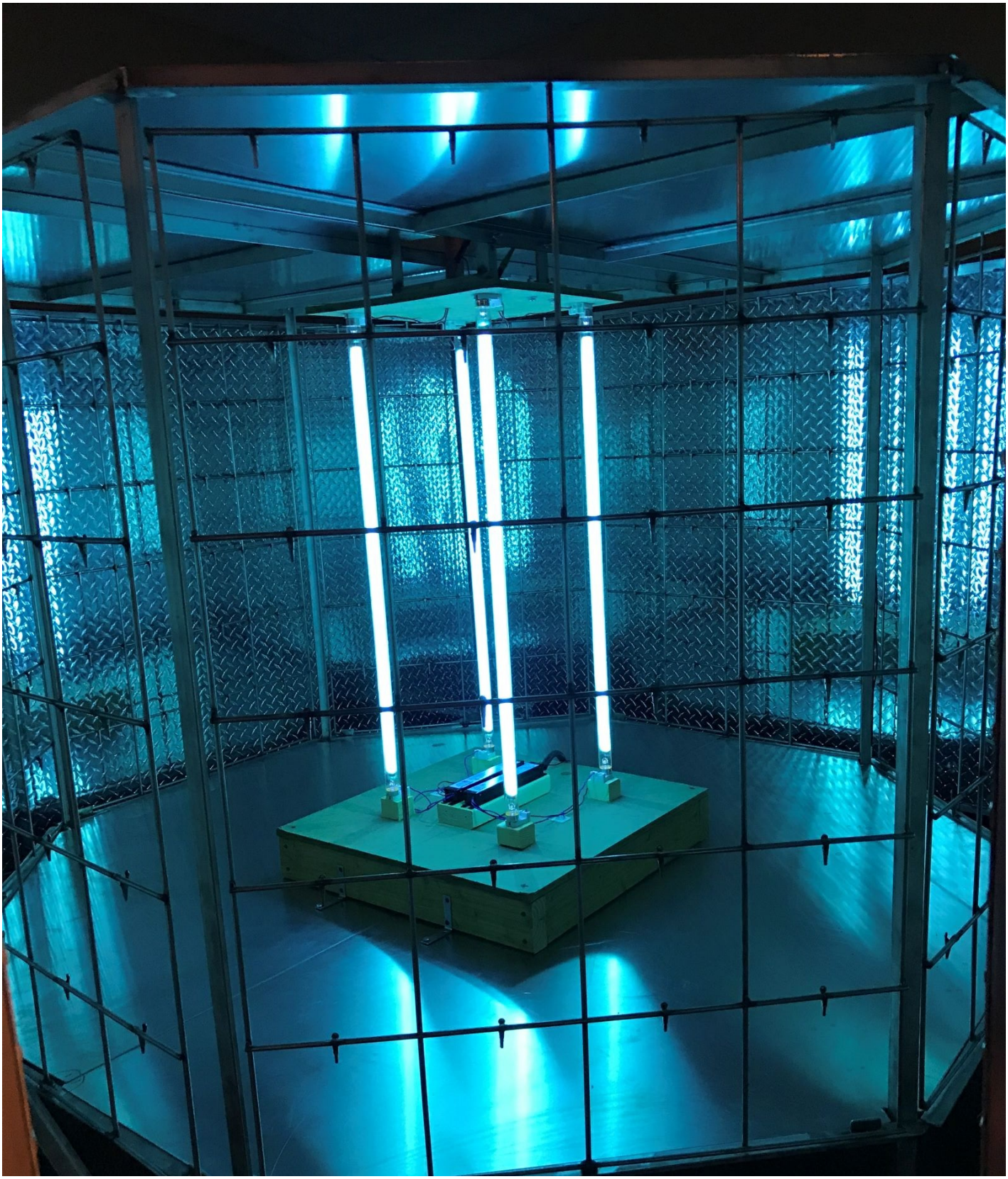
# Lehigh, St. Luke's Hospital Design UV N95 Decontamination System

Lehigh University



Lehigh University professor Dr. Nelson Tansu, along with Dr. Christopher Roscher from St. Luke's Hospital in Bethlehem, have designed an Ultraviolet Decontamination System for N95 Masks which can disinfect about 600 masks per hour. In a 10-hour working period, it could disinfect up to 5,000 masks a day, “plenty for our network’s needs,” Roscher said. An initial prototype is working at St. Luke’s.

In an interview on local *WMFZ*, Roscher said that when the shortages of PPE in China began, he started reading through medical literature. He read about different ways to decontaminate masks in a pandemic setting. “UV light tended to be the most practical solution,” he said.

He reached out to collaborate with Tansu, Director of the Center for Photonics and Nanoelectronics at Lehigh, after being introduced by a mutual friend.

They affectionately call their invention the “bug zapper” because of its form and function, Roscher said.

Using the right wavelength and dose of ultraviolet light disrupts the biochemical structure of the virus, as well as other bacteria and mold, while maintaining a safe level to avoid disrupting the filtration capacity of the masks. To eliminate coronavirus, the invention will use ultraviolet light with a 254nm wavelength, or spectral range from 200-280nm, with a dose of 1 J/cm$^2$.

The design of their High-Throughput Symmetrical and Non-Shadowing Ultraviolet Disinfection System for N95 Masks system focuses on practical implementation by medical technicians in hospital settings. It will feature a significant symmetrical radiation pattern to ensure full irradiation of the masks, including in shadowed regions.

Another unique aspect of the design is that it was built without human contact between its designers. “We never met in person, only interacted by Zoom or phone calls,” Roscher said.

To obtain the materials, Roscher went to his local Home Depot, then leaned them outside the door of Tansu’s building. “It was an intense production schedule,” Roscher said to WMFZ. “It was a unique and gratifying collaboration with Lehigh.”

> *"I'm not surprised that Drs. Tansu and Roscher were able to come together, create a solution to a dire problem, and build a prototype in 2 weeks. Like past Coulter Foundation project teams, pairing an engineer with a clinician is a very innovative partnership," said Rick Smith, Director of Lehigh’s Technology Transfer Office.*

Smith consulted with outside patent counsel to file a patent application on the invention, and worked with St. Luke’s on the joint partnership. The TTO has been in touch with the Pennsylvania Economic Development office managing a

program for new COVID-19 technologies, including looking for local PA manufacturers. Lehigh University has endorsed AUTM's COVID-19 Licensing Guidelines and are proceeding per these guidelines on management of university inventions in the public interest in the context of the pandemic.

In late 2020, Leihigh licensed the N95 Mask UV Decontamination System to Analytik Jena US, a subsidiary of Analytik Jena AG in Germany.

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