UTC Project Information	
Project Title	Trace Metals in Airborne Particulate Matter and Genomic Characterization of Associated Microorganisms: Insights into Health Effects from an Industrialized, Near-Roadway Site in Houston
University	Texas A&M University
Principal Investigator	Shankar Chellam
PI Contact Information	Professor, Departments of Civil & Environmental Engineering and Chemical Engineering, 3136 TAMU, College Station, TX 77843-3136. chellam@tamu.edu 979-458-5914
Funding Source(s) and Amounts Provided (by each agency or organization)	CARTEEH $81,249 TAMU $24,000
Total Project Cost	$105,249
Agency ID or Contract Number	
Start and End Dates	September 1, 2019 – August 31, 2020
Brief Description of Research Project	This project focuses on PM_{10} prevalent at an air monitoring site adjacent to the Houston Ship Channel and Interstate Highway 610; Clinton Drive. The main goal of this study is to simultaneously measure major/trace metals and microorganism diversity in airborne coarse particulate matter. We will quantify vehicular contributions to PM_{10} by analyzing aerosols' elemental composition. Additionally, state-of-the-art next generation sequencing tools and 16S rRNA gene sequencing will be implemented to evaluate airborne microorganism diversity and prevalence in PM_{10} in the proximity of roadways. Nine PM_{10} samples were collected from August 10 – August 18, 2018 for analysis. Elemental analysis will be performed using high temperature microwave assisted acid digestion followed by inductively coupled plasma – mass spectrometry (ICP-MS). Next, source apportionment via the chemical mass balance model will be performed to determine the extent to which tailpipe and non-tailpipe emissions including resuspended road dust contribute to ambient PM concentrations. These experiments and modeling will be conducted by Mr. Sourav Das, a doctoral student in the Department of Civil & Environmental Engineering. Separately, Dr. Jothikumar at the Centers for Disease Control and Prevention will implement novel whole genome sequencing to evaluate microorganism diversity. Note that PM_{10} is targeted to capture fungi. Finally, undergraduate students will review health effects

	literature relevant to our measurements stressing knowledge gaps. At the successful completion of this project, a novel, high-impact, high quality, "hard science" dataset on exposure of low-income underrepresented minority families to vehicular trace metals and biological aerosols proximal to a busy roadway will be generated.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • Reports • Project website	