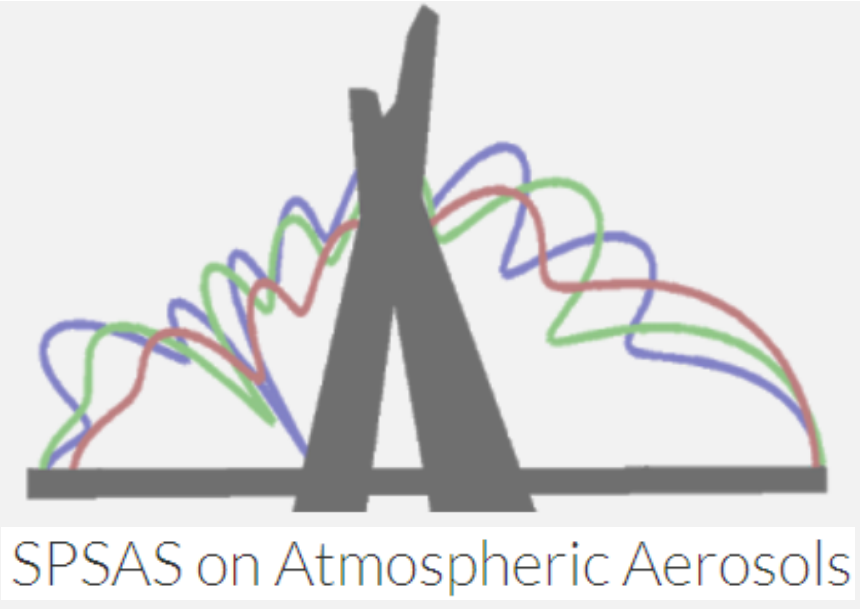
Field Measurement's Day



Prof. J. Vanderlei Martins
Earth and Space Institute – UMBC
University of Maryland Baltimore County

Our Experimental Measurement's day:

- Field trip to the MAC (Contemporaneous Art Museum)
- Measurements from the roof top of the building observing solar and sky radiances with a simple manual photometer from your smart phone.
  - The intent is to illustrate how to make measurements and convert it to scientific variables but it is not to actually perform a fully calibrated scientific measurement
- First you will characterize and understand better the sensors in your Smart Phone:
  - Photometer
  - Camera
  - Inclinometers, accelerometers, compass, GPS, etc.
- Second you will perform actual atmospheric measurements and compare results with AERONET

Ibirapuera Park Across the Street from MAC

What to bring:

- We plan to use personal Smart phones for the measurement
  - Students will be divided in teams of 3 people
  - Important to have at least one smartphone per team
- Not required but very useful to have a laptop computer for data analysis (plotting, etc.).
- Sunscreen, hat, long sleeves for wind and sun blocking
- Water bottle or mug.
- Lunch boxes will be provided by the School.

Important notes:

- The museum is a safe/secure place but, keep in mind that you are bringing smartphones, laptops and other belongings at your own risk.
- You can visit the whole museum but our experimental activities will happen only the 1st and 8th floors.

> Important: You are not allowed to bring backpacks to any other floors!!!
> In fact, it is better to keep your backpacks in the 1st floor rooms dedicated to our group.

- Across the street from the museum there is the beautiful Ibirapuera Park that you should consider visiting. While in the Park be always careful with your belongings (computer, cameras, phones, etc.).

Apps to download to your computer:

- There are three Apps that we plan to use in this experiment:
  - Physics toolbox suite
  - GPS Status
  - Photometer PRO – Lux Light Meter & Tools

Note: Aple Iphone's will have a different photometer App but it should work similarly

If your phone is limited in memory space, start with the Photometer Pro – Lux Light Meter. You may be able to use this App only for all measurements.

Division in groups

- Students will be divided in teams of 3 people
  - There must be at least one smartphone per team.
  - It would be useful if each team had at least one laptop computer for data analysis.
- The student teams will be split into 4 groups lead by a professor and monitors.
- The Professors will coordinate the groups to perform experimental activities in the laboratories and on the roof of the museum.
- Each group will have an assigned 2 hours window to perform the laboratory characterization of their phone.

Computer and Data analysis

- A laptop computer is not required for participation in the course but it is highly recommended.
- We will have data analysis and measurement activities for which the laptop computer will be highly beneficial. The work will be done in groups of 3 students so, it is highly advisable to have at least one computer in each group.

Software requirements

- Any data analysis software (including excel) can be used to the general data analysis but we will be basin all our measurements and data analysis on Python.
- I highly recommend everybody to install and get some familiarity with Python. In particular, I recommend Python 2.7 in the Anaconda distribution.

Poster Session

- Student teams will prepare a poster with results from their experiment to present to the whole group of students. We will have a poster session in the last Thursday of the event.