Amy L. Dale, Ph.D.

Senior Environmental Engineer

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Dr. Dale is an environmental engineer with expertise in contaminant fate and transport, integrated assessment, and numerical modeling of environmental systems. At Gradient, she applies her expertise to a range of projects including environmental cost allocation, risk assessment, site characterization and remediation, and litigation support. Prior to joining Gradient, Dr. Dale was a Postdoctoral Associate at MIT, where she developed and integrated agricultural, hydrological, and water resource management models in order to predict the 21st century impacts of climate change on food and water security across Africa. As a doctoral student, she became a leading expert in the design of contaminant fate models for engineered nanomaterials, an emerging class of environmental contaminants. She has teaching experience in environmental organic chemistry and quantitative policy analysis. She has co-authored nine peer-reviewed publications, including an invited feature article on nanomaterial fate modeling in Environmental Science & Technology.

Representative Projects

Water Quality Modeling: Developed a water quality model in order to assess the risk of bacterial outbreaks and inform the safe design of a swimming pool filled with treated water from the East River tidal strait in New York City.

Environmental Modeling: Aided in development of a transient, spatially resolved simulation of groundwater recharge at a former manufacturing facility in New York State contaminated with chlorinated solvents. Led model documentation efforts. Critically evaluated models of the site developed by non-Gradient scientists.

Source Allocation Assessment: Estimated the contribution of multiple sources of polychlorinated biphenyls to contamination in a northwestern US watershed. Reviewed historical documents to re-construct the history of contaminant use and disposal at multiple sites.

Site Assessment: Performed site assessment and provided modeling support for an analysis of coal ash impoundments at 15 current and former coal-fired power plants. This work was undertaken as part of an insurance cost recovery case motivated by recent legislation at the state and federal levels.

Computational Fluid Dynamics: Developed and analyzed computational fluid dynamics models in order to assess the flammability risk associated with new refrigerant blends.

Forensic Analysis: Performed forensic analysis of sample data collected at a Superfund site contaminated by dense non-aqueous phase liquids as part of an environmental liability assessment.

Modeling Support: Analyzed results from a groundwater model to determine flow rates in a disputed aquifer as part of a water rights case.

Principal Component Analysis: Performed principal component analysis on sample data collected at a former manufactured gas plant as part of an insurance cost recovery effort.

Areas of Expertise

- Contaminant Fate and Transport
- Numerical Modeling
- Computational Fluid Dynamics
- Risk Assessment
- Quantitative Policy Analysis
- Climate Impact Assessment
- Nanomaterials

Education

Ph.D., Engineering & Public Policy/Civil & Environmental Engineering, Carnegie Mellon University

M.S., Civil & Environmental Engineering, Carnegie Mellon University

B.S., Bioinformatics, University of Pittsburgh

Selected Publications

Dale, A; Boehlert, B; Reisenauer, M; Strzepek, K; Solomon, S. Forthcoming. "Climate change at the food-water nexus in Africa: Crop production and water for irrigation."

Dale, A; Fant, C; Strzepek, K; Lickley, M; Solomon, S. 2017. "Climate model uncertainty in impact assessments for agriculture: A multi-ensemble case study on maize in sub-Saharan Africa." *Earth's Future.* 5:337-353.

Dale, A; Lowry, G; Casman, E. 2015. "Stream dynamics and chemical transformations control the environmental fate of silver and zinc oxide nanoparticles in a watershed-scale model." *Environ. Sci. & Tech.* 49:7285-7293.

Dale, A; Lowry, G; Casman, E. 2015. "Much ado about α: reframing the debate over appropriate fate descriptors in nanoparticle environmental risk modeling." *Environ. Sci: Nano.* 2:27-32.

Dale, A; Casman, E; Lowry, G; Lead, J; Viparelli, E; Baalousha, M. 2015. "Modeling nanomaterial environmental fate in aquatic systems." *Environ. Sci. & Tech.* 49:2587-2593.