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(she/her)

## Patricia M. Clyde, Ph.D.

### Senior Environmental Chemist

Dr. Clyde is an environmental chemist specializing in contaminant fate and transport, environmental forensics, read-across assessment, and wastewater treatment. At Gradient, she provides chemistry expertise on a range of projects, involving cost allocation, source identification, remedy evaluation, and contaminant modeling. She also advises on the use of appropriate chemicals for toxicological read-across analyses to support consumer product safety assessments. Before joining Gradient, Dr. Clyde received her Ph.D. in Marine and Atmospheric Science from Stony Brook University, where she authored a dissertation on the fate and transport of pharmaceuticals and personal care products in on-site wastewater treatment systems. She also has experience working with quaternary ammonium compounds as tracers to assess the effects of extreme weather events on sewage distributions in coastal embayments.

### Areas of Expertise

- Contaminant Fate & Transport
- Environmental Forensic Chemistry
- Analytical Chemistry
- Wastewater Treatment
- Read-Across Assessment

### Education

- Ph.D., Marine and Atmospheric Science, Stony Brook University
- B.S., Chemistry, and B.A., Mathematics, Bucknell University

### Selected Projects

**Contaminant Evaluation at a Superfund Site:** Evaluated the nature and distribution of contaminants near multiple properties at a complex sediment Superfund site. Used spatial distribution analyses, chemical fingerprints, and historical records to connect remedy-driving chemicals with potential upland sources in support of equitable cost allocation.

**Fate and Transport Assessment:** Evaluated the fate and transport of 1,4-dioxane on Long Island and the potential contribution of 1,4-dioxane from private septic systems to public water supply wells in Suffolk County.

**Toxic Substances Control Act (TSCA) Chemical Analysis:** Coordinated analytical laboratory testing of representative chemicals within a TSCA new chemical category. Assisted with the interpretation of the test results and related communications with US EPA.

**Statistical Assessment of Tetrachloroethylene (PCE) in Groundwater:** Provided technical and strategic support to a potentially responsible party group at a Superfund site to address a PCE plume in groundwater. Statistically assessed PCE plume stability and trend analyses as part of a proposed amendment to the remedial approach (*i.e.*, from active pump-and-treat to monitored natural attenuation).

**Contaminated Sediments Evaluation:** Updated an existing polycyclic aromatic hydrocarbon (PAH) forensics allocation model for contaminated sediments in an urban waterway.

**Consumer Product Safety Chemical Analysis:** Applied read-across, structure-activity relationship (SAR) models, and other chemistry-related tools to ensure consumer product safety and reduce reliance on animal testing. Authored reports supporting the use of read-across chemical analogs to predict the physiological behavior of chemicals that lack readily available toxicity data.

### Selected Publications and Presentations

**Clyde, P;** Smolinski, R; Price, R; Venkatesan, A; Brownawell, B. 2022. "Evaluating the Effects of Antibiotics on the Biological Transformation of Nitrogen and PPCP Removal from On-site Wastewater in Nitrifying Sand Columns." Presented at SETAC North America 43rd Annual Meeting 2022, Pittsburgh, PA, November 15.

**Clyde, P;** Chinniah, A; Kneeland, J. 2022. "Read-Across: A Promising Tool for Predicting Removal of Chemicals of Emerging Concern From Wastewater." Poster presented at SETAC North America 43rd Annual Meeting 2022, Pittsburgh, PA, November 15.

**Clyde, P;** Lee, C; Price, R; Venkatesan, A; Brownawell, B. 2021. "Occurrence and removal of PPCPs from on-site wastewater using nitrogen removing biofilters." *Water Res.* 206:117743.

Gobler, C; Waugh, S; Asto, C; **Clyde, P;** Nyer, S; Graffam, M; Brownawell, B; Venkatesan, A; Goleski, J; Price, R; Mao, X; Russo, F; Heufelder, G; Walker, H. 2021. "Removing 80%-90% of nitrogen and organic contaminants with three distinct passive, lignocellulose-based on-site septic systems receiving municipal and residential wastewater." *Ecol. Eng.* 161:106157.