In this lab, you will examine and interpret brand new Mars data from two instruments on the Mars Reconnaissance Orbiter:

The Compact Reconnaissance Imaging Spectrometer at Mars (CRISM) [http://crism.jhuapl.edu/](http://crism.jhuapl.edu/) – 0.36 to 3.92 microns, 6.55 nm per channel, ~16-20 m/pixel.

High Resolution Imaging Science Experiment (HiRISE) [http://hirise.lpl.arizona.edu/](http://hirise.lpl.arizona.edu/) – 3 channels (blue/green = 400-600 nm, red = 550-850 nm, nir = 800-1000 nm). 30 cm/pixel at 300 km altitude.

1. **Open CRISM image frt00003e12subset.** This map projected image has been spectrally subset to include data from 1.0014 – 2.6021 microns. Using z-profiles and the techniques you have learned in the course to identify the major minerals present in this scene. Hints: there are primary igneous minerals here and clay minerals. A list of clays (phyllosilicates) that have been found on Mars include, nontronite, illite, kaolinite, chlorite, saponite, muscovite, montmorillonite, to name a few.
   a. Plot the z profiles of the major spectral units in the scene. On each, list the characteristic absorptions of the spectra.
   b. Plot candidate mineral library spectra alongside your z profiles to support your mineral identifications.
   c. Create an RGB image or a classification image that highlights the distribution of the major spectral units.

2. **Open HiRISE image PSP_002176_2025_RED.JP2.** This is a single band image of the red channel and is 25 cm/pixel. Using the CRISM and HiRISE data, examine the outcrops of the major spectral units you identified above.
   a. Describe the outcrop scale morphology of the major spectral units.
   b. Examine the contact between the major material units (a nice place to look is e.g., near 14348, 29045). What is the stratigraphic relationship between the units?
   c. Based on your analysis, what is the geologic history of the rocks in this area? Is this a good place to go look for water on Mars?