



Environmental and Human Health

Environmental Context—The air we breathe, the food we eat, and the water we drink contribute to our health. While our environment provides health-enhancing recreational and economic benefits, public health problems caused by environmental contamination and emerging infectious diseases are growing concerns. These potential threats to public health are affected by the dynamic relationship between humans and the physical, chemical, and biological components of ecosystems. Many of the traditional pollutants known to affect human health have come under regulatory control; however, emerging issues about environmental exposure and effects on health are understood poorly. Primary examples of this include pharmaceuticals in the environment, the role of climate change in pollutant fate and transport, health effects of nanomaterials, and exposure to indoor and outdoor air pollutants.

Resources and Instrumentation—CESE has extensive analytical expertise and advanced instrumentation in the quantification of environmental pollutants, both organic and inorganic, in a variety of matrices including air, water, soils, and biological tissues.

Instrumentation includes:

- Ultra performance liquid chromatograph/tandem mass spectrometer (UPLC/MS/MS)
- Ultra high-performance liquid chromatograph - time-of-flight high resolution mass spectrometer (UHPLC-QToF).
- UPLC with evaporative light scattering and photo diode array detectors
- Gas chromatograph/mass spectrometer (GC/MS)
- Inductively coupled plasma/mass spectrometer (ICP/MS)



Research Capabilities—CESE has considerable capacity to support a diversity of research projects related to environmental and human health by providing a quantitative assessment of a wide array of compounds including pharmaceuticals, heavy metals, per and polyfluoroalkyl substances (PFAS's), brominated fire retardants, and persistent organic pollutants.

Examples of projects that CESE can support include:

- Assessment of environmental estrogens, pharmaceuticals, and personal care products in surface, storm, and wastewater.
- Analysis of heavy metals, including total mercury, in fish and other biota.
- Role of climate change in the transport and exposure of persistent pollutants from landfills.
- Human and ecological risk assessment through the quantification of PFAS and other emerging organic contaminants in biological tissues and the environment.
- Detection and quantitation of marine algal toxins in fish, shellfish, and marine mammals.
- Characterization of bioactive phytochemical compounds and natural products.