2023 Sagan Summer Workshop
Characterizing Exoplanet Atmospheres: The Next Twenty Years
Getting Started Guide: Google Colab

For the workshop hands-on sessions, participants can choose to run the exercises from their own installation of Python or use Google Colaboratory. The instructions in this document are for the Google Colaboratory. In addition to following these instructions, please also run the Setup notebook(s) for the hands-on sessions you will be participating in.

Google Colaboratory allows you to execute Python in a browser without configuring Python in your local system. The Python code is run from a notebook environment similar to Jupyter notebooks with execution and text cells. For a general introduction to Colaboratory, see:

What is Colaboratory?
https://colab.research.google.com/notebooks/intro.ipynb

Overview of Colaboratory Features
https://colab.research.google.com/notebooks/basic_features_overview.ipynb

Workshop Colaboratory Instructions

You will need:
- A *new* free Google account to maximize the available 15G storage: https://www.google.com/account/about/
- To recover diskspace after running each setup notebook, be sure to *empty the trash in your google drive to get rid of the temporary download files*. You may need to wait a bit or you can re-login again to see the recovered space.

Verify that you have about 15 GB storage available:
1) Log into your Google account
2) Navigate to Google Drive - either follow this link: https://drive.google.com/drive/my-drive OR from your account click on the dot navigation and then click on the Drive icon.

3) Once in Drive, on the left side menu, there is a section called "Storage" which will show how much space you have available. If you have insufficient storage in your Google account, we suggest creating a new account rather than purchasing storage. Note that if you hit the limit of storage, it will affect your email usage, so it is better to create a new account.
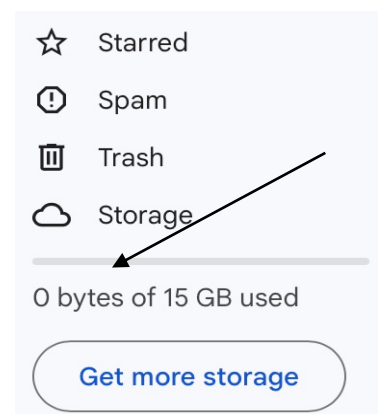
SSW 2023 Notebooks

[NOTE: the notebook links have been updated to their permanent archive location]

Copy the Notebooks individually to your Google Drive (see the step-by-step instructions below, "Follow these steps to copy the Notebooks to your Google Drive") or you can download the notebooks all at once and copy them into the "Colab Notebooks" directory in your Google Drive via the tar or zip format file.

Tar format: https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_notebooks.tar.gz
Zip format: https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_notebooks.zip

Hands-on Session I: Reducing JWST Data: From Raw Data to Light Curves

SSW2023_JWST_MIRI_NIRSpec_Setup.ipynb
*(Note: needs to be run just **once** and applies to Hands-on Sessions I & II)*
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_JWST_MIRI_NIRSpec_Setup.ipynb

SSW2023_Workshop1_MIRI_Handout.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Workshop1_MIRI_Handout.ipynb

SSW2023_Workshop1_NIRSpec_Handout.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Workshop1_NIRSpec_Handout.ipynb

Hands-on Session II: Fitting JWST Data: From Light Curves to Planet Spectra

SSW2023_JWST_MIRI_NIRSpec_Setup.ipynb
(Note: skip this step if you've already run it for Hands-on Session I)
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_JWST_MIRI_NIRSpec_Setup.ipynb

SSW2023_Workshop2_MIRI_Handout.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Workshop2_MIRI_Handout.ipynb

SSW2023_Workshop2_NIRSpec_Handout.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Workshop2_NIRSpec_Handout.ipynb

Hands-on Session III: Forward Modeling with PICASO

SSW2023_Forward_Model_Picaso_Setup.ipynb
*(Note: needs to be run just **once** and applies to Hands-on Session III)*
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Forward_Model_Picaso_Setup.ipynb

SSW2023_Forward_Model_Picaso.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Forward_Model_Picaso.ipynb

Hands-on Session IV: Retrievals using petitRADTRANS

SSW2023_Retrievals_using_petitRADTRANS_Setup.ipynb
*(note: needs to be run just **once** and applies to Hands-on Session IV)*
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_Retrievals_using_petitRADTRANS_Setup.ipynb

SSW2023_petitRADTRANS_intro_exercises.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_petitRADTRANS_intro_exercises.ipynb

SSW2023_petitRADTRANS_retrieval_exercises.ipynb
https://catcopy.ipac.caltech.edu/ssw2023/hands-on/SSW2023_petitRADTRANS_retrieval_exercises.ipynb

Follow these steps to copy the Notebooks to your Google Drive:

1) Log into your Google account with the available storage – make sure you have signed out of all other Google accounts if you have logged into more than one.

2) From the browser where you have logged into your Google account, put in the URL of the notebook (see above).

3) The notebook will open in your browser. You should see your profile/initial on the upper right side of the page. If you see "Sign in", log into your Google account.

4) Under the name of the notebook, there will be "File, Edit, View" etc. Click on "File" and then select "Save a Copy in Drive" (see image on the right).

5) You will be prompted to open the notebook in a new tab or window, and the notebook name will be prefaced with "Copy of". You can rename the notebook by clicking on the name. The notebooks will be saved in your Google Drive https://drive.google.com/drive/my-drive in a directory called "Colab Notebooks".

6) Close the notebook browser windows.
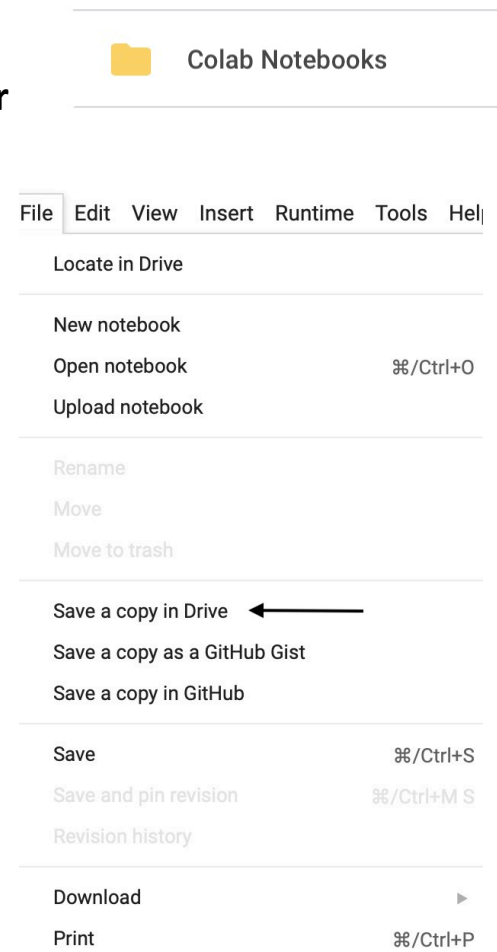
7) Repeat this process to save all the Google Colab notebooks to your Google Drive.

Instructions for Using Google Notebooks

Launching the Google Notebook

1) Login to your Google account where you have saved the notebooks.
2) Go to your Google drive: https://drive.google.com/drive/my-drive
3) Click on Colab Notebooks directory
4) Click on the Google notebook.

Running the Notebooks

For the hands-on activities notebooks, you should step through each cell individually by clicking on the right-facing triangle to the left of each cell (▶). Be sure to run all the initialization cells before the exercise cells. *The notebooks will have some cells marked Colab only or Python use only. Run only the Colab ones.*

Useful Colab Top Menu items

- **File** -> Save   Saves the file to your Google Drive
- **File** -> Download   Downloads a .ipynb (Jupyter Notebook) or .py (Python) version to your local machine
- **Edit** -> Clear all outputs   Clears the output from all cells
- **Runtime** -> Run all   Run all the cells. Can be run multiple times.
- **Runtime** -> Disconnect and delete runtime   Disconnects and exits the runtime and resets the notebook variables back to its original state and only useful if the notebook gets into an odd state. It does not affect the files that have been downloaded to your drive. To restart the notebook, use the "Reconnect" button on the right.
- **Table of contents** – the 3 orange horizontal lines at the top left; clicking on them shows/hides the Table of contents.
- Closing the browser window stops the Colab instance.