

Destroying Dangerous Pollutants

Bacteria, mold, viruses and chemicals – these are some of the most common pollutants that affect the quality of indoor air and impact our health. In fact, the Environmental Protection Agency (EPA) estimates that indoor air can be five times more polluted than outdoor air, leading a team of researchers from the University of South Florida (USF) to invent a novel solution.

More than 20 years ago, Dr. Yogi Goswami was motivated to improve indoor air quality after watching his son suffer from debilitating asthma and allergies. He tried traditional air purifiers, but found that these devices only capture pollutants rather than eliminate them, meaning they can easily mix back into the air.

Feeling dissatisfied with current technology, Goswami was determined to find an answer – and that's exactly what he did. With a background in solar energy research, Goswami realized he could use UV light as a way to eliminate harmful pollutants.

"Using solar technology I had developed, I invented a filter that cleaned the air more effectively," said Goswami, who was recently inducted into the Florida Inventors Hall of Fame in Tampa. "The only difference is, instead of using solar energy, the filter utilizes UV-A blacklight lamps to destroy pollutants as air passes through it."

The air filter utilizes photocatalysts, which generate a chemical reaction using light energy. When dangerous pollutants come in contact with photocatalysts on the filter surface under the presence of UV light, they are immediately broken down and eliminated.

Having developed the first-ever molecular air purifier, Goswami and his wife, Lovely, took the technology to market and launched a successful company by the name Molekule. But Goswami and his team weren't satisfied yet—they discovered a way to make the technology better and partnered with USF through a Matching Grants Research Program (MGRP) project to do so.



"Our current research is a further advancement of the technology based on the company's initial idea funded by the EPA," said Dr. Lee Stefanakos, director of USF's Clean Energy Research Center and lead investigator on the project. "The idea was, 'How can we make this more efficient?' That's when we discovered we could use another form of photocatalyst to achieve better results."

Rather than using the original photocatalysts, the filter surface would instead be coated with a new catalyst formulation, which can trap gaseous pollutants and destroy them. Though Goswami's current technology is incredibly effective, the new formulation has been shown to improve the process by 30 percent. Thanks to funding from The Corridor's MGRP, the team is working to commercialize the new technology.

"These matching funds were critical in helping us expand the project further," said Lovely Goswami. "We are excited about the success we've had with Molekule, and we are confident we will have the same success with the improved technology." ■