

LADCO Summer 2024 Internship

The Lake Michigan Air Directors Consortium (LADCO) is hiring a summer intern to investigate the impacts of warehouses and intermodal facilities on air pollution in the Chicago area. The intern will help analyze data from a mobile air monitoring vehicle collected during a summer 2023 field campaign. This project will involve both examination of the scientific literature and new analysis of environmental datasets.

Applications are due on March 8 @ 5:00 Central.

Project Description

Nitrogen oxides (NO_x) are air pollutants that cause serious respiratory health issues and contribute to the formation of other pollutants, including ozone and fine particulate matter (PM_{2.5}). Emissions of NO_x from heavy duty diesel vehicles (HDDV) are believed to be underestimated in most emissions inventories, including those used to project future air quality levels. HDDV NO_x emissions appear to be particularly important at locations where vehicles idle for long periods of time, such as at warehouses and intermodal facilities.

The Chicago area is the largest rail hub in the U.S, hosting dozens of rail-to-truck intermodal facilities, as well as hundreds of warehouses. LADCO has identified that emissions from freight handling are an important and under-represented source of NO_x in the area and is working to better quantify the air pollution impacts of intermodal facilities. As part of this effort, LADCO worked with the U.S. Environmental Protection Agency's (EPA) Chicago office to deploy EPA's Geospatial Measurement of Air Pollution (GMAP) vehicle in the summer of 2023. This deployment was part of the combined AEROMMA/STAQS field campaigns¹ over Chicago. On four days during the field campaign, GMAP drove around several intermodal facilities and warehouse-heavy areas twice a day, continuously measuring concentrations of nitrogen dioxide (NO₂, a component of NO_x), ozone, and meteorology. At the same time, NASA and NOAA were measuring and mapping NO₂ concentrations from aircraft.

The summer 2024 LADCO intern will analyze the data collected from GMAP during the field campaign to estimate NO_x emissions from intermodal facilities and warehouses in the Chicago area. The intern will also evaluate the impact of measures to minimize idling at facilities. This project will involve analysis of spatial data and changes over the course of the day. The intern

¹ AEROMMA = NOAA's Atmospheric Emissions and Reactions Observed from Megacities to Marine Areas campaign. <https://csl.noaa.gov/projects/aeromma/>. STAQS = NASA's Synergistic TEMPO Air Quality Science campaign. <https://www-air.larc.nasa.gov/missions/stags/>

may connect these ground-based measurements to spatial mapping of NO₂ from NASA's GEOstationary Coastal and Air Pollution Events Airborne Simulator (GCAS)², which flew as part of the STAQS campaign, and from the Tropospheric Emissions: Monitoring of Pollution (TEMPO) satellite.

The objective(s) of the project are to (1) examine the spatial distribution of NO_x pollution around intermodal facilities and warehouses in Chicago, (2) determine the impact of idling reduction programs on emissions, and (3) work to quantify NO_x emissions from these facilities. Because these facilities are located in communities of color and low-income communities, these findings are also important for environmental justice.

The final products of the internship will be a report describing the intern's analysis and findings, and a presentation to staff from LADCO, U.S. EPA, and LADCO member states.

Position Requirements

You must have completed at least your sophomore year at an accredited university. Preference will be given to applicants who are either currently enrolled in a university degree program or who recently graduated from a university. If you are not a U.S. citizen, you must have a valid and current student or work visa. Preference will be given to students majoring in a scientific field (including but not limited to atmospheric science, environmental science, biology, chemistry, engineering, geology, mathematics, meteorology, and physics). Students should have completed some environmental course work.

Additional Skills Desired:

- Familiarity with and ability to program in interpreted programming languages such as MATLAB, R, and Python.
- Access to online library databases (e.g., Web of Science) and electronic scientific journals.
- Experience in literature review of scientific papers and publications.
- Experience in research paper writing and presenting technical information to others.

Internship Details

- Term: 8 weeks in June – August 2024 (exact timing is negotiable)
- Hours: 20-30 per week

² <https://impact.earthdata.nasa.gov/casei/instrument/GCAS#top>

- Location: Virtual
- Stipend: \$3,000 paid in two installments
- The intern will work remotely under the supervision of the LADCO Data Scientist

Application

Applicants should submit the following materials via email to the LADCO office manager (heath@ladco.org) by March 8 @ 5:00 Central.

- Cover letter that Includes a 1-page statement describing your interest in the internship and your qualifications for the position. This statement should describe your experience reading and applying information from the scientific literature, analyzing environmental data or other complex datasets, and developing software tools for data analysis.
- A resume or CV that includes your full contact information, and describes your academic background, GPA, course work, academic honors or awards, and any relevant research or work experience.
- Two reference letters. Letters should address your academic abilities, accomplishments, work habits, potential as a researcher, and ability to participate in and benefit from an internship program in air quality science. Recommendations generally come from your professors or supervisors. Please include your reference letters with your application.

About LADCO:

LADCO is an air quality research and planning organization located in Chicago. We work with state, local, and tribal air agencies in the Great Lakes region to fulfill their commitments under federal clean air regulations to improve air quality in the region. The LADCO region includes Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

LADCO provides equal employment opportunities to all employees and applicants for employment and prohibits discrimination and harassment of any type without regard to race, color, religion, age, sex, national origin, disability status, genetics, protected veteran status, sexual orientation, gender identity or expression, or any other characteristic protected by federal, state, or local laws.