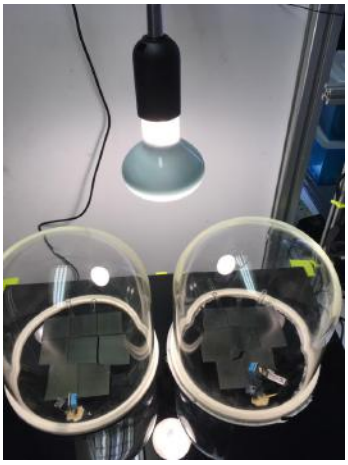
Enviornmental monitoring using Audrino

Arduino is a single-broad microcontroller for building low-cost digital devices and interactive objects that interact with their enivronment using sensors and actuators. Based on these arduino cards, a portable enviornmental monitoring system has been developed. In this set-up, different sensors with an individual ardino card inside have been develped. In the figure, sensors used to measure different parameters such UV light radiation & ozone concentration, PM2.5, and carbon monoxide & carbon dioxide concentration are shown. The size of the sensors is small and students can carry them easily to any location for the measurement. The data recorded can be uploaded to the mobile phone using the Apps developed by our team.

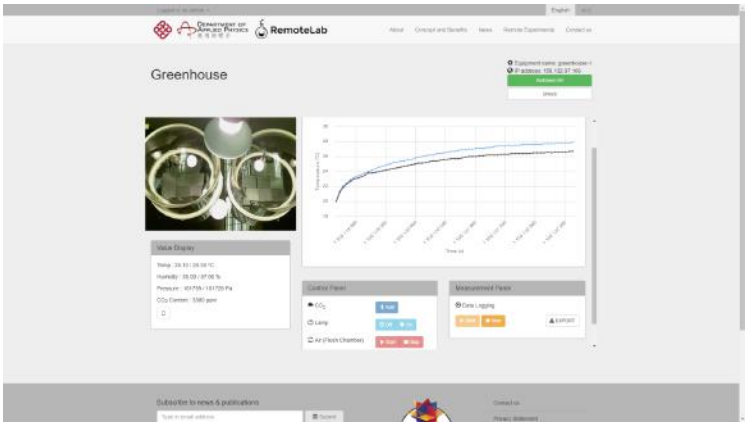
The figure shows the different senesors powered with a portable power bank (white in colour). The data can be uploaded to the mobile phone using the Apps developed by our team.

Green House Effect Experiment

The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse gases. Greenhouse gases include carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs). Through this experiment, students can verify the effects of carbon dioxide on global warming. The set-up includes two containers (act as the earth): one filled with natural air content and the other with few more percentages of carbon dioxide. By turning on the light bulk (act as the sun) and measuring the temperature inside the containers as a function of time, we can observe the different temperature change in the two containers. This experiment is fully automated and the students can perform the experiment remotely at anyplace and anywhere. In additional, the experiment can be modified to study the effects of other greenhouse gases.



The greenhouse effect experimental set up.



Screen captured for the greenhouse effect experiment and the graphs show the different temperatures measured in the two containers as a function of time (the blue one is the container with 2 % more carbon dioxide).