2011 Clarke Prize Laureate

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Dr. Mark Wiesner was among the first American scientists to research the application of low-pressure membranes to water treatment. He initiated research on the factors controlling membrane performance, and proposed using coagulants as a pretreatment to remove organic matter and prevent membrane fouling. Later, he and his students developed cost models that predicted the circumstances in which membrane filtration would be cost-competitive with conventional water treatment. He also edited and co-authored the very first membrane process book for environmental engineers, *Water Treatment Membrane Processes*.

His efforts to improve the performance of water treatment membranes led him to a new area of research: investigating the uses of technology at the molecular level ("nanotechnology"). Initially working in the area of applications of nanochemistry to membrane science, he also explored the use of nanomaterials for environmental remediation, as advanced sorbents in water treatment, and as "smart" disinfectants that inactivate viruses without creating harmful byproducts. His work in developing nanomaterial-based technologies for water treatment led him to consider the possible detrimental effects that these materials might have on human health and the environment.

Since the late 1990s, Wiesner has taken the lead in studying the fabrication, transport, fate, toxicity, and risk of nanoparticles in the environment. He co-edited the textbook, *Environmental Nanotechnology*, in 2007, and currently serves on a National Research Council committee to develop a research strategy for environmental, health, and safety aspects of engineered nanomaterials. One of his major accomplishments was the creation of the Center for the Environmental Implications of NanoTechnology (CEINT) at Duke University, where he serves as Director. A multidisciplinary research effort supported by the National Science Foundation and U.S. Environmental Protection Agency, CEINT is focused on understanding nanomaterial behavior from the nano-scale to the ecosystem-scale and identifying possible risks to human health and the environment.

These achievements, among others, have earned Wiesner recognition as the leading researcher in water treatment and environmental nanotechnology.