

1. Overview/Abstract (1-page)

Photochemical smog is a brownish-gray haze caused by the action of solar ultraviolet radiation on the atmosphere polluted with hydrocarbons and oxides of nitrogen. High-precision measurements on formaldehyde (HCHO) are required to understand the chemical processes of photochemical smog for air quality management, and assess the exposure for public health and environmental justice.

We propose to acquire a high-precision HCHO analyzer to enable Dr. Huang and Dr. Mak's research capabilities on high-precision HCHO measurements. The proposed HCHO analyzer, with our existing NO_x and ozone analyzers, will allow us to observe and understand the physical and chemical processes of photochemical smog and its impact on public health and environmental justice.

The proposed HCHO analyzer will be primarily installed in the PI's Stony Brook University Mobile Laboratory for Air Quality and Health (SBU MoLab). It will also be used for the Co-I's and other aircraft for airborne field campaigns. The proposed instrument will enhance our research capabilities as follows:

1. Validation of NASA's new satellite observations and model simulations.
2. Field campaigns of atmospheric composition and atmospheric chemistry using SBU MoLab and aircraft.
3. Exposure assessment for environmental health and community engagement.
4. Air pollution mapping for environmental justice.

The proposed instrument will significantly enhance our competitiveness for external grants. With the proposed instrument, the PI plans to propose ~6 million grants from multiple federal agencies.

Combining PI's other instruments and SBU MoLab, the proposed instrument will be a game changer for air pollution research at Stony Brook University. Stony Brook University, as New York's flagship, will have the only mobile lab with this kind of measurement capability in the State of New York. It will also be an important part of the atmospheric observatory of the Climate Exchange on the Governor's Island.