

# Source and Fate of Microplastics Fibers in The Ocean A Case of Study in Newtown Creek and Flushing Bay

Mariela Carrera<sup>1</sup>, Emmerline Ragoonath-De Mattos<sup>2</sup>, Joaquim I. Goes<sup>3</sup>, Beizhan Yan<sup>3</sup>

*<sup>1</sup>Hudson County Community College, <sup>2</sup>Kingsborough Community College, <sup>3</sup>Lamont-Doherty Earth Observatory of Columbia University*

Several studies have confirmed the ubiquitous presence of microplastics in the marine environments and in marine animals at different trophic levels. Understanding how they reach the ocean is crucial for adopting sustainable policies that help mitigate their spread and arrest their detrimental impacts on aquatic ecosystems. Wastewater treatment plants are considered a potential pathway of microplastics into the aquatic environment. In this study, we attempted to quantify synthetic microfiber loss during domestic washing. Additionally, we examined the presence of microfibers in water and sediments samples from Newtown Creek and Flushing Bay, because these water bodies receive wastewater from treatment plants that cater to highly urbanized locations of New York City. Fabrics with different percentages and types of polymers were washed with and without detergent. In both variants, Tencel an organic fabric had the biggest mass loss. In addition, clothes shed 50 to 90% more fibers when detergent was used. Likewise, during the drying cycle, fiber loss increased up to 35 times more than the loss during the washing process alone, especially in mixtures containing nylon. Finally, microplastics comprising of fragments, beads, and fibers ranging from 0.05 mm to 3.5 mm that were encountered were quantified and characterized in the creek and bay water and sediment samples to assess their distribution and fate in the aquatic environment.