# *PHY 250L – Spring 2018*
# *Python tutorial 4*

Welcome back to the PHY 250L Python programming tutorial!

**Things you should understand after week 4**:

- plotting data (histograms, scatter plots)
- defining functions
- fitting a function/model to data
- extracting fit parameter and uncertainties

**Problems for 3.15.2018** The following problems should be completed and uploaded to Sakai by 09:45 on 3.15.2018. Each problem should correspond to its own python program (*i.e.*, each problem will correspond to a single file). The preferred names for the files are indicated in each problem.

1. `wash_temps.py`, 50 points

   I have placed a data file called wash_pa_temps_only.csv on Sakai. This file contains the temperature maxes and mins per day for the years 2000-2009 in Washington, PA. This is actual data!

   Make a plot of the maximum temp versus day number. Fit this data with a function of the following form:

   $$T(t) = A\cos(\omega t + \phi) + B$$

   This function has four fit parameters: $A$, $\omega$, $\phi$, and $B$. Make sure you supply good initial guesses for these parameters. Use your value of $\omega$ returned by the fit to estimate the length of the year. Also estimate the average **annual** temperature from your fit parameters.