On March 15, 2016, the class and I went on a field trip to visit the Optical Remote Sensing Laboratory located on the Groove School of Engineering. In this trip, I have learned several things that are very useful. Professor Viviana had shown us couple remote sensing instruments and explained the operations for each instruments. First, we saw the LIDAR system. What it does is it sends light to the atmosphere and then measures the properties of scattered light to find range and other information of a faraway object. Since the LIDAR system is active remote sensing, sensors provide their own energy source for illumination. Unlike the radar, LIDAR uses laser to detect small particles like molecules and aerosol. Professor Viviana also explains the components of the LIDAR system. The LIDAR system consists of a transmitter, detectors, and a receiver. There were three mirrors used for detecting different wavelength channels such as 1064nm (infrared), 532 nm (green), and 355 nm (UV). It was great to hear some guides of handle those components. For example, we can’t put our finger onto the lens otherwise it might affect whole the measurement.

We went on the roof and saw couple optical remote sensing instruments. One of them was the sun photometer. I learned that sun photometer is used to detect solar radiation and there are different types of sun photometers. Multi-filter Rotating Shadowband Radiometer (MFRSR) was one of them. It is used to measure the total and diffuse solar hemispheric down welling radiance in seven wavelength bands. The set of wavelengths are sensitive to ozone absorption, water vapor absorption, aerosol scattering, and Rayleigh scattering. It was interesting to know the main components of the MFRSR and how they operate together. The components of the MFRFR are the rotating shadow and the sensor head. The shadowband is a strip of metal formed into a circular arc and attached along a celestial meridian. The diffuser of the instrument is located at the center of the arc. What the shadowband does is rotated to block out the direct solar beam so that a diffuse measurement can be made. The instrument is controlled by the microprocessor. The measurement is first made with the band rotated to its lowest position to get the global vertical irradiance. Then the band would rotated to obtain various measurements depend on the sun’s position.

Another type of sun photometer was the CIMEL sun photometer. I learned that this instrument is an automatic sun and sky scanning radiometer. It measures the direct solar irradiance and sky radiance at the Earth’s surface. It takes measurement only during daytime. The instrument consists of the sun photometer, satellite antenna, solar panel, and weather box.

Overall, it was a great experience. This field trip gave me the opportunity to verify how optical remote sensing works and be able to see some of the instruments that CCNY have. I learned much information during the field trip as such as the slides. The slides provide additional information about the LIDAR system. The slides present a brief structure of active remote sensing. It starts from the laser transmits beams to atmosphere, receiver collects the atmospheric return signals, data acquisition samples the electrical signals from detectors outputs, and analyze the data.