



Stockholm Junior Water Prize Winners Propose Novel Approach to Expanding Safe Water Resources

By Joan B. Rose, Ph.D.

Striving for a better world by 2030, countries around the globe are beginning to incorporate the new, ambitious [UN Sustainable Development Goals](#) into their national agendas. Among the 17 bold goals, which include ending poverty and hunger, is the [goal of universal access to safe drinking water and sanitation](#). This goal was front and center at last week's Stockholm International Water Institute's (SIWI) [World Water Week](#) meeting, the world's biggest annual global meeting focused on water and development. SIWI Executive Director, Torgny Holmgren [noted](#), "... it is here that we come together and make sure that the very best ideas are brought forward".

One of those ideas originated with two Long Island, New York, high school students, earning them the 2017 Stockholm Junior Water Prize.

Rapid Contaminant Detection and Water Purification

Manhasset High School students Ryan Thorpe and Rachel Chang [engineered a system that rapidly and cost-effectively detects bacteria in water and purifies the water](#). The students engineered graphene-based biosensors to detect minute levels of specific bacteria *in less than one second*, a great improvement over conventional methods, which can take one to two days. An added bonus: The biosensors can detect as few as one colony forming unit (CFU) of bacteria. Other rapid DNA detection methods often require 1,000 CFUs.

The water purification part of the system is achieved by injecting hydrogen peroxide and sodium hydroxide into contaminated water. These chemicals react to produce *hydroxyl free radicals*, short-lived, highly reactive chemical species composed of oxygen and hydrogen. Hydroxyl free radicals eliminate organic matter (e.g., bacteria) in the water, producing carbon dioxide and water.



New York high school students Ryan Thorpe and Rachel Chang, receive the 2017 Stockholm Junior Water Prize from H.R.H. Crown Princess Victoria of Sweden in Stockholm

Photo credit: The Stockholm International Water Institute

Reducing the Global Threat of Waterborne Pathogens

Ryan and Rachel report that their system has the potential to rapidly detect and destroy drinking water pathogens, including *E. coli*, *Shigella*, *Salmonella* and *Cholera*. They consider their results to be “fundamental to the advancement of water sanitation throughout the world, in the developing and developed world alike,” and even applicable to industrial settings. I agree with and congratulate these highly impressive and articulate young people. The creative energy with which they have tackled a significant global challenge is exactly what the world community needs to get us to a better world for all.

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