Recirculating Air Filtration Enclosure

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3D printers have moved from the research lab into the home and the market for consumer level 3D printers is growing at a rapid rate. The most common type of 3D printing involves the process of melting plastic filament and extruding it out of a small hole onto a moving stage to create a 3D product. The problem is that this process of 3D Printing emits Ultrafine Particles (UFPs) and Volatile Organic Compounds (VOCs), both of which remain airborne until they are removed. Unfortunately, one of those processes to remove these particles is by breathing them in. When inhaled, Ultrafine Particles form deposits in the alveoli region of the lungs, where they can remain embedded for years or be absorbed into the bloodstream. While these particles are not shown to have short term health effects on humans, people with high exposure to UFP's are more likely to suffer from cardiovascular and respiratory problems such as asthma and strokes. The primary goal for this engineering project was to make an enclosure that recirculates air through filters to reduce the impact of UFP's and VOC's on the surrounding environment. Based on the determined engineering goals, an enclosure was designed, built, and tested. Tests consisted of using a particle counter to measure the amount of particles in the air. Currently there are no similar inventions. This invention isolates the 3D printer from the living environment and effectively filters the pollutants created by the 3D printing process, thereby protecting the 3D printer operator from these pollutants.

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