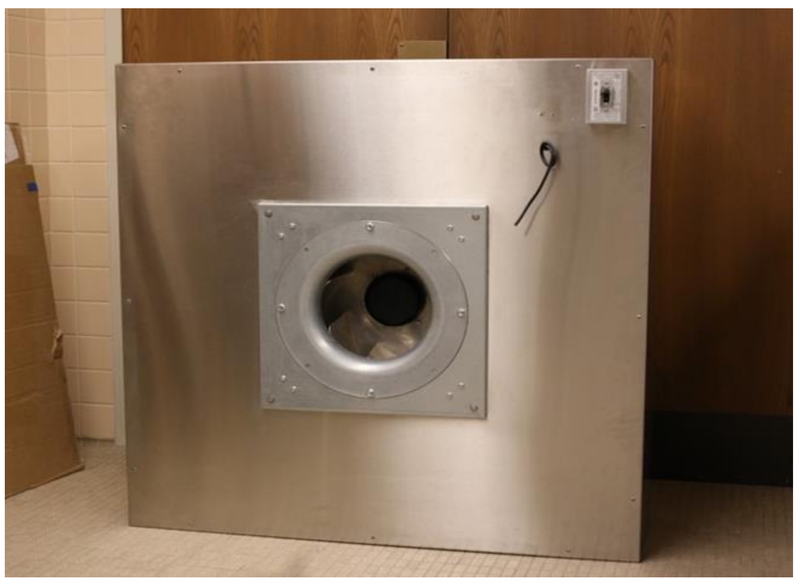
Compact High-Efficiency Air Handling Unit

Upstate Parts and Supply together with Syracuse University have designed, developed and tested a new axial fan concept (named Ex-Fan) under a DOE grant for the past three years. This Capstone project will advance this concept to commercialization by integrating an external-rotor motor into the design.



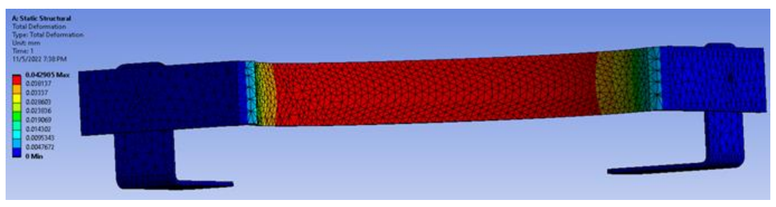
Project Description

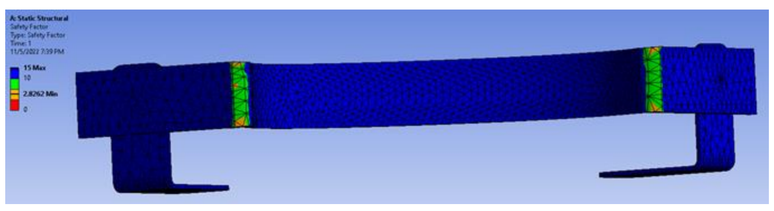
Centrifugal Fans have been at the forefront of Cleanroom Technology and have been the industry standard for a long time. Professor Sarimurat and Professor Dang have designed a new Axial Fan to be utilized in a Microchip Manufacturing Plant (Class 1000) which uses less energy. Our job is to develop a Fan Filter Unit (FFU) which can house the designed fan and to test the design and make sure it holds up.

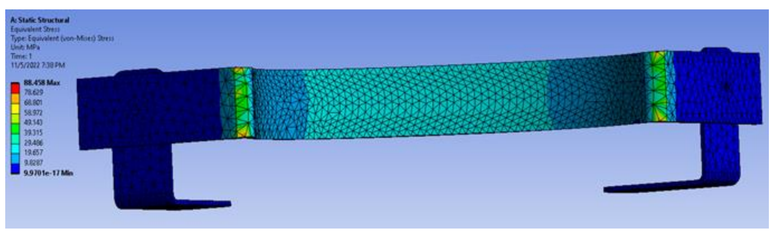
Current Progress

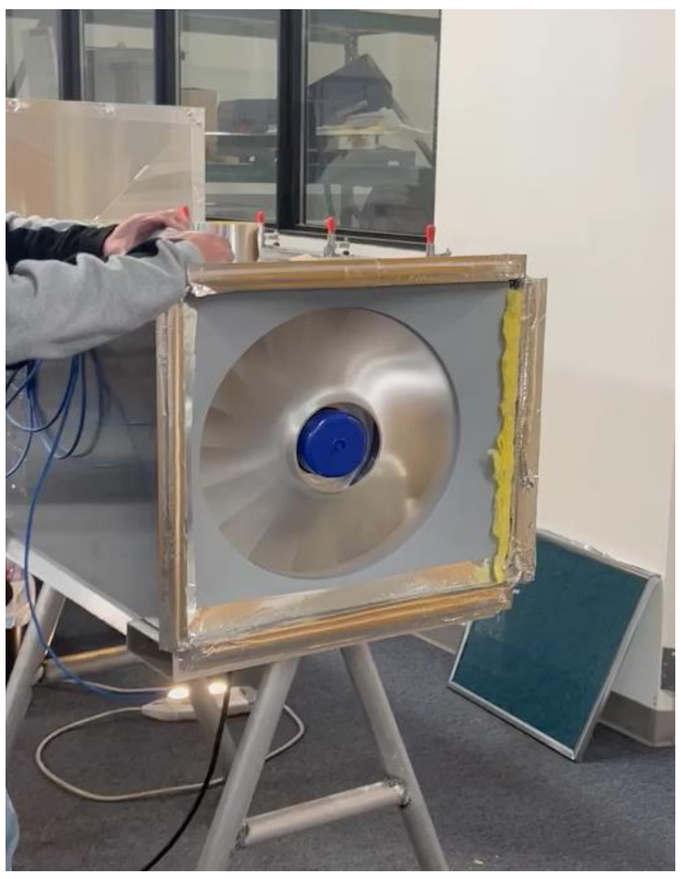
The fan, FFU, and ring fixture with brackets designed by the team have been modeled and assembled in SolidWorks. Testing has been initiated, and the fan has shown the ability to operate at 1800 rpm without any cause for worry.

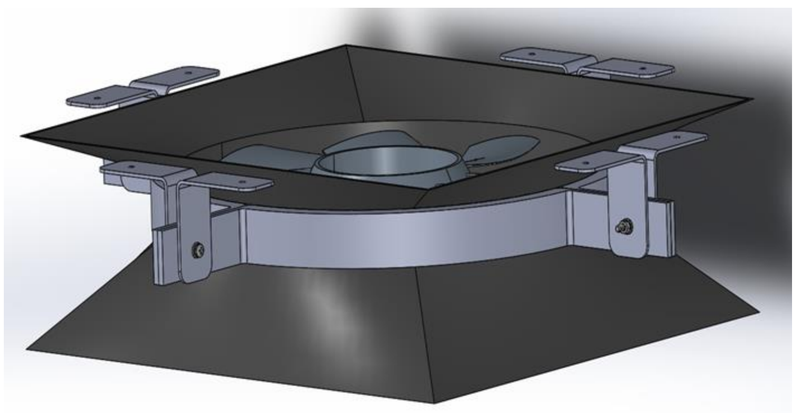
Simulations/Testing





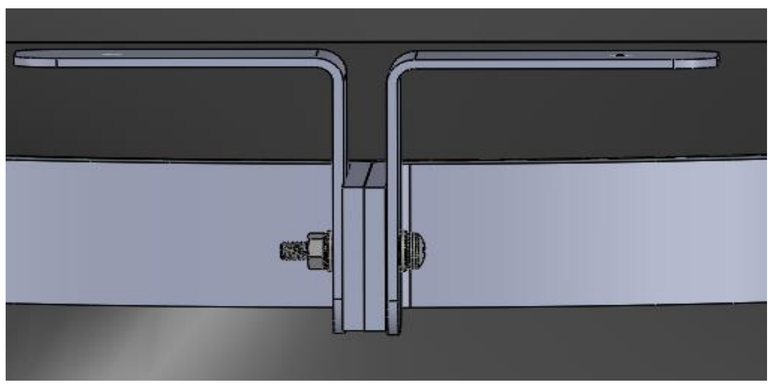






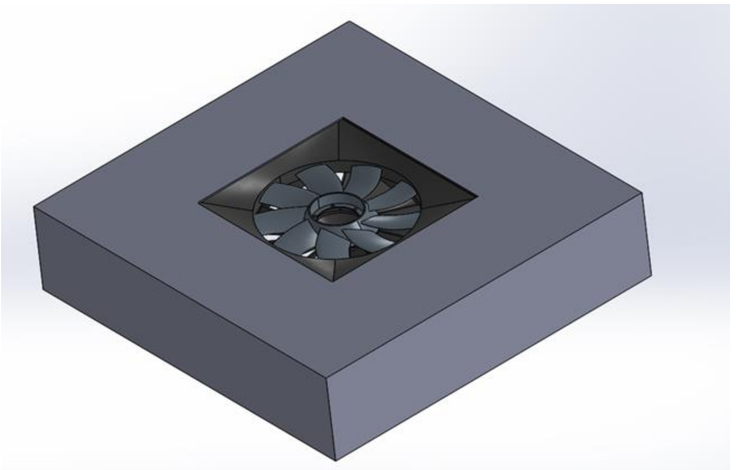
Other Solutions

- Materials: Aluminum 6061 vs. Steel 1008 with Zinc coating
- Make the thickness of the rings and brackets to be smaller since the stress and deformation are quite low with the current dimensions
- End goal: Lightweight assembly, minimal deformation, acceptable safety factor and low cost.



Deliverables

- A design of a FFU to be constructed over Winter Break within which the fan would be fixed
- Fixtures to keep the fan locked in the FFU
- More simulation and analysis to ensure proper function of fan
- Performance testing to prove axial fan consuming less energy
- Design must be compatible with a HEPA filter



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