Wearable Mask Fit Monitor

Farmer, Nathaniel

This project develops and tests a prototype respirator fit monitor that can be worn continuously by users so they can know how well their masks fit while in use. Expensive and bulky equipment is available to perform annual, regulation-driven tests, but it appears there are no quantitative, wearable fit testers available for extended use in real-life situations. This project employs a new-to-market, low-cost (~$20) optical particle sensor to perform a fit test by comparing particle concentrations inside and outside a mask. This measurement is similar to current approaches, however, the new sensors are so small that they can be designed into a wearable system. The prototype has achieved its original design goals including being low cost (<$100), wearable, with dual sampling, capable of fit-factor ratios well above 100, battery powered, and near real time with a way to indicate the fit of the mask that includes cellphone display and data logging. The use of the monitor is demonstrated for three different mask types in a real-life situation. The value of this project extends beyond industrial workers to anyone who wants to be sure their masks are protecting them such as do-it-yourselfers at home, first responders and maybe even military personnel.

Awards Won: