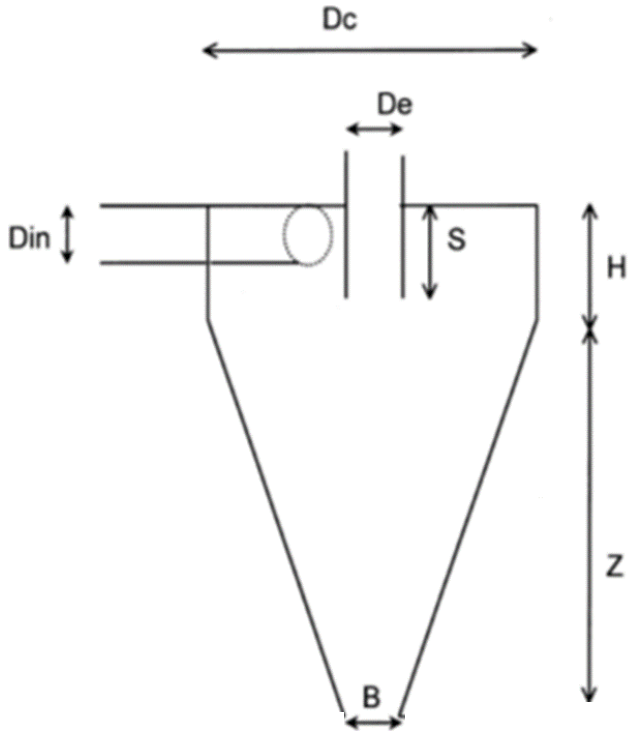
Supplementary Information for "Development and Evaluation of an Ultrasonic Personal Aerosol Sampler (UPAS)"

Authors and Affiliations:

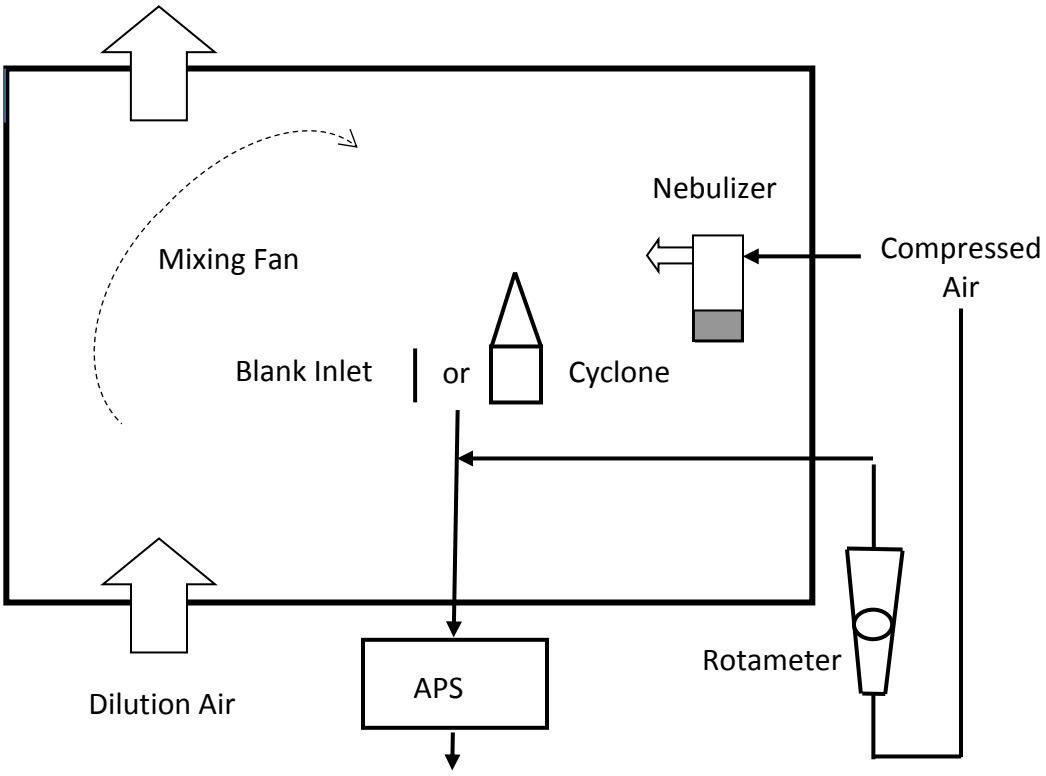
John Volckens[1,2], Casey Quinn[2], David Leith[1,3], John Mehaffy[1], Charles S. Henry[4], Daniel Miller-Lionberg[1]

1. Department of Mechanical Engineering, Colorado State University, Fort Collins, CO 80523
2. Department of Environmental and Radiological Health Sciences, Colorado State University, Fort Collins, CO 80523
3. Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599
4. Department of Chemistry, Colorado State University, Fort Collins, CO 80523

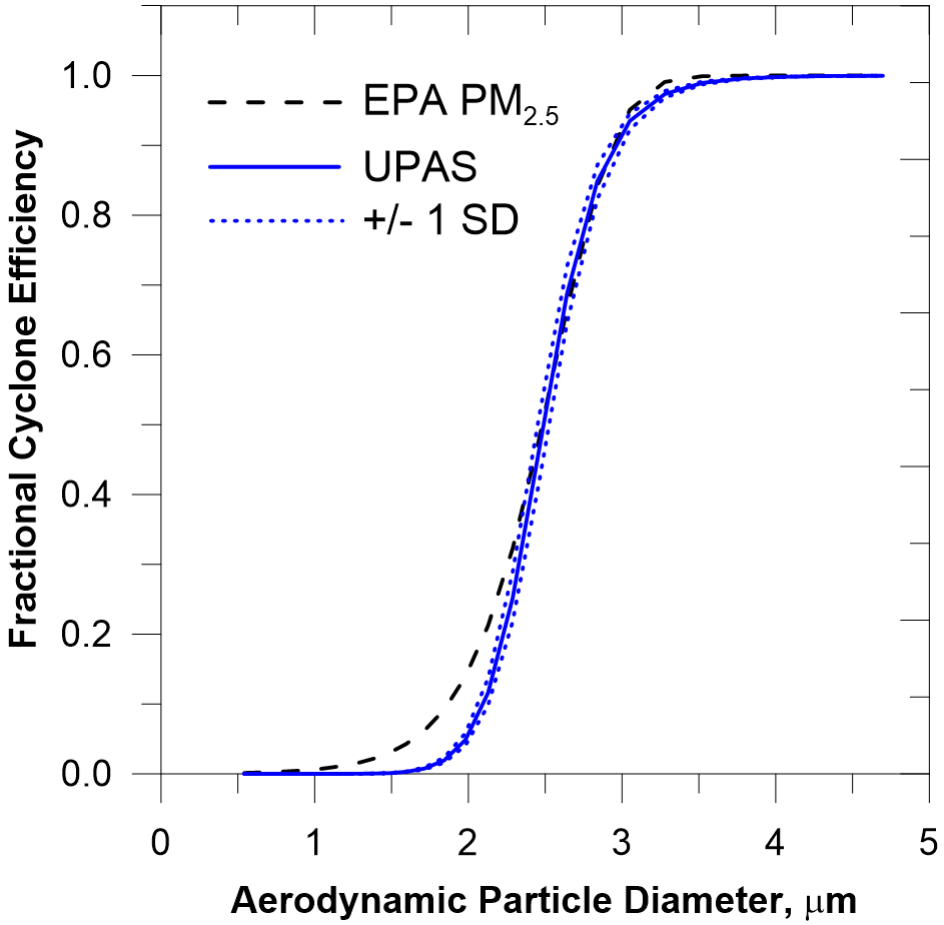
Supplementary Figure 1. Nomenclature for cyclone dimensions used in this work. The cyclone inlet and outlet are circular, and the inlet is tangential to the cyclone body.



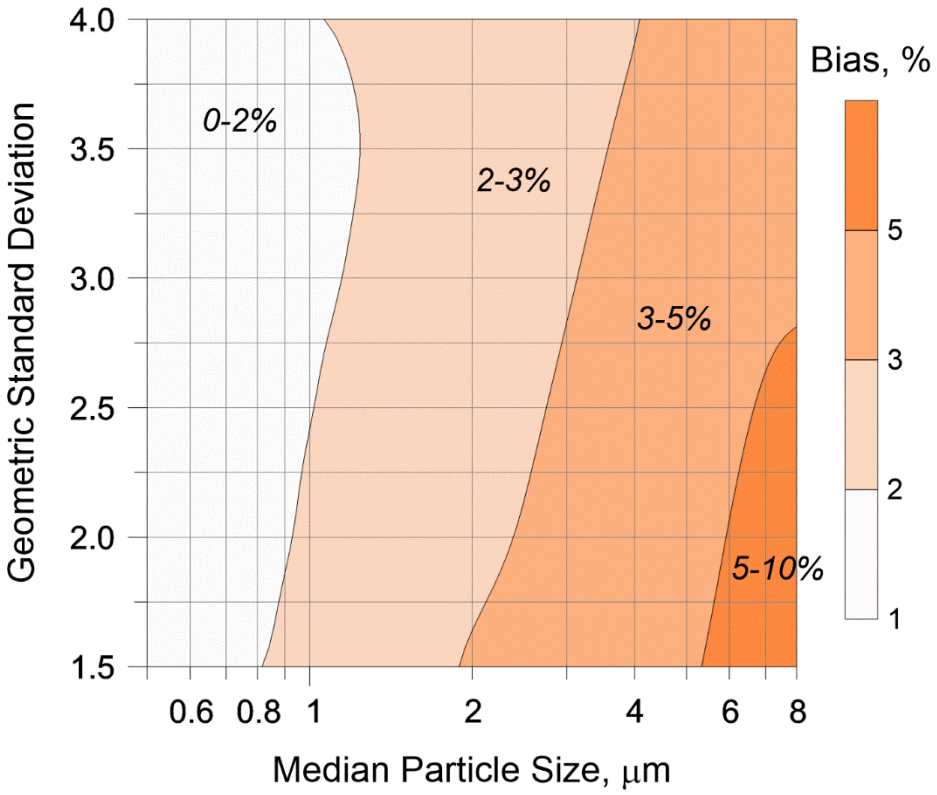
Supplementary Figure 2. Schematic drawing of apparatus used to measure cyclone performance.



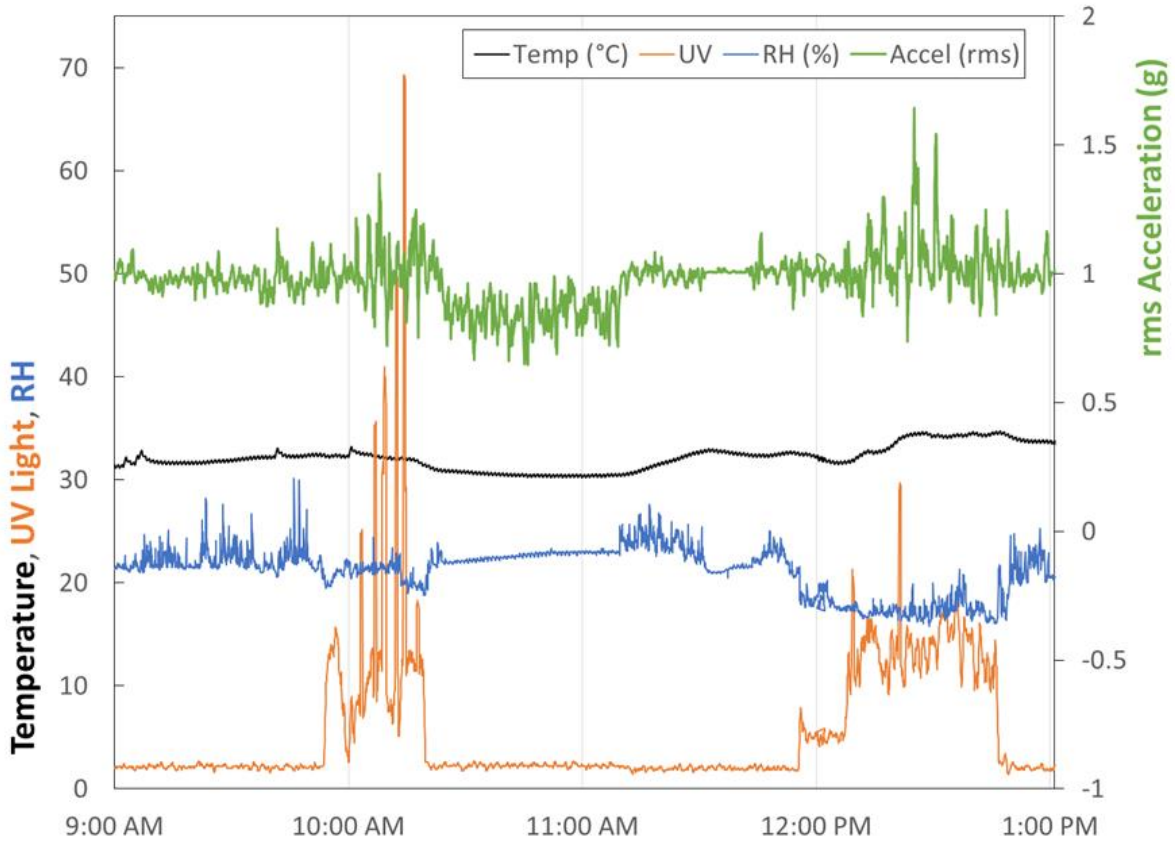
Supplementary Figure 3. Collection efficiency of 1 L/min cyclone relative to the EPA $PM_{2.5}$ criterion standard.



Supplementary Figure 4. Bias Plot for the 1 L/min cyclone design. The axes define the median size and geometric standard deviation of a lognormal particle size distribution; colors represent a positive percent bias in collected sample relative to the EPA $PM_{2.5}$ criterion.



Supplementary Figure 5. Example time-series plot from environmental sensors onboard the UPAS. Shown is a 4-hour time series from a 5th grade student wearing the sampler during a school day.



Supplementary Figure 6. Photo of the UPAS worn on an arm band (inset shows close up).