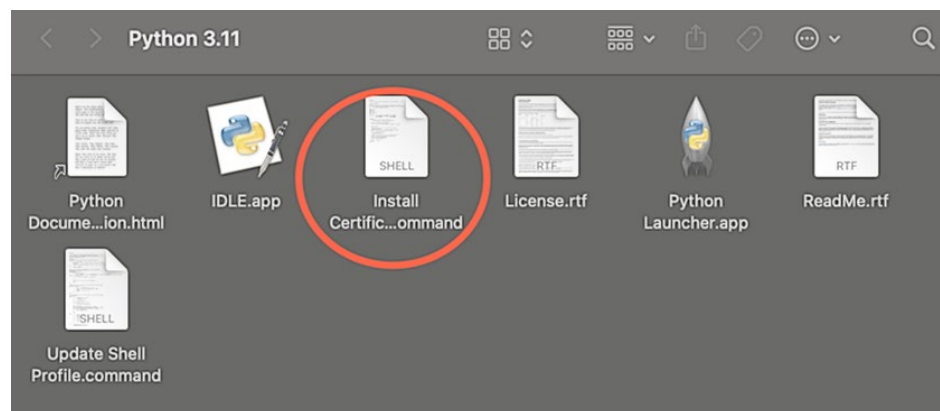


In the folder that is opened, double click "Update Shell Profile.command". This will open the terminal and should finish with "[Process completed]".

Now double click "Install Certificates.command". This should open the terminal and finish with "[Process completed]".



Python should be installed. You can now exit out of the terminals and the Finder window and move the installer to the trash.

## Set up Jupyter Lab

Open the terminal (both Windows and Mac) and run the following command:

<div align="center">python3 -m pip install jupyterlab</div>

On Windows, you may receive an error message "Python not found…" In that case, go to Start and type "Manage App Execution Aliases". Go to it and turn off Python (see the screenshot below). You might need to restart your computer for the change to take effect. Then go back to the terminal and try again the previous command (in red).
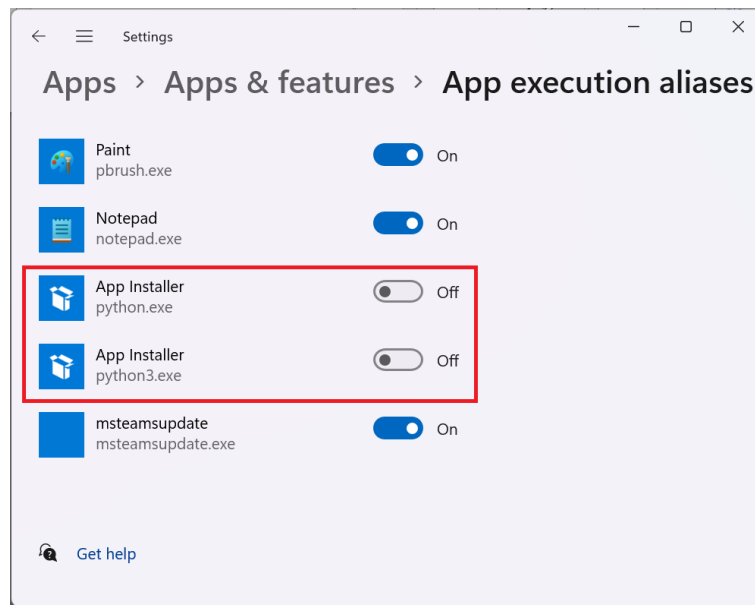
## Put them all together

Suppose you are shared a folder named "Summer 2024" on Google Drive. You can sync it on your local computer as follows:

1. Go to https://drive.google.com and click on **Shared with me** on the left panel.

2. Right click on top of the folder Summer 2024, then choose **Organize**, and choose **Add shortcut.**

The folder *Summer 2024* will appear in the local folder where your Google Drive is synced.

## Open an ipynb file with JupyterLab

Suppose that you have a file testing.ipynb in the folder Summer 2024. You can open/run/edit this file *on your local computer* as follows (see the screenshots attached):

1. On your computer, navigate to the local folder Summer 2024.
2. On the address bar, type jupyter lab and press Enter. If JupyterLab doesn't open on the web browser, try the command python -m jupyterlab instead.
3. A terminal will pop up and a JupyterLab session will open on your web browser. Simply navigate to the file testing.ipynb on the left panel.
4. To end a JupyterLab session, you close the web browser tab and press Ctrl+C (or Cmd+C for Mac) in the terminal.
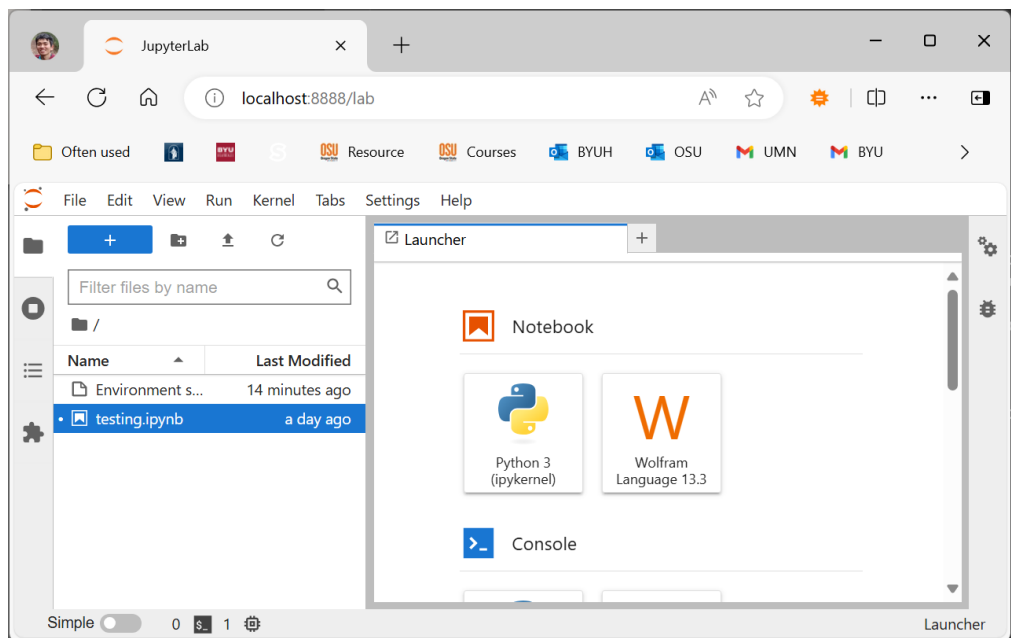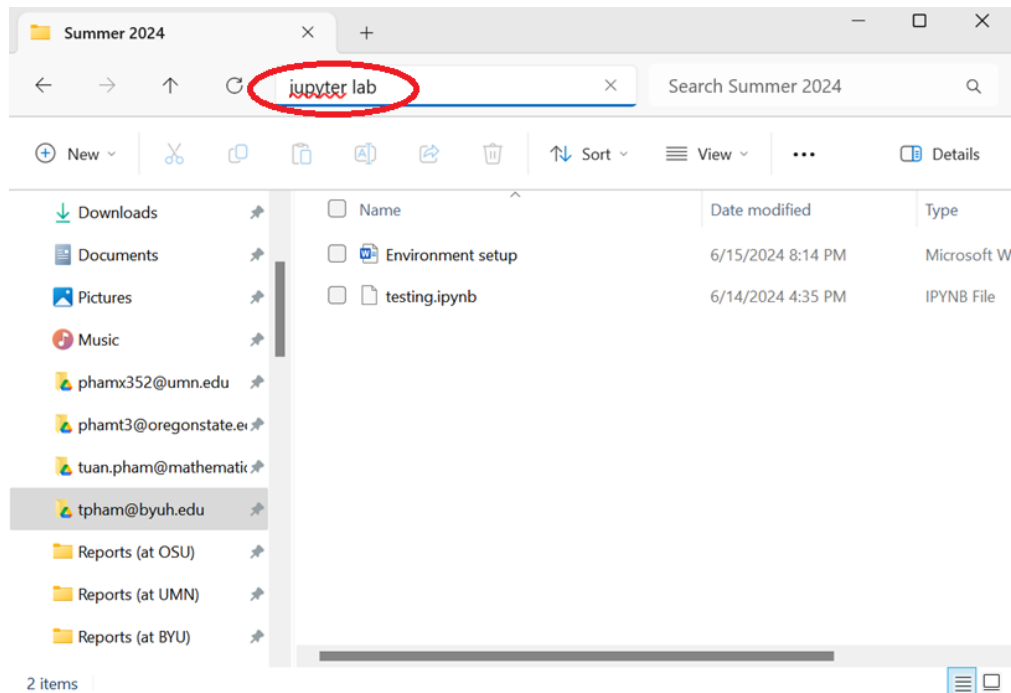
## Open an ipynb file with Google Colab

Suppose that you have a file testing.ipynb in the folder Summer 2024. You can open/run/edit this file *on Google cloud* as follows (see the screenshots attached):

1. On your computer, navigate to the folder Summer 2024.
2. Right click on the file testing.ipynb and choose Open with Google Drive. *Note that you can open this file straight from the web version of Google Drive. Just right click on the file and choose Open with → Google Colaboratory.*

3. A Google Colab session will pop up. Anything you do here will sync with your local computer as well as Google Drive.
4. If you want to navigate to other files on the folder Summer 2024 from the Google Colab session, click on the folder icon on the left panel of the browser and then click on the Google Drive icon. Wait a few seconds for your files to be fetched to Google Colab.