

## EMSL Spotlight

### Breathing Easier in the Big Apple

*Instrument Development Lab designs aerosol monitors to study childhood asthma*

Soon, a select set of 9-year-old children in New York City will be sporting durable, lightweight aerosol monitors, thanks to the Instrument Development Laboratory at the Department of Energy's EMSL. These monitors were designed as part of a long-term study by the National Institutes of Health to determine possible causes of childhood asthma in urban settings.

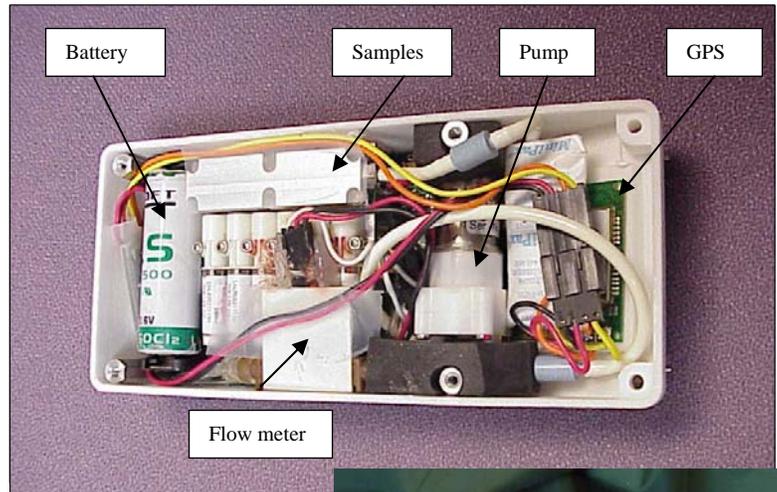
The children will carry the monitors, which are just under 6 inches in length, when they go to school and other locations. Inside each monitor is a pump that continuously draws in air, which then passes through two filters. The first filter traps soot; the second traps other particles. Researchers at Columbia University and Pacific Northwest National Laboratory will then analyze the material trapped on the filters.

However, the filters alone do not provide the level of detail needed for the study. So, the IDL team packed in a number of other instruments inside the custom-designed case. A global positioning system will provide general data about the location of the monitor. A triaxial accelerometer will measure the motion the monitor experiences. The data from these and other instruments will be captured on a computer chip. The data will then be retrieved via Bluetooth technology and a special software designed by IDL staff. The software will also allow researchers to communicate with the monitor to change pump settings.

In designing the personal air monitors, the greatest challenge was power. "All of the parts had to work just as well two days out as when the fresh batteries were put in," said IDL's Eric Choi, who has worked on this project for over a year. The key was selecting batteries with a high-energy density and designing circuitry that minimized energy use.

Five to ten monitors are being tested in laboratories this spring.

For more information, contact EMSL Communications Manager Mary Ann Showalter (509-371-6017).



*The IDL designed these palm-sized personal aerosol monitors for use in a long-term epidemiological study of childhood asthma in New York City.*

