

## The Bacterial and Fungal Microbiome in Retail Stores

Andrew J. Hoisington<sup>1</sup>, Juan P. Maestre<sup>1</sup>, Sungwoo Bae<sup>1</sup>, Jeffrey A. Siegel<sup>1</sup>, and Kerry A. Kinney<sup>1</sup>

<sup>1</sup>Department of Civil, Environmental and Architectural Engineering, University of Texas, Austin, TX

\*Corresponding email: [kakinney@mail.utexas.edu](mailto:kakinney@mail.utexas.edu)

*Keywords: Indoor microbiome, Retail environments, HVAC filter dust, pyrosequencing*

The bacterial and fungal microbiome present in retail environments has not been studied in depth despite the fact that millions of Americans work and shop in these establishments. The objective of this investigation is to explore the airborne microorganisms present in retail stores by analyzing the microbial community captured in HVAC filter dust recovered from 14 retail sites in Texas and Pennsylvania. The microbial community is being investigated through a variety of techniques including pyrosequencing, Sanger sequencing, qPCR, and conventional culture-based methods. Building data including ventilation rates and indoor air quality parameters are also being measured to investigate potential correlations between building factors and the microbial community.

Results for the first ten sites (over 160,000 sequences) indicate that microorganisms in the bacterial phylum *Proteobacteria* and fungal classes *Dothideomycetes* (Texas) and *Ascomycetes* (Pennsylvania) are the most commonly detected in the samples collected to date. Interestingly, almost 25% of the fungal sequences in Texas are attributed to the fungal species *Alternaria alternata* compared to less than the 3% detected in the sequences recovered from the Pennsylvania sites. Results to date suggest that the bacterial community may be influenced to some degree by the type of store while the fungal community may be influenced by the location of the store. Also, the number of unique fungal OTUs appears to be correlated with air exchange rates. Collection and analysis of the building and microbial community data continues and this dataset will be used to confirm the findings to date. Most recently, we have conducted an in depth study at one retail site to assess the building parameters in more detail and to compare the microbial community recovered from four different bioaerosol samplers, as well as from HVAC filter dust and settled dust.