



MECH 493 project: (Research on Impacts of Technology on Society) Developing a technology-based understanding of patterns of industrial pollution emissions in Canada

Background and research goal

The goals of this project are to characterize patterns of industrial air pollution in Canada, identify “super-emitters,” and develop technology-based hypotheses for their existence. Research in the United States has indicated that there are large disparities in both the production of, and exposure to industrial air pollution. A small fraction of industrial emitters contributes the majority of industrial emissions of hazardous chemicals, and these facilities are disproportionately located in low-income communities of colour. To provide insight into this phenomenon in a Canadian context, this research will involve geospatial data analysis of the National Pollutant Release Inventory, and analysis of technology and processes in key industrial sectors. The student will develop skills in data wrangling and visualization, statistics, geospatial analysis, and systems analysis of industrial technology and processes. An improved understanding of the distribution of industrial emissions and their potential causes may offer actionable insight for the design of regulations and strategies to mitigate emissions.

Tasks to be performed by the student

Statistically and spatially characterize the distribution of industrial emissions in Canada (by pollutant, by industry)
Assess potential technology and process drivers for key polluting facilities/industries
Communicate findings and methods in written, graphical and open-source code (Python or R) forms

Facilities and team:

The student will work in the Lab for Environmental Assessment and Policy, located in AERL. The student will join an interdisciplinary team of researchers working on Environmental Justice in Canada, primarily working with Prof. Giang and a Graduate Research Assistant.