# Christopher M. Long, Sc.D., DABT

## Principal Scientist, Air Quality & Environmental Health

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Dr. Long is an expert in the area of exposure and risk assessment, with particular expertise in indoor and outdoor air pollution, inhalation toxicology, air pollution epidemiology, air sampling and measurement, and air modeling. He has assessed exposures and health risks associated with airborne particulates such as diesel exhaust particulates, carbon black, coal ash, ambient sulfates and nitrates, asbestos, ambient ultrafines, engineered nanoparticles, metals (*e.g.,* hexavalent chromium, lead, arsenic), and bioaerosols, as well as with numerous gaseous criteria and hazardous air pollutants. Dr. Long's practice area includes evaluating product safety, with specific expertise in airborne exposures and electric and magnetic fields (EMF).

Dr. Long has published approximately 30 journal articles and book chapters in the general areas of indoor and outdoor air pollution and exposure assessment. He is a member of the International Society of Exposure Science, the Air and Waste Management Association, and the American Chemical Society.

## Representative Projects

**Air Toxics Health Risk Characterization**: At the request of the New Mexico Environment Department (NMED), prepared a community acute health risk assessment associated with inhalation exposures to over 80 air toxics using air monitoring and modeling data.

**Air Quality Impacts at a Confined Animal Feeding Operation (CAFO)**: Conducted air sampling and performed air dispersion modeling analysis to characterize the air quality impacts of hydrogen sulfide ($H_2S$) gas emissions at a large Midwestern hog farm.

**Analysis of Air Quality Data and Public Health Studies Relevant to Marcellus Shale Development**: Prepared a report providing an overview of the current science bearing on the potential community-level air quality impacts and public health risks associated with natural gas development activities in the Marcellus Shale region. Served as public health expert at local municipal hearings.

**Commercial Printer Product Safety Evaluation**: Designed a comprehensive measurement program to assess potential exposures associated with the use of a commercially available printer. Assessed toxicological significance of indoor air and surface wipe measurements.

**Transmission Line Electric and Magnetic Field (EMF) Assessments**: Conducted modeling analyses of the EMF impacts of a variety of transmission line projects, involving both overhead and underground lines. Performed magnetic field monitoring studies. Served as EMF expert at regulatory hearings, open houses, and public meetings.

**Human Health Risk Assessment for a Biomass-burning Power Plant**: Prepared a human health risk assessment to support the permitting process for a biomass burning power plant. Assessed potential cancer and non-cancer risks from inhalation of criteria air pollutants and air toxics in stack and fugitive emissions from the plant and also evaluated potential health risks associated with mercury deposition and accumulation in fish.

## Areas of Expertise

- Inhalation Risk Assessment
- Exposure Assessment
- Indoor/Outdoor Air Pollution
- Air Sampling, Measurement, & Modeling
- Nanotechnology
- Electric and Magnetic Fields (EMF)

## Education

Sc.D., Environmental Health, Harvard School of Public Health

M.S., Environmental Engineering, Massachusetts Institute of Technology

A.B., Chemistry and Environmental Studies, Bowdoin College

Diplomate, American Board of Toxicology

## Selected Publications

**Long, CM;** Briggs, NL; Bamgbose, IA. 2019. "Synthesis and health-based evaluation of ambient air monitoring data for the Marcellus Shale region." *J Air Waste Manag Assoc.* 69(5):527-547. doi: 10.1080/10962247.2019.1572551.

**Long, CM**; Valberg, PA. 2019. "Low-frequency magnetic fields: Potential environmental health impacts." In *Encyclopedia of Environmental Health*, 2nd Edition, Vol. 3. (Ed.: Nriagu, JO), Elsevier, Burlington.

Briggs, NL; **Long, CM**. 2016. "Critical review of black carbon and elemental carbon source apportionment in Europe and the United States." *Atmos. Environ.* 144:409-427 doi:10.1016/j.atmosenv.2016.09.002.

**Long, CM**; Nascarella, MA; Valberg, PA. 2013. "Carbon black versus black carbon and other airborne materials containing elemental carbon: Physical and chemical distinctions." *Environ. Pollut.* 181:271-86.

Hesterberg, TW; **Long, CM**; Bunn, WB; Lapin, CA; McClellan, RO; Valberg, PA. 2012. "Health effects research and regulation of diesel exhaust: An historical overview focused on lung cancer risk." *Inhal. Toxicol.* 24(S1):1-45.