

ME 250 SEMINAR

Data-driven insights into extreme NO₂ and PM_{2.5} concentrations in a hyperlocal air quality monitoring network

The Breathe London project has provided an unprecedented opportunity to resolve hyperlocal air quality levels in a large metropolitan area. Through data-driven techniques such as machine learning and network analysis, our study has focused on analyzing and modeling the spatial and temporal distributions of the extreme NO₂ and PM_{2.5} concentrations, loosely defined as those in the 90th percentile of the recorded data. Those extreme concentrations contribute disproportionately to human exposure and air quality non-attainment. Our work has revealed insights on the atmospheric processes and source contributions that led to those extreme concentrations. Furthermore, our data-driven methods in separating regional and local contributions and identifying source contributions are highly transferrable to other cities where hyperlocal data are available.

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K. Max Zhang

Dr. Max Zhang is a professor at Sibley School of Mechanical and Aerospace Engineering, Cornell University. He received his PhD in Mechanical Engineering from UC-Davis. Dr. Zhang's research areas reside on the nexus of energy and environmental system engineering, and currently focus on passive mitigation of air pollution, renewable energy planning, sustainable heating solutions in cold climate and droplet dynamics in indoor environments. Several of his recent publications on those topics have been rated as "Highly Cited Paper" by Web of Science. His research and community engagement efforts have been recognized by a number of local and national awards. Dr. Zhang currently serves on the Faculty Advisory Council and the Public Engagement Council, advising Engaged Cornell, a \$150 million initiative to establish community engagement and real-world learning experiences as the hallmark of the Cornell undergraduate experience.