Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Flow Disturbances Reduce the Effectiveness of a Face-mounted Negative Pressure Antechamber for Endonasal Surgery HAZEL RIVERA-ROSARIO, Department of Mechanical and Aerospace Engineering, Cornell University, MARK LEE, MATTHEW KIM, Department of Otolaryngology - Head and Neck Surgery, Weill Cornell Medicine, JANE WANG, ZELLMAN WARHAFT, Department of Mechanical and Aerospace Engineering, Cornell University, BRADLEY STYLMAN, Environmental Health and Safety, Weill Cornell Medicine, ANGELA PARK, Molecular Biology, Weill Cornell Medicine, AOIFE MACMAHON, ASHUTOSH KACKER, Department of Otolaryngology - Head and Neck Surgery, Weill Cornell Medicine, THEODORE SCHWARTZ, Department of Neurosurgery, Weill Cornell Medicine, GREGORY BEWLEY, Department of Mechanical and Aerospace Engineering, Cornell University — The COVID-19 outbreak has driven an increase in face-mask research. Despite many investigations concerning general-use face masks, few options are available to protect surgeons performing aerosol-generating procedures. A novel mask was designed based on the containment technique of biosafety cabinets using negative pressure. Cross-validation using a high-speed camera and an optical particle counter was done to find a threshold where no aerosol leakage occurred. Two masks of different opening areas were developed, and these resulted in different minimum pressure requirements. Flow disturbances impacted the ability to contain aerosols near the larger opening, leading to a higher pressure threshold. These experiments showed the mask was effective in containing aerosols, limiting the spread of diseases during surgical procedures.

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Date submitted: 03 Aug 2020 Electronic form version 1.4