Introduction to the ENVI software suite
Pre-Lab: September 11th, 2024

I. Introduction
- This is the first "unofficial" laboratory exercise. It will **not** be graded but you have to finish it and hand it over to me at the end of the class. Rather, it is designed to give you a basic introduction to the *Environment for Visualizing Images* (ENVI) image processing software and working with an actual remote sensing image. Follow the instructions and fill in the questions and blank spaces below. Keep this as a guide for your later labs and ask questions as you work through it.

II. Logging in:
- In order to use the Remote Sensing Teaching Lab, you will need to log on to the laboratory PC's using your Pitt user ID and password.
- **To login:** press Ctrl-Alt-Delete to call up a dialog box
  - Type in your Pitt username, password and press <return>
  - *NOTE: Case matters.*

- Create a new directory (i.e., a new folder) on the desktop and name it using your last name. *Hint: use a right click on the desktop to do that.*
  - If you're working with a partner, create a combined directory with both names
  - *Remember, anything saved into this directory will only be accessible to the student who logged in using their Pitt ID!*
- In order to access the data you will need to-
  - Access the "Blackbird" drive through My PC and go to the remote sensing folder. All data you should need is in the geol-1460 folder.
- If you have any issues with this process, please let the TA know and they will assist you.

III. The ENVI image processing software:
- Go to the desktop and start the ENVI software by double-clicking on the ***"ENVI Classic 5.7"*** icon.
- After it starts, you should see a main menu bar at the top of the screen
  - list some of the main menu items you see on the bar:

Note: the "Help" menu at the far right. Use this if you need help with ENVI now or on future labs. It contains a lot of useful information!

- Go to the "File" menu bar and click on *Open Image File*
  - Use the directory window that opens and navigate to the GEOL-1460 folder on the desktop. In there you will find a folder called **pre-lab** and in that folder a file called ***TM-reflectance.dat.***
  - Double-click on the file and describe what happens next in the ENVI software:

  - What are the numbers in parentheses after the band names in the 'Available Bands List' window telling you? *(don't just list them)*

- Now go the main menu bar in ENVI and click on *File → Edit ENVI Header* and click on the ***TM-reflectance.dat*** file in the Available Bands List. *Do **NOT** click on OK, but rather just describe the file information appears in that window.*

- You should now be able to identify which sensor collected the image and where in the world the image is located.

- Click OK to close.
- Next, load TM Band 4 as a gray scale image by double-clicking on it in the Available Bands List. Describe what happens and what appears. What are the different windows showing?

- Now load Band 7 as a gray scale image. Describe the changes in the image. *Hint; double-click back and forth between the two bands in the Available Bands List window to see the changes.*

- Double-click in the larger image window to call up the Cursor Location / Value window. Scroll the cursor around the image and describe what is changing in the Cursor window. Is the image geo-located *(in other words, are there real geographic locations associated with each pixel or just DN values)*?

- Re-load Band 4 and maneuver the zoom window (red box) over the large white circle in the center of the image *(hint: you can just click on the circle)*. Can you tell what it is? What are the average pixel values of it compared to the surrounding darker pixels?

- Right-click on the larger image window to bring up a menu. Click on: *Z Profile (Spectrum)*. Describe what happens and what is being shown. What are the units of the x and y axes?

   o Now, click the cursor on the large bright circle. Describe the spectral shape. Is it familiar based on information from the first lectures? Based on the spectrum, why is the circle so bright *(high DN values)* in Band 4?

o How does that spectral shape change when you click the cursor over the darker gray regions next to the circle? Describe why these areas are darker in Band 4?

• Close the Profile (Spectrum) window, go back to the Available Bands window, click on RGB Color button, and load Bands 3,2,1 in R,G,B by clicking on each successively and then click on the *Load RGB* button. Would this image be called **true color** or **false color**? *Hint, look at the wavelengths for each band!*

o On the menu bar for the **image** window, click *Enhance → [Scroll] Linear 2%* and describe the image before and after the enhancement.

o Now click *Enhance → [Scroll] Gaussian* and describe the changes in color seen in the circle after this stretch. What could be causing this?

o Finally, describe the possible climate of the region based on what you see *(or don't see)*?

• Now, load Bands 3,4,1 in R,G,B and once again, click *Enhance → [Scroll] Linear* on the menu bar for the image window. What changes from the last color combination and would this image be called **true color** or **false color**? Why?

- Save this image out as a .JPEG file by going to the File menu on the **Image** window. Click on *Save Image As → Image File …* on the *Output Display to Image File* window that appears.
  - Make sure the resolution pull-down menu is set to: **24-bit Color (BSQ).**
  - Change *Output File Type* pull-down menu to: **JPEG.**
  - Change the Compression Factor term to **1.0.**
  - Make sure the filename is being saved into the desktop directory that you created in the first part of this pre-lab.

  - Before hitting ok, next change the size of the image by clicking on the **Spatial Subset** button.
    - On the next window *(Select Spatial Subset)* that appears, click on the *Image* button and select a 200 by 200 subset. Center that over the green circle.
    - Click OK.

  - Then click OK again on the *Select Spatial Subset* window.

  - Use the **Choose** button on the *Output Display to Image File* window to navigate to the folder you created in Part I and name the file.
  - Finally, click OK again on the *Output Display to Image File* window to save the JPEG file into your new directory.

  - ***Now using Windows, navigate to your new directory to make sure the new JPEG file is there! You should be able to double-click on it to make sure it opens with the default Windows picture viewer.***
- Lastly, click Cancel and exit ENVI by clicking on *File → Exit* on the main menu bar
- **Be sure to save any files you need to a flash drive or OneDrive.**
- Then, log off the computer.