Project Overview:
Bring all of your newly learned Tropical Cyclone knowledge and research skills together by studying a specific storm and present your results to your colleagues in a 15-20 minute Power Point presentation.

First Step: Split into groups of 2 and pick a storm. We will draw numbers to determine which group picks first. Have a first, second, and third choice ready.
-Note: storms before 2008 do not have HWRF model data available from the HRD site.

-2007 Hurricane Dean (Caribbean Category 5)
-2007 Hurricane Felix (Caribbean Category 5)
-2008 Tropical Storm Fay (made 4 separate landfalls in Florida)
-2008 Hurricane Gustav (Cat 4 landfall in Cuba, Cat 2 landfall on Gulf Coast)
-2008 Hurricane Ike (3rd most costly hurricane on record)
-2009 Hurricane Bill (Large, long-lived hurricane over Atlantic)
-2010 Hurricane Alex (Cat 1 Texas landfall)
-2010 Hurricane Earl (RI near Puerto Rico, long-lived Cat 4)
-2010 Hurricane Karl (RI in Bay of Campeche, Mexico landfall)

Second Step: Using the skills learned in the first week of the internship, study the track and intensity of your storm. Follow the Scientific Method that we talked about last week:

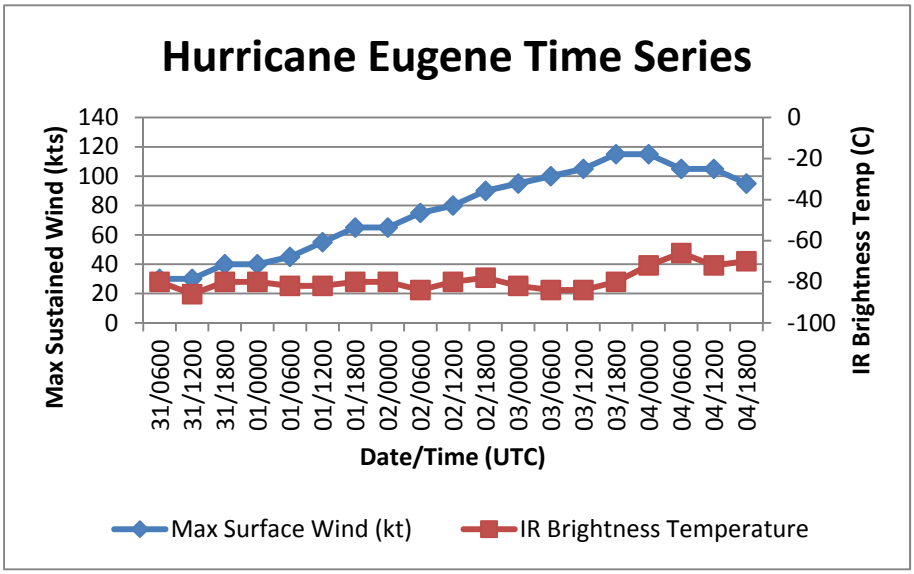
1) Define a question (or questions):
    -Examples: How did the structure of the TC evolve over time? Why did the TC go through Rapid Intensification? How did land interaction, wind shear, or eyewall replacement cycles affect the intensity of my storm?
2) Gather information and resources (observe):
    -Learn the track and intensity of your storm well. Take advantage of the wealth of data sources on the Internet to learn more about the questions you asked in Step 1. Refine your questions or ask more specific questions based on what you discovered.
    -Use external sources (textbooks, online guides, your classmates, Joe/Cheng) to learn more and get multiple opinions. Make sure to cite all sources.
3) Form an explanatory hypothesis:
    -Example: Hurricane Katrina underwent rapid intensification in the Gulf of Mexico because the center of circulation passed over the warm loop current, upper level winds were favorable for development, and the lower level circulation was undisturbed after passing over South Florida.
    -You may have multiple hypotheses if there are several aspects of your storm worth studying and you have enough time.

4) Perform an experiment and collect data, testing the hypothesis

Examples:

-Find satellite images that support/refute your hypothesis. For example, if you think your storm weakened because it was undergoing an eyewall replacement cycle, search the microwave imagery for concentric eyewalls.

-Using MS Excel and online resources, create excel plots of your storm's intensity compared with relevant variables. Examples of variables to plot include minimum IR brightness temperature, storm relative wind shear, sea surface temperature, radius of TS or Hurricane force winds, or any other ideas that you have. Example below:



-Another option is to compare the model data to the forecasts and satellite (using the HWRF data from HRD). How did the model forecast intensity compare to the actual storm? How does the HWRF forecasted wind field compared to the satellite-measured wind field?

-We will go over how to use HRD data on Tuesday morning

5) Analyze the data, interpret the data and draw conclusions

-After you have interesting data and can make a good scientific argument, consider how to organize your results into a presentation.

Third Step: Create a presentation

-Time allotted: 15-20 minutes. The presentation should be divided as equally as possible between the two group members. One member should control the slides and the other should talk, switching when appropriate.

-Leave a few minutes for questions at the end. Try to anticipate what questions might be asked. We will have questions prepared to ask you if the general audience does not ask any.
-Assume that you are speaking to an educated, scientifically minded audience, but do not assume that they will have experience with the images or data that you are showing. For example, if you are showing an IR satellite image, make sure to inform the audience that the image is showing the temperature of the cloud tops and show a legend that depicts the color of the warm and cold clouds.
-Do not try to fit too much into your presentations. For a 15-minute presentation, 20 slides should be the absolute maximum and even 12-15 is reasonable. It is better to explain a smaller number of your best plots/images in detail instead of showing lots of things too quickly.
-Keep in mind the criteria on the evaluation sheet. Speak loudly and clearly and make eye contact with the audience. Show enthusiasm for your topic.

Evaluation:
-Projects will be evaluated using the forms already provided.